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# International Gastric Cancer Congress

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# IGCC 2022 ABSTRACT BOOK

## Genetics and translational research

IGCC22-ABS-1154

### CPEB3 SUPPRESSES GASTRIC CANCER PROGRESSION BY INHIBITING ADAR1-MEDIATED A-TO-I RNA EDITING

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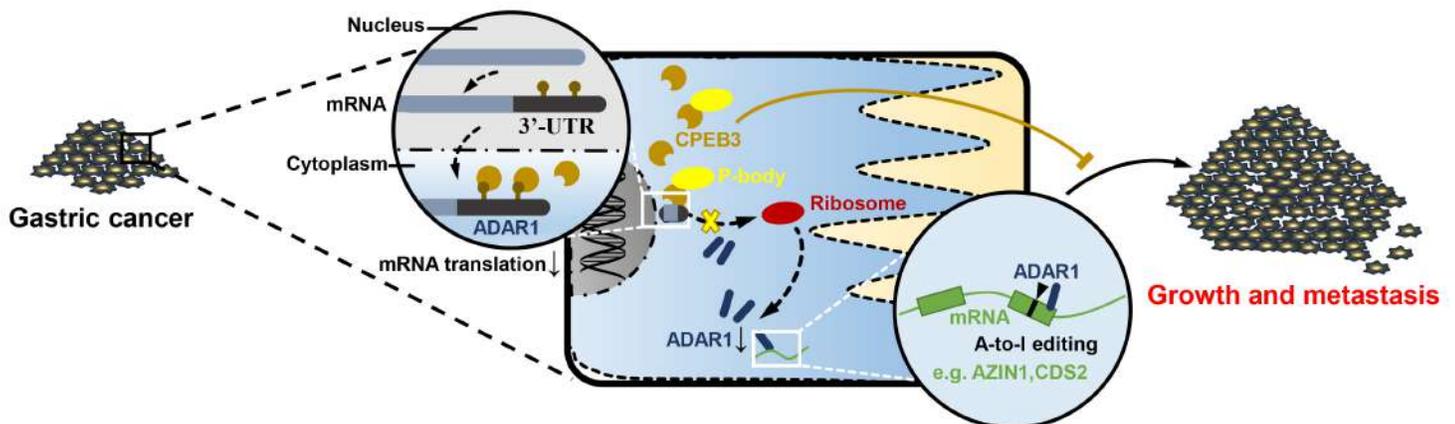
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**Objectives:** Deciphering the crosstalk between RNA-binding proteins and corresponding RNA targets will provide a better understanding of cancer biology and potentially uncover novel targets for gastric cancer (GC) therapy.

**Methods:** The comprehensive bioinformatics study identified Cytoplasmic Polyadenylation Element-Binding protein 3 (CPEB3) might play a vital role in GC progression. The expression level of CPEB3 and its prognostic prediction value were analyzed. The effect of CPEB3 on GC progression was detected *in vitro* and *in vivo*. RIP-seq, dual-luciferase reporter assay and RNA editing detection was performed in indicated cells. Immunofluorescence co-localization analysis, co-immunoprecipitation, surface plasmon resonance and microscale thermophoresis were used to validate the binding of CPEB3 to P bodies.

**Results:** We found CPEB3 was frequently down-regulated in human GC cells and tissues. Then our cohort study demonstrated CPEB3 low-expression was correlated with aggressive clinicopathological features and poor clinical outcome of GC patients. In addition, CPEB3 suppressed GC cell proliferation, invasion and migration *in vitro* and tumor growth and metastasis *in vivo*. Mechanism study demonstrated CPEB3 could directly bind to 3'-UTR of ADAR1 mRNA. CPEB3 inhibited translation of ADAR1 mRNA by localizing them to P bodies. CPEB3 exerted its function by suppressing ADAR1-mediated A-to-I RNA editing. Last, AAV9-CPEB3 was administrated in GC subcutaneous tumor model, Xenograft lung metastasis model and Patient-Derived Xenograft model mice to assess its potential value of applications in targeted therapy. We found AAV9-CPEB3 inhibited GC growth and metastasis. Besides, we monitored the liver and kidney function of mice. It demonstrated AAV9-CPEB3 would cause hydropic degeneration in liver, but would not cause kidney damage.

**Image:**



**Conclusions:** Our study demonstrated CPEB3 suppressed GC progression by inhibiting ADAR1-mediated RNA editing via localizing ADAR1 mRNA to P bodies.

**Genetics and translational research**

IGCC22-ABS-1263

**A TALE OF TWO GASTRIC CANCERS: MICROSATELLITE INSTABILITY-HIGH VS. DIFFUSE GASTRIC CANCER**

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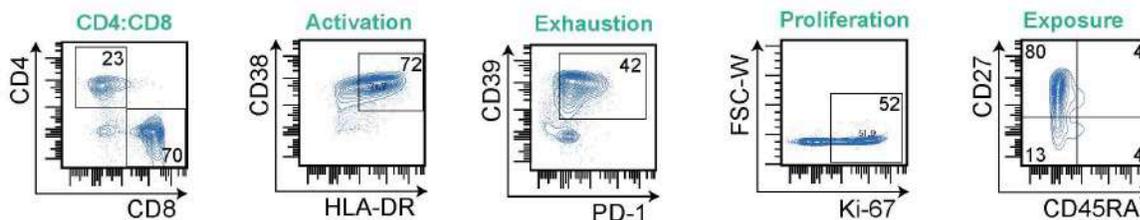
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**Objectives:** The landscape of gastric cancer has changed remarkably since the discovery of subtypes that are more immunogenic and respond well to immunotherapy. Of the subtypes characterized by the Cancer Genome Atlas project, microsatellite instability-high (MSI-high) tumors exhibit immunogenicity with significant responses to immunotherapy. In contrast, diffuse gastric cancer types are thought to be immune silent and better treatment strategies are desperately needed. The goal of this study was to determine whether primary MSI-high and diffuse gastric cancers display distinct immunological profiles in order to identify targetable alterations in their immune landscapes.

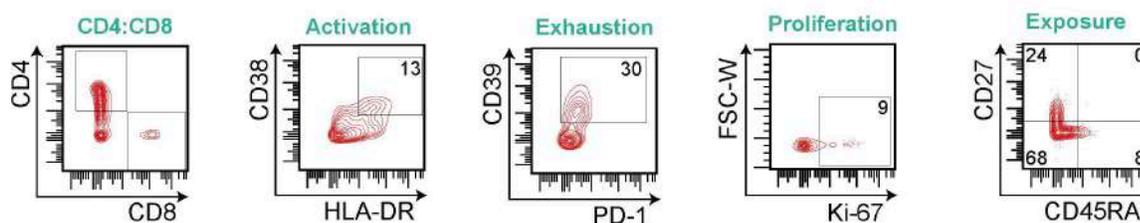
**Methods:** 15 fresh gastric tumor samples with matched normal tissue and lymph nodes were obtained for high-resolution flow cytometry. Multi-parametric immune phenotyping of single-cell suspensions was performed using distinct myeloid and T-cell antibody panels. The total number of viable CD4 and CD8 cells, and markers for T-cell activation (HLA-DR/CD38-high), exhaustion (PD-1/CD39-high), proliferation (Ki-67-high), and antigen exposure (CD27/CD45RA-low) were determined.

**Results:** MSI-High tumors showed CD8-dominant T-cell infiltrate that had robust expression of activation, exhaustion, and proliferation markers (Figure 1A). Diffuse cancers showed a CD4-dominant T-cell infiltrate, with reduced expression of activation, exhaustion, and proliferation markers despite equivalent rates of antigen exposure (Figure 1B).

**Image:**



A. MSI-High gastric cancer



B. Diffuse type gastric cancer

**Figure 1.** High-resolution flow cytometry of MSI-High (A) and diffuse gastric cancer tumors (B) with immune phenotyping of CD4:CD8, activation, exhaustion, proliferation, and antigen exposure markers.

**Conclusions:** Compared to MSI-high gastric tumors, which showed a classic immune checkpoint blockade (ICB) responsive signature, diffuse cancers display a pattern of immunosuppression that appears independent of classical exhaustion pathways. However, the presence of a rich immune infiltrate within diffuse tumors suggests that identifying unique mechanisms of immune suppression may enable novel approaches to enhance anti-tumor immunity in ICB-non-responsive gastric tumor subtypes.

**Genetics and translational research**

IGCC22-ABS-1363

**NEAR-INFRARED FLUORESCENCE IMAGING FOR VISUALIZATION OF HER2-OVEREXPRESSED GASTRIC CANCER**

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**Objectives:** HER2 is highly overexpressed in many kinds of cancers with a poor prognosis. Recently, near-infrared (NIR) fluorescence-based imaging is a growing field for both pre-clinical and clinical application. In this study, we aimed to synthesize Human Epidermal Receptor2 (HER2)-specific near-infrared (NIR) fluorescence probes and evaluate their applicability in cancer-specific image-guided surgeries using an animal model.

**Methods:** An NIR dye emitting light of 800 nm (IRDye800CW, Li-COR, USA) was conjugated to trastuzumab and HER2-specific affibody using click mechanism. HER2 affinity was assessed by the surface plasmon resonance technique. HER2 positive/negative gastric cancer cell lines (NCI-N87 and SNU-601) were subcutaneously implanted into female BALB/c-nu (6 to 8 weeks old) mice. The biodistribution and fluorescence signal intensity were measured by Lumina II (Perkin Elmer, MA, USA) and a laparoscopic NIR camera (InTheSmart, Seoul, Korea) after injecting the probes intravenously.

**Results:** Trastuzumab-IRDye800CW showed higher affinity to HER2 ( $K(D) = 2.093(3)\text{pM}$ ) than unconjugated trastuzumab ( $K(D) = 25.75\text{pM}$ ). The significant signal of fluorescence was targeted to the HER2-positive tumors at 24hr after injection, while no or low signal retention was observed in negative group. The peak appears at 24hr after injection. On the other hand, small difference of affinity was shown between HER2-target affibody-IRDye800CW ( $K(D) = 4.71\text{nM}$ ) and unlabeled pure affibody ( $K(D) = 1.42\text{nM}$ ). The renal clearance of HER2-target affibody conjugated with IRDye800CW was so fast that we could not detect the signal.

**Conclusions:** Our results suggest that trastuzumab conjugated with IRDye800CW can be a feasible tool to monitor HER2 status in pre-clinical cancer imaging. Moreover, this probe can provide complementary means for assessment of HER2 expression in gastric cancer patients and/or be used to further detection of HER2-positive lesions during image-guided surgery.

## ***Genetics and translational research***

IGCC22-ABS-1121

### **GENOTYPE-PHENOTYPE ASSOCIATIONS PROVIDE A RATIONAL TO IDENTIFY POTENTIALLY ACTIONABLE VUS**

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**Objectives:** Germline *CDH1* Pathogenic (P) and Likely Pathogenic (LP) variants are actionable variants in Hereditary Diffuse Gastric Cancer (HDGC), predisposing for diffuse gastric cancer (DGC) and lobular breast cancer (LBC). While asymptomatic P/LP variant-carriers undergo intensive stomach/breast surveillance and prophylactic surgery to avoid disease, the clinical management of carriers of *CDH1* variants of unknown significance (VUS) remains unsolved, which are mainly those carrying missense variants. Using genotype-phenotype analysis, we analyzed the *CDH1*-associated disease spectrum and age-of-disease onset to improve VUS classification.

**Methods:** Among European Reference Network ERN-GENTURIS collaborators from 10 European countries, we collected phenotypes from 854 families carrying *CDH1* germline variants. We classified all variants according to the *CDH1*-ACMG clinical classification.

**Results:** From 854 families, 194 carried truncating variants, from which 88% were P/LP and 12% were VUS, 71% fulfilling clinical criteria. Among 607 phenotypes from P/LP variants, DGC was the most prevalent phenotype (37%) followed by LBC (10%), both at an average age of onset <51. Families carrying truncating-P/LP (607 phenotypes), most truncating-VUS and a few missense-VUS (56 phenotypes) showed an equivalent phenotype distribution, suggesting a potentially clinical actionability for these VUS. In most families carrying missense-VUS (411 phenotypes), the phenotype distribution overlapped that of benign/likely benign carrier families, with <10% of phenotypes being DGC or LBC, suggesting these as non-actionable VUS.

**Conclusions:** Our study encloses the largest dataset of *CDH1* variant carriers ever studied for genotype-phenotype analysis and the first formally demonstrating potential differences in clinical actionability of *CDH1* VUS, supported by phenotypical presentations. These data open the discussion on the application of preventive/surveillance measures in ~5% of VUS-carriers.

**Genetics and translational research**

IGCC22-ABS-1078

**OPTIMIZATION OF A PATIENT-DERIVED XENOGRAFT GENERATION PROTOCOL FOR GASTRIC CANCER**

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**Objectives:** Patient-derived xenografts (PDXs) are established by engrafting human tumors into immunodeficient mice. However, the generation of PDXs may be hampered by the overgrowth of B cell lymphoma. The routine administration of prophylactic rituximab to recipient mice has been used to reduce lymphomatous overgrowth. In this study, we compared the use of mice with different degrees of immunodeficiency to establish PDXs.

**Methods:** Gastric cancer tissue was obtained by biopsy of the primary tumor, biopsy of a metastasis, or following surgical resection. 1-4 mm<sup>3</sup> of tissue was implanted into the flanks of immunocompromised NOD.Cg-Prkdc<sup>scid</sup>Il2rg<sup>tm1Wjl</sup>/SzJ (NSG) or *Foxn1<sup>nu</sup>* (nude) mice. Prophylactic rituximab was not administered. Engraftment was defined by growth to a diameter of at least 1.5 cm and growth after passage to a second recipient mouse. Tumors were analyzed via H&E and immunohistochemical staining and evaluated by a board-certified pathologist.

**Results:** PDX models were established from 25 unique patients. The overall engraftment rate was 16% (25/154). PDXs were successfully generated from tissue derived from biopsies of the primary tumor, metastases, and post-neoadjuvant therapy resection samples. Lauren intestinal-type tumors engrafted at a higher rate than diffuse-type tumors ( $p < 0.01$ ). Tumors implanted into nude (18%; 7/39) and NSG (16%; 18/115) mice had a similar engraftment rate. However, the rate of lymphoma in nude mice (0%; 0/39) was lower than in NSG mice (20%; 23/115;  $p = 0.001$ ). Transplant of a mixed gastric cancer-lymphoma PDX from an NSG to a nude mouse eradicated the lymphoma component.

**Conclusions:** Nude mice are a superior recipient than NSG mice for PDX generation. The use of prophylactic rituximab for lymphoma prevention is not necessary if nude mice are used as recipients.

## ***Genetics and translational research***

IGCC22-ABS-1106

### **FAM46C/TENT5C EXPRESSION PREDICTS POST-RESECTION SURVIVAL AND SUPPRESSES GASTRIC CANCER PROGRESSION**

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**Objectives:** The non-canonical RNA polymerase FAM46C has been identified as a tumor suppressor in multiple myeloma. Altered *FAM46C* expression has also been found in some epithelial cancers, including gastric adenocarcinoma (GC). Here we investigated the role of FAM46C in GC progression.

**Methods:** *FAM46C* mRNA expression was assessed via qPCR in tumor (T) and paired normal mucosa (NM) tissues of 158 consecutive patients who underwent curative-intent resection for GC (2001-2017). Disease-specific survival (DSS) was estimated by Kaplan-Meier and hazard ratios estimated with Fine-Gray. Effect of FAM46C depletion was examined in AGS GC cell migration (wound healing) and invasion (Transwell) assays. RNA-seq was performed to explore downstream signaling pathways.

**Results:** Median age of the study cohort was 70yr, with a median post-resection follow-up time of 31mo (IQR 12-73) and 3-yr DSS of 66%. *FAM46C* expression was reduced in T vs NM in 94% of cases. Retention of *FAM46C* expression (T/NM  $\geq$  median, n=79) was associated with superior 3-yr DSS (75% vs 57%, p=0.02). In multivariable analysis, loss of *FAM46C* independently predicted inferior DSS (HR 1.7, p<0.05). Supporting the hypothesis that FAM46C suppresses GC progression, *FAM46C* knockdown increased GC cell migration and invasion (p<0.05 vs control, n $\geq$ 3). RNA-seq on resected specimens revealed that ion-channel pathways were dysregulated in low-*FAM46C*, but not high-*FAM46C* tumors, suggesting a novel relationship between FAM46C and ion channels. Expression of *FAM46C* and *KCNQ1*, the main K<sup>+</sup> recycler in parietal cells, was correlated in patient samples and cells. FAM46C-depleted GC cells were more resistant to cytotoxicity of high K<sup>+</sup> media.

**Conclusions:** Retention of *FAM46C* expression in tumor tissue was associated with a better prognosis following curative-intent resection of GC. Taken together, our findings implicate FAM46C as a tumor suppressor in GC patients and cell lines. The role of KCNQ1 as a downstream mediator of FAM46C tumor suppressor activity is under investigation.

**Genetics and translational research**

IGCC22-ABS-1346

**DISSECTING PROTEASE-ACTIVATED RECEPTOR-1 IN SHAPING YAP ACTIVATION TO DRIVE GASTRIC TUMORIGENESIS**

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**Objectives:** The study aims to delineate the molecular mechanisms of protease-activated receptor 1 (PAR1) in gastric carcinogenesis through fast- and advanced- activation of YAP and appraisal its clinical significance in primary gastric cancer (GC) samples.

**Methods:** The expression and clinical significance of PAR1 in GC was investigated in cell lines and primary samples by qPCR, Western blot and immunohistochemistry on tissue microarray. siRNA-mediated knockdown was employed for confirming the functional role of PAR1. The PAR1 agonist Thrombin was employed to stimulate PAR1. The mRNA and protein expression of PAR1 downstream, YAP, was validated in different timepoints and dosages. RNA-seq was used to identify the key downstreams of PAR1 in gastric carcinogenesis. The specific small molecules targeting PAR1 and YAP were administrated to confirm the synergistic effects.

**Results:** PAR1 was highly expressed in GC cell lines and primary samples and its abundance was associated with an unfavorable outcome in GC patients. siRNA-mediated knockdown of PAR1 exerted anti-tumor effects both *in vitro* and *in vivo*. In Thrombin stimulation assays, two activation peaks were detected. In the "fast activation" (1-hour stimulation), PAR1 agonists dephosphorylates YAP and promotes its nuclear translocation. In the "advanced activation" (16-hour stimulation), both mRNA and protein levels of YAP were upregulated, suggesting YAP is transcriptionally activated. MAPK-CREB was confirmed to mediate the oncogenic transduction from PAR1 to YAP. CREB binds to YAP promoter and directly regulates its expression. In primary samples, PAR1 shows positive correlation with pCREB, YAP1 together with YAP signature. Co-targeting PAR1 and YAP by Vorapaxar and Verteporfin achieved a synergistic effect in "YAP-driven GC".

**Conclusions:** Our study not only demonstrates the clinical significance of PAR1 as a prognostic marker, but also provides therapeutic potential for targeting PAR1 in YAP-driven GCs.

***Genetics and translational research***

IGCC22-ABS-1365

**NEUTROPHIL AND NON-CLASSICAL MONOCYTE: POTENTIAL THERAPEUTIC TARGETS OF HER2-NEGATIVE GASTRIC CANCER**

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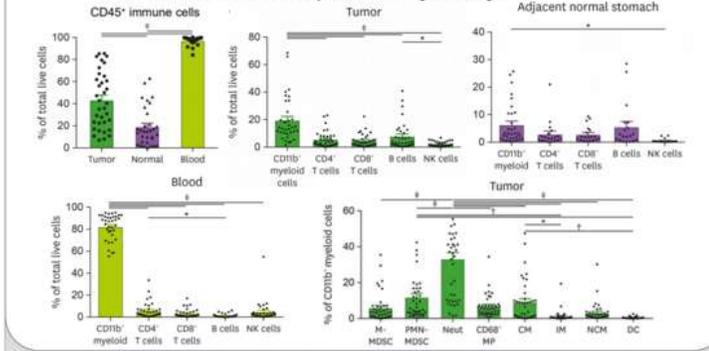
**Objectives:** Advanced gastric cancer (AGC) patients whose tumor cells express high levels of human epidermal growth factor receptor 2 (HER2) can now benefit from trastuzumab. However, patients with HER2<sup>negative</sup> AGC receive limited clinical benefit from this treatment. Based on strong demand for new therapeutic targets for HER2<sup>negative</sup> AGCs, we identified potential immune therapeutic targets in HER2<sup>negative</sup> AGCs with our multi-channel/multi-panel flow cytometry analysis.

**Methods:** GC tissues, adjacent normal stomach tissues, and blood were freshly obtained from 40 AGC patients who underwent surgical resection. Single-cell suspensions from the acquired tissues were stained with fluorescent-conjugated anti-human surface Abs following the manufacturer's protocols, and analyzed by LSRFortessa and FACSymphony A3.

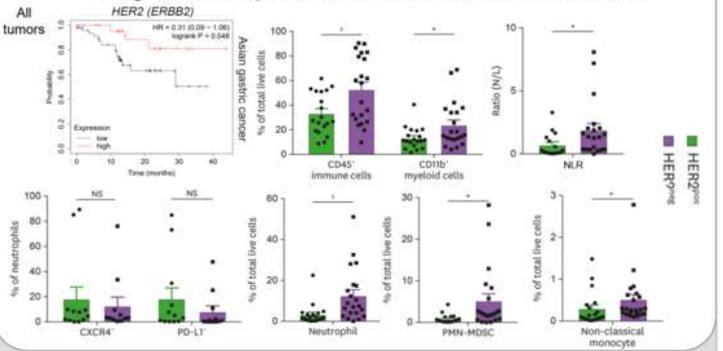
**Results:** To identify targetable populations for HER2<sup>negative</sup> AGC, we grouped the patients according to GC HER2 expression. In total, 19 and 21 of the patients had HER2<sup>positive</sup> and HER2<sup>negative</sup> AGCs, respectively. Our flow cytometry result showed that the HER2<sup>negative</sup> gastric tumors exhibited >3.8-fold and >1.7-fold greater infiltration of neutrophils and non-classical monocytes compared to the HER2<sup>positive</sup> tumors. The TCGA database revealed that high expression of the molecular signatures of neutrophils and non-classical monocytes in gastrointestinal tumors associates with poor overall survival (OS). Moreover, our flow cytometry analysis identified advanced cancer stage associates with significantly greater neutrophil and non-classical monocyte infiltration.

**Image:**

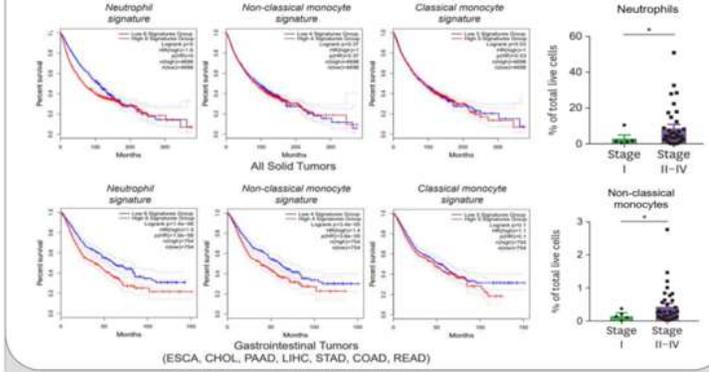
**Fig. 1 Immune profiles of AGC tumors, normal stomach tissues, and blood with multi-channel/multi-panel flow cytometry.**



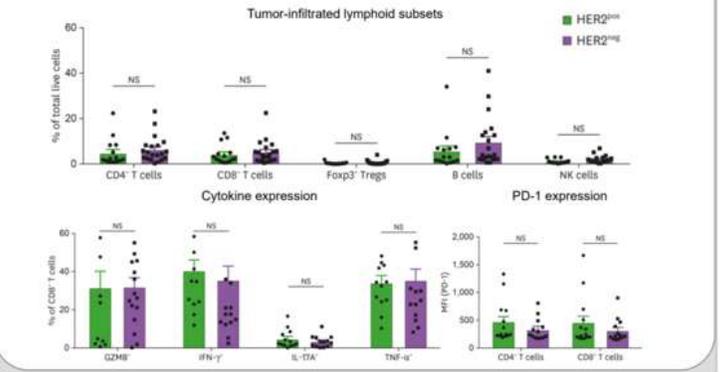
**Fig. 2 HER2<sup>negative</sup> AGCs associated with lower OS and greater neutrophil and non-classical monocyte infiltrations.**



**Fig. 3 High expression of neutrophil and non-classical monocyte signatures in gastrointestinal tumors associates with poor OS.**



**Fig. 4 Neutrophil and non-classical monocyte in HER2<sup>negative</sup> AGC do not affect lymphoid composition or function.**



**Conclusions:** We showed that high TME frequencies of neutrophils and non-classical monocytes associated with AGC progression and poor OS. Moreover, both of these 2 pro-tumoral myeloid subsets were more frequent in the TME of HER2<sup>negative</sup> AGC compared to HER2<sup>positive</sup> AGC. This strongly suggests that neutrophils and non-classical monocytes may be potential therapeutic targets for HER2<sup>negative</sup> AGC.

***Genetics and translational research***

IGCC22-ABS-1368

**DIFFERENTIAL RESPONSE TO IMMUNE CHECKPOINT INHIBITOR IN SYNGENEIC GASTRIC CANCER MOUSE MODELS**

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**Objectives:** The appropriate preclinical mouse models have been required to assess the response to immunotherapeutic agents. The immunocompetent mouse models have rarely been reported for gastric cancer (GC). We investigated the immunophenotypes and responses to immune checkpoint inhibitor in immunocompetent mouse models using various murine GC cell lines.

**Methods:** We constructed subcutaneous syngeneic tumors with murine GC cell lines, YTN3 and YTN16 in C57BL/6J mice. We also compared the expression of protein and RNA between YTN3 and YTN16 cell lines using mouse cytokine array and RNA-sequencing, respectively. And then the mice were treated with IgG isotype control or anti-PD-L1 antibody, intraperitoneally. Immunohistochemistry (IHC) was conducted to assess the tumor-infiltrated immune cells of formalin-fixed paraffin-embedded (FFPE) mouse tumor tissues.

**Results:** We confirmed the tumorigenesis by two kinds of murine GC cell lines. The IHC results for harvested tumors showed that YTN3 tumors had more infiltration of CD8-positive cytotoxic T cells and fewer myeloid-derived suppressor cells (MDSCs) compared to YTN16 tumors. The mouse cytokine array revealed that immune-suppressive cytokine-like CCL2, CCL5 and CXCL12, and M-CSF in the conditioned media of YTN16 were higher than YTN3. The transcriptomes for two cell lines showed that YTN3 cell lines were more immunogenic relative to YTN16. Anti-PD-L1 antibody significantly regressed YTN3 tumors, but not in YTN16. The IHC for post-treated specimens revealed that anti-PD-L1 treatment increased tumor-infiltrated CD8-positive cytotoxic T cells only in YTN3 tumors.

**Conclusions:** We confirmed the heterogeneous responses to immune checkpoint inhibitor among various GC syngeneic mouse models. The immunophenotype of syngeneic tumors can predict the response to immunotherapy. Those models can be used in preclinical research for the responsiveness of immunotherapy in GCs.

## ***Genetics and translational research***

IGCC22-ABS-1380

### **GENOMIC LANDSCAPE OF TARGETED DEEP SEQUENCING FOR ADVANCED GASTRIC CANCER PATIENTS: K-MASTER PROJECT**

Myong Han Hyun<sup>1</sup>, Ah Reum Lim<sup>1</sup>, Jwa Hoon Kim<sup>1</sup>, Ju Won Kim<sup>1</sup>, Yeul Hong Kim<sup>1</sup>

<sup>1</sup>Division of Oncology, Department of internal medicine, Korea University Medical Center, Seoul, Korea, Republic Of

**Objectives:** The gene mutation profiles of advanced gastric carcinoma (AGC) are incompletely understood in Asian population. The purpose of this study was to characterize the genomic landscape for AGC by targeted deep sequencing using multicenter next generation sequencing data (K-MASTER project).

**Methods:** From 2017 to 2021, a consecutive number of 790 patients with AGC were registered in K-MASTER project. Targeted sequencing was performed utilizing Cancer Scan panel and K-MASTER Cancer (v1.0 or v1.1) panel for tumor tissue. If tumor tissue was not available, liquid biopsy was performed using circulating cell-free DNA and targeted sequencing was conducted utilizing Axen Cancer panel.

#### **Results:**

Among 790 patients, 675 patients (85.4%) of tissue sample and 35 patients (14.6%) of cell-free DNA was evaluated. In total samples, TP53 (42%) mutation was the most frequent alteration found in non-MSI AGC. Additionally, we observed TGFBR2 (37%), BRD7 (36%), MSH3 (28%), NCOA3 (25%), ABL1 (25%), FAT3 (24%), ROS1 (22%), and ALK (21%) mutation were found as top 10 ranked mutation. Other potentially actionable mutation including BRCA2 (Rank 13, 20%), EGF(Rank 14, 20%), ERBB3 (Rank 17, 18%), CDH1 (Rank 18, 18%) were also identified. In tissue sample, the top 10 frequent mutated are as follows; TGFBR2 (44%), BRD7 (42%), TP53 (38%), MSH3 (33%), NCOA3 (30%), FAT3 (28%), FAT1 (24%), XPC (24%), EGF (23%), and KMT2D (22%). In comparison, the high prevalence of NOTCH1 (97%), followed by ABL1 (91%), ERBB3(86%), ALK (85%), MTOR (82%), EGFR (79%), NTRK1 (79%), AXL (78%), RET (77%), and FANCA (72%) were ranked as top 10 mutations in liquid biopsy samples.

#### **Conclusions:**

In the present study, we observed a high prevalence of TP53, TGFBR2, BRD7, MSH3, NCOA3 mutation. In addition, other potentially actionable target could be harbored in AGC Asian population. Future clinical trials in these patients should be anticipated to tailor the combination or sequential treatment strategies.

## Genetics and translational research

IGCC22-ABS-1437

### ESTABLISHMENT AND CHARACTERIZATION OF GASTROINTESTINAL STROMAL TUMOR(GIST) PDX MODELS.

Hyun Myong Kim<sup>1</sup>, Kyoungyun Jeong<sup>1</sup>, Jaeun Yoo<sup>1</sup>, Eunhee Koo<sup>1</sup>, Seong-Woo Bae<sup>1</sup>, Leena Lim<sup>1</sup>, Sara Kim<sup>2</sup>, Ji-Hyeon Park<sup>2</sup>, Do Joong Park<sup>1, 2</sup>, Hyuk-Joon Lee<sup>1, 2</sup>, Han-Kwang Yang<sup>1, 2</sup>, Seong-Ho Kong<sup>2</sup>

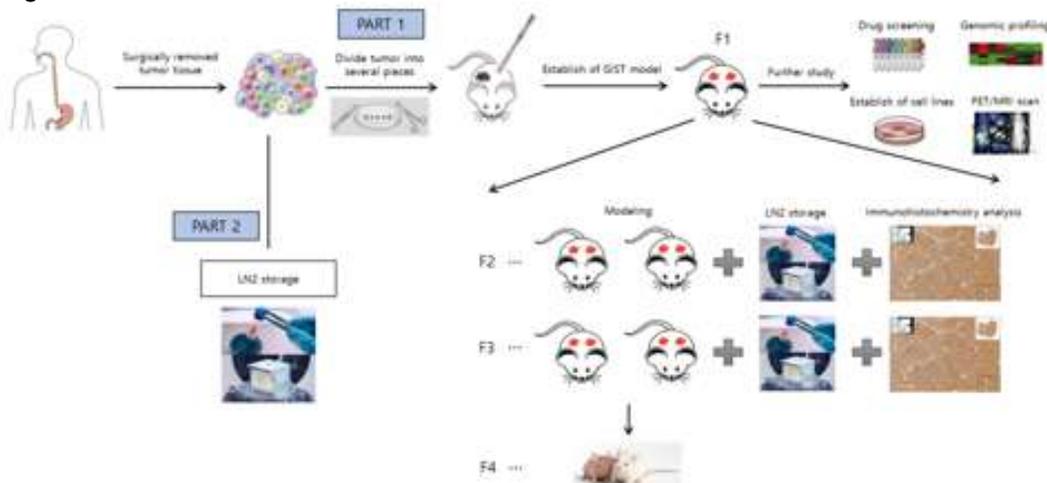
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**Objectives:** Gastrointestinal stromal tumors (GISTs) are the most common mesenchymal tumors of the gastrointestinal tract, which frequently express mutations in the c-KIT and PDGFRA genes. At present, there are few GIST models that exist for understanding GIST biology. Therefore, using GIST patients' tissues, we have been developing GIST models and investigating which biomarker is significant for the successful establishment of the models.

**Methods:** GIST tumor tissues were obtained from patients undergoing surgical resection of the primary tumor. Last two years we injected small pieces(2~3mm) to mice, but it failed. From this year, tumor tissues from GIST were cut into several pieces(5~10mm) with matrigel and subcutaneously inserted using trocar into the right flanks of NOD mice. GIST models were successfully developed in approximately 3~4 months. Based on pathologic characteristics, c-kit and FDGFR antibodies were used for all GIST tissues. Metastatic risk was classified as low, intermediate, or high by modified NIH classification.

**Results:** This year, nineteen GIST tissues were collected. Of these nineteen, seven samples successfully developed into GIST models; four of these models are currently in the F1 generation, two in the F2, and one is fully established in the F3 generation. Tissues resected from mice after each passage were analyzed by immunohistochemical staining for c-kit and PDGFR. All tissue samples showed c-kit and PDGFR positivity, with the exception of one case, which showed PDGFR expression but no c-kit. Also, some of those samples were originated from patients who underwent pre-operative neoadjuvant treatment of imatinib.

#### Image:



**Conclusions:** GIST PDX requires large amount of tumor tissues compared to gastric adenocarcinoma model. High risk factor is correlated with successful establishment despite its slow growth rate. Moving forward, in order to develop a more robust and accurate characterization, we need to establish more GIST models and further conduct genetic profiling and drug screening.

## ***Genetics and translational research***

IGCC22-ABS-1076

### **SOMATIC MUTATIONAL LANDSCAPE OF MEXICAN PATIENTS WITH GASTRIC ADENOCARCINOMA**

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<sup>1</sup>Subdirección de Investigación Básica, Instituto Nacional de Cancerología, <sup>2</sup>Departamento de Farmacología, Centro de Investigación y Estudios Avanzados del Instituto Politécnico Nacional (CINVESTAV, <sup>3</sup>Unidad de Biomedicina, Facultad de Estudios Superiores Iztacala, Universidad Nacional Autónoma de México, <sup>4</sup>Departamento de Informática Biomédica, Facultad de Medicina, Universidad Nacional Autónoma de México, Mexico City, Mexico, <sup>5</sup>Department of Environmental Health Science, Mailman School of Public Health, Columbia University, New York City, United States, <sup>6</sup>Servicio de Endoscopia, <sup>7</sup>Dirección de Investigación, Instituto Nacional de Cancerología, Mexico City, Mexico

**Objectives:** Early onset and high frequency of diffuse gastric adenocarcinoma (GA) have been reported in Hispanics and Mexican patients. We aim to elucidate the mutational landscape of GA from Mexican patients and explore its association with clinical-pathological features.

**Methods:** This is a cross-sectional study including 50 patients. Tumoral and adjacent samples were collected by endoscopy and prepared for exome sequencing. Somatic variants were compared with those reported by The Cancer Genome Atlas (TCGA) to identify differences. COSMIC database was used as reference to identify novel variants. Associations with clinical-pathological characteristics were evaluated.

**Results:** Patients had a mean age of  $54.84 \pm 15.49$  years. Diffuse GA was detected in 62%, intestinal GA in 32% of the samples. SRC were present in 68% and a poorly differentiated tumor grade in 84% of the samples. Sequencing was achieved with an average depth of 186.90x and coverage of 99.73%. *TP53* (35%), *TTN* (35%), *MUC19* (23%), *MUC6* (23%) and *CDH1* (21%) were the 5 most frequently mutated genes found. *MUC19*, a highly mutated gene in this cohort was not found in the TCGA study. One P53 (D208A), four E-cadherin (D257A, R619\*, N256K and E518K) and four ARID1B (-403-404GGG, GG404-405- P802\*, P1220PLX) variants were novel. The cytoband 14q32.33 was affected by gains and losses in 80% of the patients. Variants in *MUC19* ( $p=0.005$ ), *ADGRV1* ( $p=0.046$ ) and *SYNE1* ( $p=0.005$ ) were associated to the diffuse GA. Structural variations in cytobands 16q13.3 and 1q42.13 were associated with presence of SRC ( $p=0.025$ ), and disease onset > 45 years ( $p=0.001$ ), respectively.

**Image:**

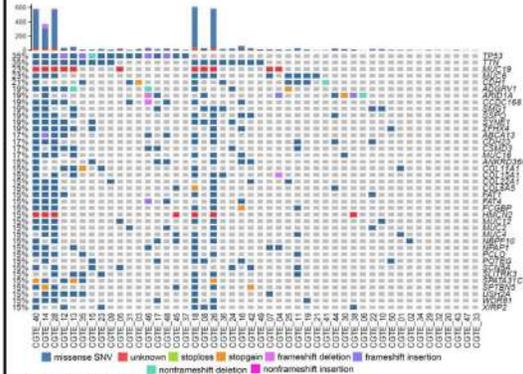
# Gastric adenocarcinoma mutational Landscape of Mexican patients

## A. Clinical-pathological characteristics

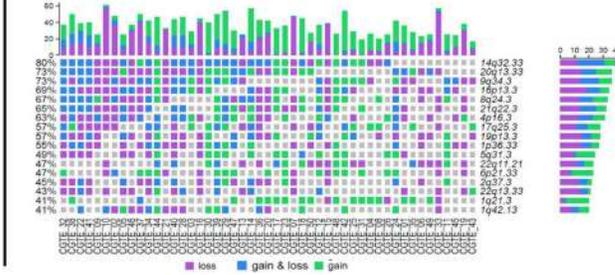
**Table 1. Clinical-pathological characteristics of the patients which samples were sequenced (n=50)**

Variable	Mean	SD
Age (years)	54.94	15.49
BMI (kg/m <sup>2</sup> )	23.60	5.18
Variable	N	%
Sex		
Male	29	58
Female	21	42
Clinical stage	n	%
I - II	3	6
III - IV	34	68
Not Reported	13	26
Tum or location		
Antrum and pylorus	11	22
Cardia	0	0
Fundus and body	18	36
Two or more locations	21	42
Lauren classification		
Intestinal	16	32
Diffuse	31	62
Mixed	3	6
Tum or grade		
Well differentiated	0	0
Moderately differentiated	8	16
Poorly differentiated	42	84
Signet-ring cell		
Present	34	68
Absent	16	32

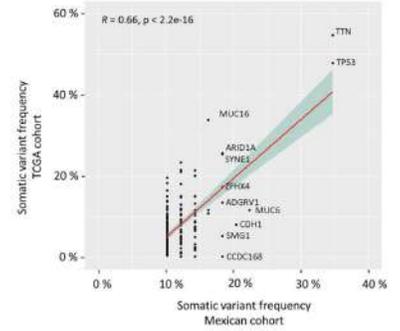
## B. Somatic variants



## C. Structural variants



## D. Somatic variants of Mexican cohort VS TCGA cohort



## E. Somatic variants exclusive of Mexican cohort

**Table 2. Mutated genes present only in the Mexican cohort**

Gene	Frequency
MUC19	22.45
SSPO	18.37
C5MD3	16.33
HMCN2	14.28
NBPF10	14.28
SPATA31C1	14.28
C10orf71	12.24
DNAH2	12.24
FSIP2	12.24
NACAD	12.24

**Conclusions:** We found a unique GA genomic landscape with novel somatic variants, and a distinctive structural variation pattern that could explain the early onset and high frequency of diffuse GA type reported for Mexican patients with GA. Our findings suggest novel biomarkers and potential therapeutic targets for GA patients of Mexican origins.

***Genetics and translational research***

IGCC22-ABS-1273

**ASTE1 FRAMESHIFT MUTATION TRIGGERS IMMUNE RESPONSE IN EPSTEIN-BARR VIRUS-ASSOCIATED GASTRIC CANCER**

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<sup>1</sup>Department of gastric surgery, Fudan University Shanghai Cancer Center, Shanghai, China

**Objectives:** Epstein-Barr virus-associated gastric cancer (EBVaGC) accounts for 10% of gastric cancers. The molecular heterogeneity within EBVaGC is unclear and the efficacy for immunotherapy is inconsistent. This study was aimed to explore immune subtypes and identify new indicators in EBVaGC and their predictive value of PD-1 inhibitor response.

**Methods:** Whole genome and transcriptome sequencing was performed in 50 patients with EBVaGC. We classified patients based on immune-related genes. The response to PD-1 inhibitor therapy was predicted according to our immune classification. Functional experiments were applied in EBV+AGS cell line.

**Results:** Among the 50 patients, 27 and 23 were identified as having the “immune-active” and “immune-inactive” subtypes, respectively. Mutation panel could predict effectively immune-active state (sensitivity=80.8%, specificity=65.2%). Moreover, the predicted response to PD-1 inhibitor therapy was confirmed in the NCT#02589496 study and the present study. Notably, mutations in ASTE1 were identified in 6 patients (12%), whose immune state was all activated. Of which, frameshift mutation R632Gfs\*33 occurred in 5 of 6 mutant cases. In cell line, knocking out ASTE1 would upregulate CXCL9 through NF- $\kappa$ B passway, thus stimulated CD8+T cell to secret IFN- $\gamma$ . Transfecting wild type ASTE1, rather than mutant ASTE1, could rescue the activation of immune response.

**Image:**



**Conclusions:** In conclusion, ASTE1 mutations, especially its frameshift mutation R632Gfs\*33 was identified for the first time in EBVaGC. It could be served as a novel predictive biomarker of active immune state and treatment efficacy of PD-1 inhibitor in clinical practice.

***Genetics and translational research***

IGCC22-ABS-1367

**COMPREHENSIVE MOLECULAR CHARACTERIZATION OF ADENOCARCINOMA OF THE GASTROESOPHAGEAL JUNCTION**

Yun-Suhk Suh<sup>1</sup>, Deukchae Na<sup>2</sup>, Ju-Seog Lee<sup>3</sup>, Jeosoo Chae<sup>4</sup>, EuiHyun Kim<sup>3</sup>, Giyong Jang<sup>2</sup>, Jimin Min<sup>5</sup>, Seong-Ho Kong<sup>1</sup>, Joshy George<sup>6</sup>, Chengsheng Zhang<sup>6</sup>, Hyuk-Joon Lee<sup>1</sup>, Jong-Il Kim<sup>4</sup>, Seong-Jin Kim<sup>7</sup>, Woo Ho Kim<sup>8</sup>, Charles Lee<sup>6</sup>, Han-Kwang Yang<sup>1</sup>

<sup>1</sup>Department of Surgery, Seoul National University Hospital, <sup>2</sup>Department of Life Science, Ewha Womans University, Seoul, Korea, Republic Of, <sup>3</sup>Department of Systems Biology, The University of Texas MD Anderson Cancer Center, Houston, United States, <sup>4</sup>Department of Biomedical Sciences, <sup>5</sup>Cancer Research Institute, Seoul National University College of Medicine, Seoul, Korea, Republic Of, <sup>6</sup>The Jackson Laboratory for Genomic Medicine, The Jackson Laboratory for Genomic Medicine, Farmington, United States, <sup>7</sup>Precision Medicine Research Center, Graduate School of Convergence Science and Technology, Seoul National University, Suwon, <sup>8</sup>Department of Pathology, Seoul National University College of Medicine, Seoul, Korea, Republic Of

**Objectives:** To investigate the molecular characteristics of adenocarcinoma of the gastroesophageal junction (AGEJ) compared with esophageal (EAC) and gastric adenocarcinomas (GC).

**Methods:** The molecular classification model with Bayesian compound covariate predictor (BCCP) was developed based on differential mRNA expression of EAC (N=78) and GC at the fundus or body (GCFB)(N=102) from the Cancer Genome Atlas (TCGA) cohort. AGEJ/cardia (N=48) in TCGA cohort and AGEJ/upper third GC (N=46 pairs) in Seoul National University (SNU) cohort were classified into the EAC-like or GCFB-like groups whose genomic, transcriptomic, and proteomic characteristics were compared.

**Results:** AGEJ in both cohorts was similarly classified as EAC-like (31.2%) or GCFB-like (68.8%) based on the 400-gene classifier. The GCFB-like group showed significantly activated PI3K-AKT signaling with decreased expression of ERBB2. The EAC-like group presented significantly different alternative splicing including the skipped exon of RPS24, a significantly higher copy number amplification including ERBB2 amplification, and increased protein expression of ERBB2 and EGFR compared with GCFB-like group. High-throughput 3D drug test using independent cell lines revealed that the EAC-like group showed a significantly better response to lapatinib than the GCFB-like group (P=0.015).

**Conclusions:** AGEJ was the combined entity of the EAC-like and GCFB-like groups with consistently different molecular characteristics in both SNU and TCGA cohorts. The EAC-like group with a high BCCP score could be effectively targeted by dual inhibition of ERBB2 and EGFR.

## Genetics and translational research

IGCC22-ABS-1231

### PREDICTIVE GENE SIGNATURE FOR FLUORODEOXYGLUCOSE AVIDITY IN GASTRIC CANCER

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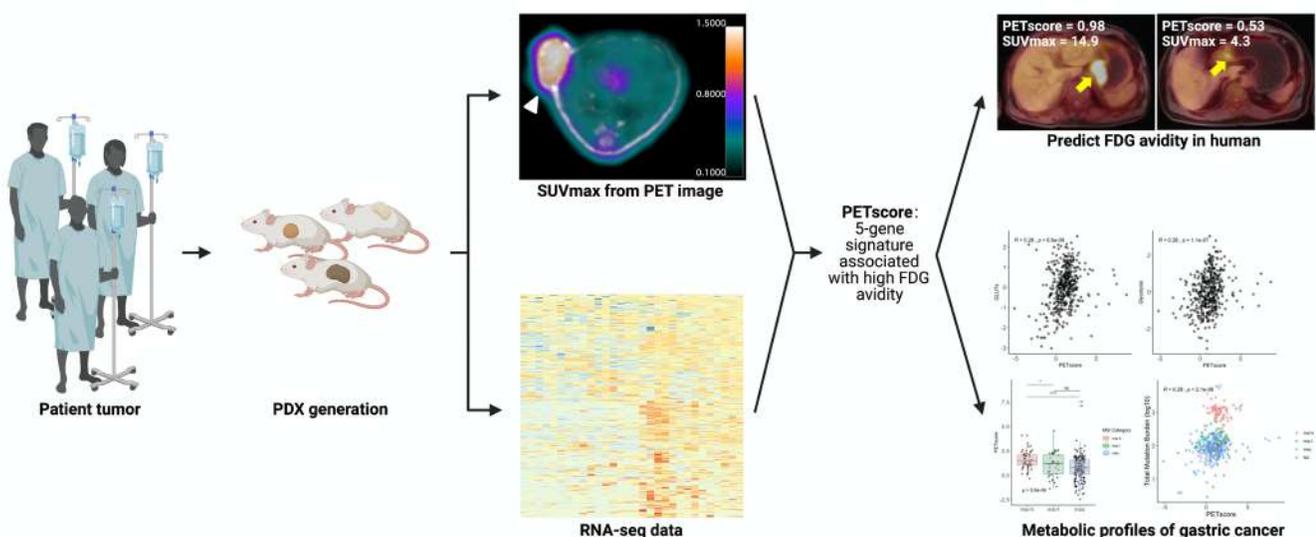
**Objectives:** Although FDG-PET is widely used in cancer, its role in gastric cancer (GC) is still controversial due to variable [<sup>18</sup>F]fluorodeoxyglucose ([<sup>18</sup>F]FDG) avidity. Here, we sought to develop a genetic signature to predict high FDG-avid GC to plan individualized PET and investigate the molecular landscape of GC and its association with glucose metabolic profiles noninvasively evaluated by [<sup>18</sup>F]FDG PET.

**Methods:** Based on a genetic signature, PETscore, representing [<sup>18</sup>F]FDG avidity, was developed by imaging data acquired from thirty patient-derived xenografts (PDX). The PETscore was validated by [<sup>18</sup>F]FDG PET data and gene expression data of human GC. The PETscore was associated with genomic and transcriptomic profiles of GC using The Cancer Genome Atlas.

**Results:** Five genes, *PLS1*, *PYY*, *HBQ1*, *SLC6A5*, *NAT16*, were identified for the predictive model for [<sup>18</sup>F]FDG uptake of GC. The PETscore was validated in independent PET data of human GC with qRT-PCR and RNA-sequencing. By applying PETscore on TCGA, a significant association between glucose uptake and tumor mutational burden as well as genomic alterations were identified.

**Image:**

### Graphical abstract



**Conclusions:** Our findings suggest that molecular characteristics are underlying the diverse metabolic profiles of GC. In addition, an individualized FDG-PET for evaluating disease status by applying our results of predicting metabolic features of GC could be proposed considering leading to a patient-tailored diagnostic and therapeutic approach.

**Genetics and translational research**

IGCC22-ABS-1330

**WHOLE TRANSCRIPTOME SEQUENCING STUDY OF LOCALLY ADVANCED GASTRIC CANCERS**

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<sup>1</sup>Department of Gastrointestinal Surgery, West China Hospital, Chengdu, China

**Objectives:** Next generation sequencing techniques can comprehensively understand the molecular characteristics of advanced gastric cancers.

**Methods:** We performed whole transcriptome sequencing (RNA-seq) on paired tumor and normal stomach tissues from 108 advanced gastric cancer patients. With an integrative analysis of RNA-seq, immune profile, and clinic-pathological characteristics, aim to dissect the molecular cluster phenotype, identifying prognostic prediction or precision treatment biomarkers.

**Results:** With the unsupervised clustering of DEGs, patients were divided into two cluster, and cluster one had significantly poor survival outcomes ( $P = 0.038$ ) and more advanced T stages ( $P = 0.045$ ). DEGs between clusters were enrichment in metastasis related pathways (EMT, TGF- $\beta$  and apical junction), proliferation related pathways (G2M, mitotic spindle) and immune related pathways (IFN- $\alpha$ , IFN- $\gamma$ ). The immune checkpoint *CD276* existed significantly different difference between clusters. Moreover, higher expression of a novel lncRNA *HOXC-AS2* was the top DElncRNA that can indicate a poor prognosis in our patients. Through over-expression or knockdown strategies, we found that *HOXC-AS2* can enhance the ability of migration but not proliferation of gastric cancer cells *in vitro* and *in vivo*. Mechanically, *HOXC-AS2* exerts its cellular functions dependent on the direct binding of YBX1. In this case, knockdown of *YBX1* and *HOXC-AS2* resulted in a consistent change in expression of several cancer-related genes and migration-related pathways. These findings demonstrated that *HOXC-AS2* may functionally involve in the metastasis of gastric cancer through interacting with YBX1.

**Conclusions:** Taken together, we have uncovered the gene expression profile of advanced gastric cancers and its molecular subtypes, which correlated with therapy response. Novel targets and immune checkpoint proteins have been identified with a potential to be translated into clinics.

## ***Genetics and translational research***

IGCC22-ABS-1290

### **MICROSATELLITE INSTABILITY AND SEX DIFFERENCES IN RESECTABLE GC – A EUROPEAN MULTICENTER STUDY**

Hedde D. Biesma<sup>1</sup>, Alexander Quaas<sup>2</sup>, Anna D. Wagner<sup>3</sup>, Marcel Verheij<sup>4</sup>, Mark I. van Berge Henegouwen<sup>5</sup>, Birgid Schoemig-Markiefka<sup>2</sup>, Aylin Pamuk<sup>6</sup>, Thomas Zander<sup>7</sup>, Janna Siemanowski<sup>2</sup>, Karolina Sikorska<sup>8</sup>, Jacqueline M. P. Egthuijsen<sup>1</sup>, Elma Meershoek - Klein Kranenbarg<sup>9</sup>, Cornelis J. H. van de Velde<sup>9</sup>, Reinhard Buettner<sup>2</sup>, Hakan Alakus<sup>6</sup>, Annemieke Cats<sup>10</sup>, Bauke Ylstra<sup>1</sup>, Hanneke W. M. van Laarhoven<sup>11</sup>, Nicole C. T. van Grieken<sup>1</sup>

<sup>1</sup>Department of Pathology, Cancer Center Amsterdam, Amsterdam University Medical Centers, VU University, Amsterdam, Netherlands, <sup>2</sup>Institute of Pathology, University Hospital Cologne, Cologne, Germany, <sup>3</sup>Department of Oncology, Lausanne University Hospital, Lausanne, Switzerland, <sup>4</sup>Department of Radiation Oncology, Radboud University Medical Center, Nijmegen, <sup>5</sup>Department of Surgery, Amsterdam University Medical Centers, University of Amsterdam, Amsterdam, Netherlands, <sup>6</sup>Department of General, Visceral and Cancer Surgery, <sup>7</sup>Department of Internal Medicine I, University Hospital Cologne, Cologne, Germany, <sup>8</sup>Department of Biometrics, Netherlands Cancer Institute - Antoni van Leeuwenhoek hospital, Amsterdam, <sup>9</sup>Department of Surgery, Leiden University Medical Center, Leiden, <sup>10</sup>Department of Gastrointestinal Oncology, Netherlands Cancer Institute - Antoni van Leeuwenhoek hospital, <sup>11</sup>Department of Medical Oncology, Amsterdam University Medical Centers, University of Amsterdam, Amsterdam, Netherlands

**Objectives:** Biological differences between male and female cancer patients are increasingly acknowledged, and could potentially also lead to differences in survival. Here, we investigate differences in clinicopathological characteristics and survival between males and females with microsatellite instable (MSI-high) and stable (MSS) gastric cancer (GC).

**Methods:** MSI and/or mismatch repair (MMR) status were determined on tumor tissues from 3 cohorts of patients with resectable gastric or gastroesophageal cancer: one retrospective cohort from Cologne, Germany (either surgery only or perioperative treatment) and two randomized clinical trials: D1/D2 (surgery only) and CRITICS (perioperative treatment).

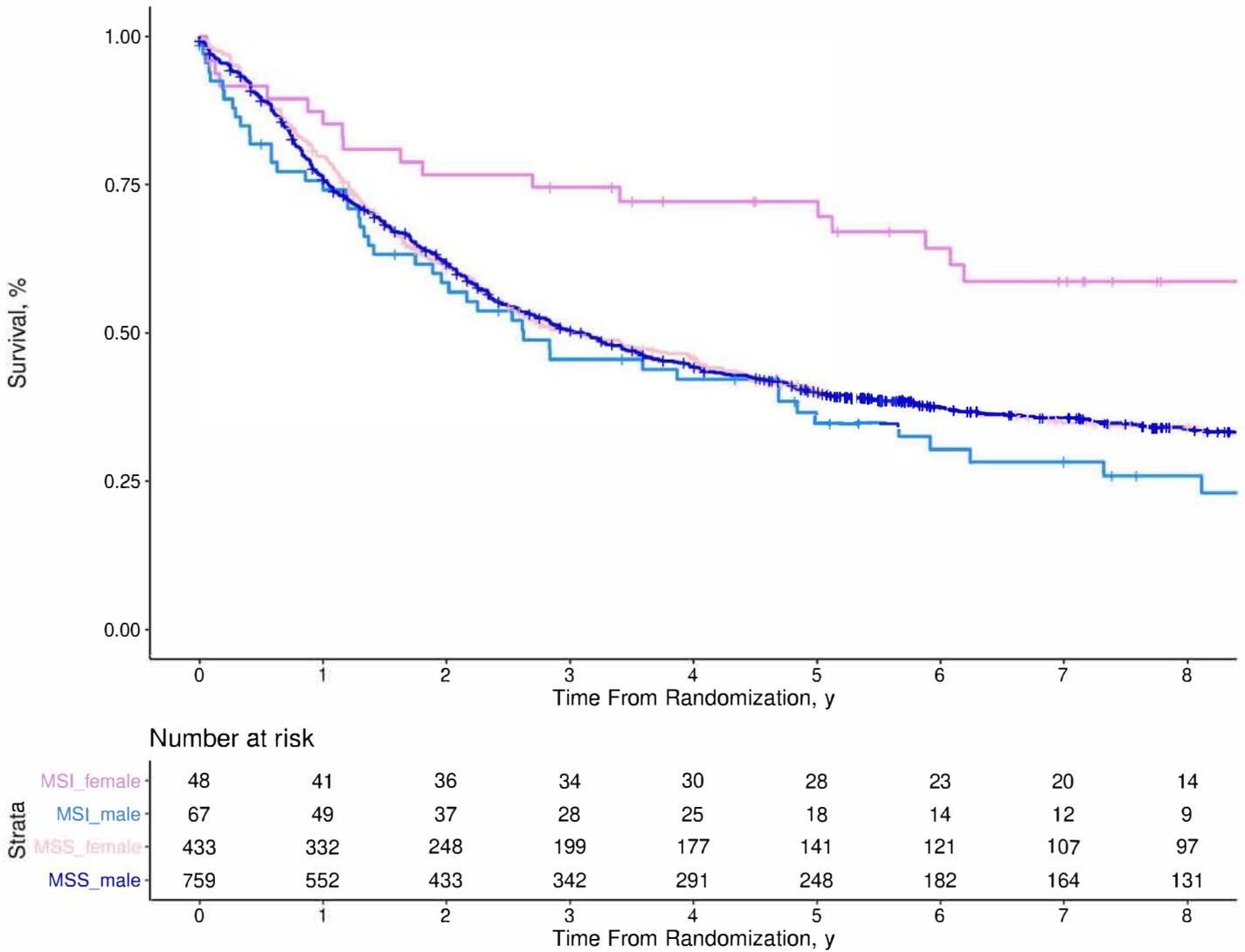
**Results:** A total of 1307 patients were included, of which 115 (8.8%) tumors were classified as MSI-high and 1192 (91.2%) as MSS/MMR proficient.

In MSI-high GC, male tumors were more often lymph node positive than female tumors (62.5% vs. 51.6%), and males had a more advanced stage of disease than females ( $p=0.03$ ). Males had a shorter 5-year overall survival (OS) compared to females (34.7% vs. 69.7%,  $p<0.001$ ). In patients treated with surgery only, 5-year OS in males and females was 36.0% and 67.3%, respectively ( $p=0.003$ ). In patients treated perioperatively, 5-year OS in males and females was 32.0% and 75.0%, respectively ( $p=0.04$ ).

In MSS GC, no sex differences were found in lymph node status, stage of disease, or survival. This was irrespective of treatment modality.

In females, MSI-high was associated with better OS compared to MSS (69.7% vs. 39.7%,  $p=0.002$ ), but not in males (34.7% vs. 40.1%,  $p=0.12$ ).

**Image:**



**Conclusions:** Males with MSI-high GC have repeatedly shorter OS compared to females in three independent cohorts. In addition, we show that MSI is only a favorable prognostic factor in female GC patients, but not in males. Therefore, sex differences should be taken into account in clinical trials in (MSI-high) GC. Translational studies are warranted to understand the biology underlying these sex differences.

**Genetics and translational research**

IGCC22-ABS-1174

**TRNA DERIVATIVE TRF-GLU-TTC-027 MODULATES THE PROLIFERATION OF GASTRIC CARCINOMA BY TARGETING TGFB2.**

Weiguo Xu\*<sup>1</sup>, Gang Li<sup>1</sup>, Huanqiu Chen<sup>1</sup>

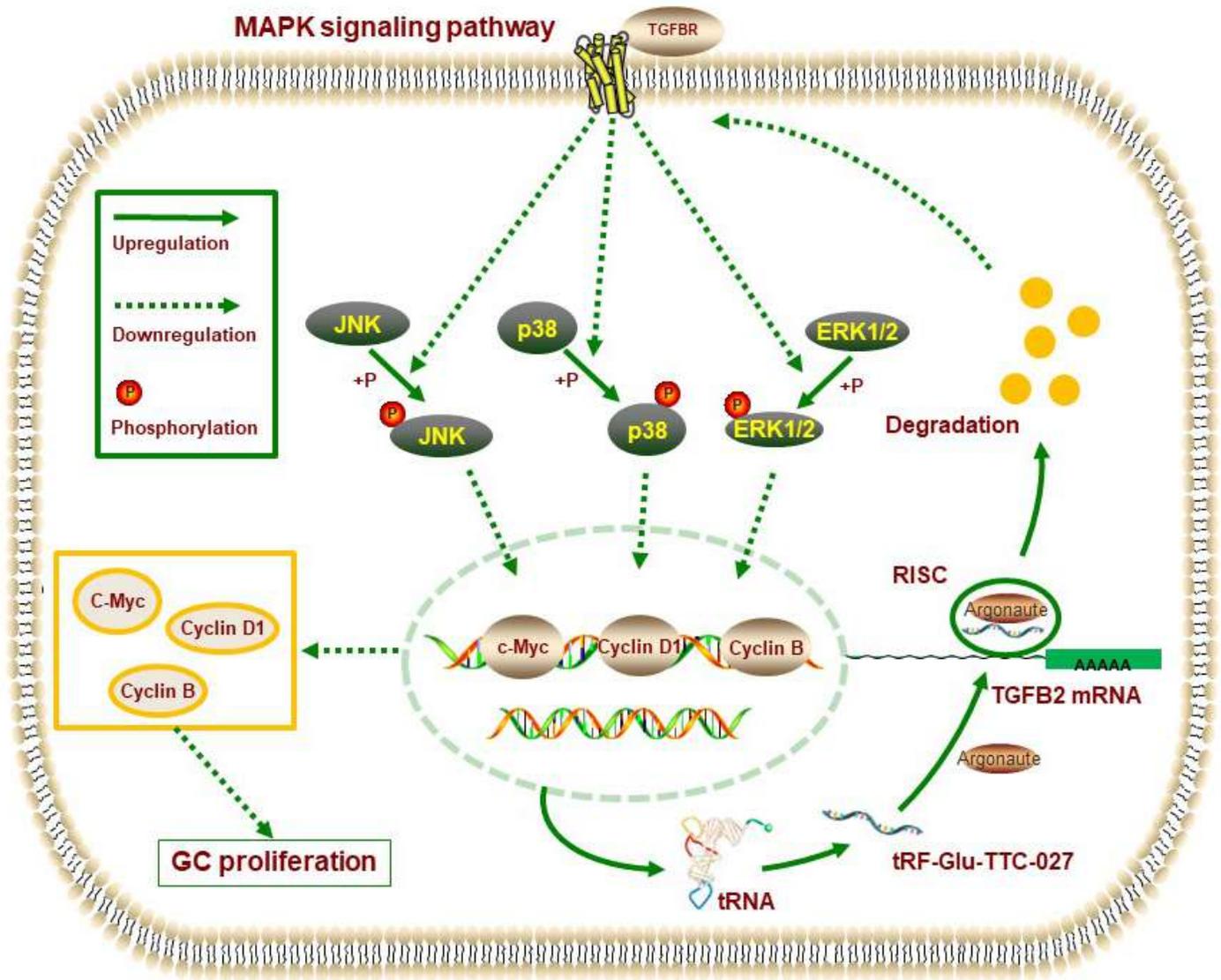
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**Objectives:** As a new kind of noncoding RNAs, tRNA derivatives play an important role in the gastric carcinoma (GC). Nevertheless, the underlying mechanism tRNA derivatives were involved in was rarely elaborated.

**Methods:** In the present study, we screened out the tRNA derivative, tRF-Glu-TTC-027 based on the tRF & tiRNA sequencing. To demonstrate the effect tRF-Glu-TTC-027 exerts on GC proliferation, we introduced the CCK8, EdU, colony formation and flow cytometry assays. And we applied the dual-luciferase reporter assay, RIP assay and bioinformatic analysis to discover the downstream target of tRF-Glu-TTC-027. Then *TGFB2* was selected and the related confirmatory assays were conducted to verify the oncogenic characteristics of *TGFB2*. Subsequently, we detected the possible regulation of the canonical MAPK signaling pathway to further explore the downstream mechanism of tRF-Glu-TTC-027. Finally, we undertook the *in vivo* assays to conduct the subcutaneous xenograft experiments to elaborate the possible functional impact.

**Results:** As a result, we found that tRF-Glu-TTC-027 was low-expressed in GC, and upregulation of tRF-Glu-TTC-027 could significantly suppress the proliferation of GC cell lines. Meanwhile, tRF-Glu-TTC-027 regulated the canonical MAPK signaling pathway by targeting *TGFB2*.

**Image:**



**Conclusions:** This is the first study to discuss the relation between tRF-Glu-TTC-027 and *TGFB2* in GC, and the pioneer work has contributed to our present understanding of tRNA derivative, which might provide an alternative mean for the target therapy of GC.

*Genetics and translational research*

IGCC22-ABS-1348

**EPIGENETIC INDUCTION OF PYCR1 PROMOTES GASTRIC CANCER GROWTH BY REGULATING MITOCHONDRIA DYNAMICS**

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**Objectives:** Reprogramming of amino acid metabolism is critical for tumor growth. We have previously shown that mitochondrial proline anabolism key enzyme PYCR1 overexpression predicated poor survival in patients with gastric cancer (GC). Thus, this present study further investigate the expression profiles of PYCR1 in GC as well as the underlying mechanisms behind its upregulation and promotion of GC progression.

**Methods:** PYCR1 expression profiles are evaluated in different human GC cohorts and also in mouse model. Mechanisms behind its upregulation and promotion of GC progression are investigated in vitro and in vivo.

**Results:** PYCR1 overexpression is prominent in intestinal-type GC and related molecular subtypes in 2 independent human GC cohorts. During the Correa cascade of gastric carcinogenesis, PYCR1 is continuously increased from atrophic gastritis with or without intestinal metaplasia, through to dysplasia, and finally to cancerous lesions. Meanwhile, this is also identified in MNU-induced mouse GC model. Mechanistically, hypomethylation and P300-mediated H3K27ac acetylation activation in the promotor of PYCR1 synergistically facilitate PYCR1 transcription. Depletion of PYCR1 increases reactive oxygen species (ROS) production, induce mitochondrial depolarization and restore mitochondrial networking via enhancing mitochondrial fusion, resulting in inhibition of cell proliferation. Consistently, pharmacological enhancement with Mdivi-1 of mitochondrial fusion also bring about the similar effects. Conversely, PYCR1 overexpression promote mitochondrial fission and reduced ROS, contributing to tumor growth.

**Conclusions:** PYCR1 overexpression is heterogenous among different GC subtypes and an increase in PYCR1 is an early event in the multistep of gastric carcinogenesis. Epigenetic modulation synergistically facilitates PYCR1 upregulation in GC, resulting in promoting tumor growth by enhancing mitochondrial fission. Collectively, PYCR1 is a promising therapeutic target for GC.

**Genetics and translational research**

IGCC22-ABS-1395

**THE EPIGENETIC MODIFIER KMT2C IS FREQUENTLY MUTATED IN GASTRIC REMNANT CARCINOMA**

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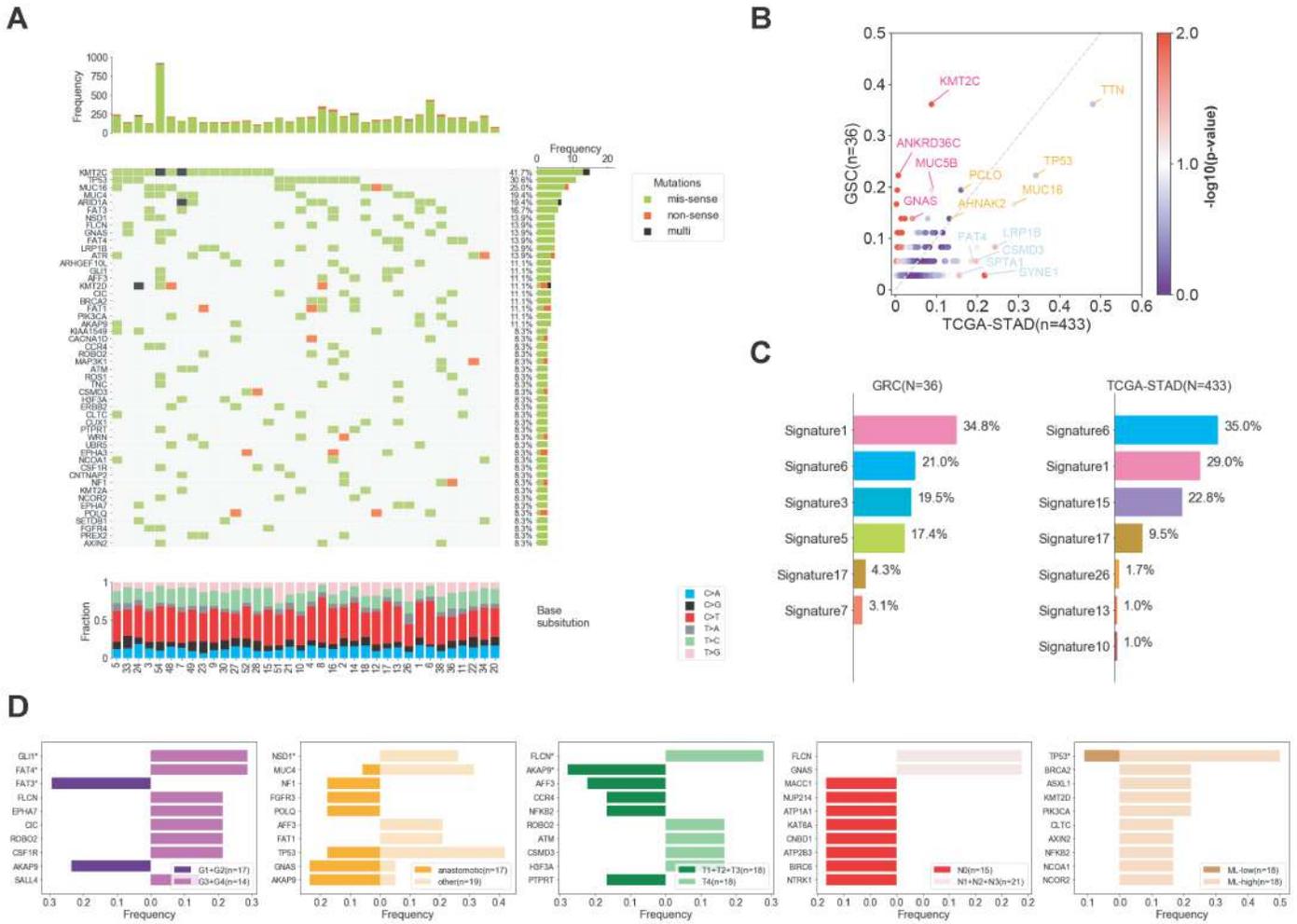
**Objectives:** Gastric remnant cancer (GRC) which occurs frequently in patients after partial gastrectomy, confers a poor prognosis. A comprehensive profiling of genomic mutations will provide a basis to elucidate the origin and characteristics of GRC.

**Methods:** Whole-exome sequencing (WES) was conducted on 36 paired tumor-normal samples and targeted deep sequencing on additional 25 paired GRC samples. TCGA primary gastric cancer (GAC) was also compared to dissect the molecular pathogenesis and identify actionable biomarkers. The relationship between somatic mutation and tumor immune microenvironment was evaluated by immunohistochemistry.

**Results:** WES identified recurrent mutations of epigenetic modifiers in 77.78% of cases, involving notably KMT2C (16/36), ARID1A (7/36) and JMJD1C (5/36). Targeted deep sequencing verified the mutation frequency of KMT2C in 12 out of 25 (48.00%) GRC cases. The overall frequency of KMT2C mutation is significantly higher than that in various GAC studies and different GAC types. Moreover, frequent mutations in epigenetic modifiers could predict a poor clinical outcome of GRC patients ( $p=0.02$ ). Notably, KMT2C mutation significantly correlated with lower expression of H3K4me1, H3K4me3, and higher CD163+ TAMs, sparser CD3+ TILs, higher PD-L1 and VEGFC expression ( $p=0.025$ ,  $p=0.027$ ,  $p=0.001$ ,  $p=0.018$ ,  $p=0.047$ ,  $p=0.029$ , respectively).

**Image:**

**Figure 1**



**Conclusions:** This is the first comprehensive exome sequencing analysis of the mutational landscape in GRC. We identify and validate the new recurrent KMT2C mutations and common alteration in epigenetic modifiers in GRC, which may thus be key tumorigenic events.

**Genetics and translational research**

IGCC22-ABS-1342

**TRANSCRIPTIONAL ACTIVATION OF MCM6 BY YAP DRIVES GASTRIC TUMORIGENICITY AND THERAPY RESISTANCE**

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**Objectives:** Yes-associated protein (YAP), a core Hippo transcriptional coactivator, exerts a pivotal role in gastric tumorigenicity. Here, we aim to identify critical effectors in YAP-driven gastric cancer (GC) and uncover the underlying mechanism.

**Methods:** RNA sequencing (RNA-seq) was performed in search of YAP direct downstreams, which was further validated by ChIP-PCR and luciferase reporter assays. The clinical relevance of minichromosome maintenance complex component 6 (MCM6) was assessed in multiple GC cohorts. Functional assays were examined *in vitro* and *in vivo*, and the molecular mechanism was revealed by RNA-seq. The efficacy of targeting MCM6 in synergizing chemo- or radiotherapy was also elucidated.

**Results:** Analysis of RNA-seq identified that MCM6 was one of the most downregulated genes in YAP-silenced GC cells. We found that YAP-TEAD complex directly bound to the promoter of MCM6 to regulate its expression. A high correlation between YAP and MCM6 expression was observed in GC cell lines and human GC tissues. Clinically, MCM6 was frequently upregulated in GC and associated with unfavorable prognosis. Functionally, MCM6 potentiated the proliferative and metastatic abilities of GC cells and xenografts. Transcriptome profiles showed the PI3K/Akt pathway to be highly associated with MCM6. From this lead, we revealed MCM6 mediated the tumor-facilitating role of YAP via the deregulated PI3K/Akt axis, suggesting it served as a key effector in YAP-driven GC. Moreover, inhibition of MCM6 sensitized GC cells to 5-fluorouracil or UV irradiation with significantly higher apoptotic rates. Mechanistically, MCM6 deficiency increased DNA breaks triggered by DNA-damaging agents and compromised DNA repair by attenuating the ATR/Chk1 signaling, thereby resulting in DNA damage accumulation and consequent cell death.

**Conclusions:** Hyperactive YAP transcriptionally regulates MCM6. MCM6 promotes GC progression via deregulated PI3K/Akt signaling and confers therapy resistance by regulating DNA damage response. Targeting MCM6 may provide benefits for GC treatment.

***Genetics and translational research***

IGCC22-ABS-1238

**GASTRIC CANCER PATIENT-DERIVED XENOGRAFT: A RELEVANT PRECLINICAL MODEL FOR TUMOR METABOLIC IMAGING**

Seong-Woo Bae<sup>1</sup>, Felix Berth<sup>2</sup>, Kyoungyun Jeong<sup>1</sup>, Yun-Suhk Suh<sup>3</sup>, Seong-Ho Kong<sup>3</sup>, Hyuk-Joon Lee<sup>3</sup>, Woo Ho Kim<sup>4</sup>, June-Key Chung<sup>5</sup>, Han-Kwang Yang<sup>3</sup>

<sup>1</sup>Cancer Research Institute, Seoul National University, Seoul, Korea, Republic Of, <sup>2</sup>Department of General, Visceral and Transplant Surgery, University of Mainz, Mainz, Germany, <sup>3</sup>Department of Surgery, Seoul National University Hospital, <sup>4</sup>Department of Pathology, Seoul National University College of Medicine, <sup>5</sup>Department of Nuclear Medicine, Seoul National University Hospital, Seoul, Korea, Republic Of

**Objectives:** The utility of <sup>18</sup>F-fluorodesoxyglucose positron emission tomography (<sup>18</sup>F]FDG-PET) in gastric cancer remains controversial and a rationale for patient selection is desired. This study aims to establish a preclinical patient-derived xenograft (PDX) based <sup>18</sup>F]FDG-PET protocol for gastric cancer and compare different PDX models regarding tumor growth and FDG uptake.

**Methods:** Nude mice were implanted orthotopically and subcutaneously with gastric cancer PDX. <sup>18</sup>F]FDG-PET/MRI protocol evaluation included different tumor sizes, FDG doses, scanning intervals, and organ-specific uptake. FDG avidity of similar PDX cases were compared between ortho- and heterotopic tumor implantation methods. Microscopic and immunohistochemical investigations were performed to confirm tumor growth and correlate the glycolysis markers glucose transporter 1 (GLUT1) and hexokinase 2 (HK2) with FDG uptake.

**Results:** Organ-specific uptake analysis showed specific FDG avidity of the tumor tissue. Standard scanning protocol was determined to include 150  $\mu$ Ci FDG injection dose and scanning after one hour. Comparison of heterotopic and orthotopic implanted mice revealed a long growth interval for orthotopic models with a high uptake in similar PDX tissues. The H-score of GLUT1 and HK2 expression in tumor cells correlated with the measured maximal standardized uptake value values (GLUT1: Pearson  $r=0.743$ ,  $P=0.009$ ; HK2: Pearson  $r=0.605$ ,  $P=0.049$ ).

**Conclusions:** This preclinical gastric cancer PDX based <sup>18</sup>F]FDG-PET/MRI protocol reveals tumor specific FDG uptake and shows correlation to glucose metabolic proteins. PDX transplanted murine model can be useful for accessing PET activity in gastric cancer.

**Genetics and translational research**

IGCC22-ABS-1084

**CLINICO-PATHOLOGIC AND GENOMIC CHARACTERISTICS OF MUCINOUS GASTRIC ADENOCARCINOMA**

Jae Eun Lee\*<sup>1</sup>, Ji Yeong An<sup>2</sup>, Ki Tae Kim<sup>3</sup>, Su Jin Shin<sup>4</sup>, Jae-Ho Cheong<sup>5</sup>, Yoon Young Choi<sup>6</sup>

<sup>1</sup>Graduate School of Integrated Medicine, CHA University School of Medicine, Pocheon, <sup>2</sup>Department of Surgery, Sungkyunkwan University School of Medicine, <sup>3</sup>Department of Molecular Genetics, Seoul National University, <sup>4</sup>Department of Pathology, <sup>5</sup>Department of Surgery, Yonsei University College of Medicine, Seoul, <sup>6</sup>Department of Surgery, CHA University School of Medicine, Ilsan, Korea, Republic Of

**Objectives:** Mucinous gastric adenocarcinoma (MGC) is a rare but distinctive histologic subtype of gastric cancer (GC). However, clinico-pathologic and genomic characteristics of MGC have not been well evaluated.

**Methods:** We collected data from five cohorts targeting MSI of GC (n=5,089) to evaluate clinico-pathologic characteristics of MGC. In addition, The Cancer Genome Atlas and Gene Expression Omnibus (GSE66229) were used for genomic analysis.

**Results:** MGC (n=158, 3.1%) showed distinctive characteristics in terms of age, sex, and TNM stage compared to both non-mucinous intestinal and diffuse (NM-INT and NM-DIF, respectively). MGC was related to MSI-H but mutually exclusive to Epstein-Barr Virus (EBV) type. The prognosis of MGC was better than NM-DIF and similar to NM-INT, and no clear benefit from postoperative chemotherapy was observed. *TP53* was the main driver mutation of MGC without recurrent variants. Mutation signature analysis showed that the SBS6, mismatch repair signature, and SBS40 of unknown etiology were dominant signatures in MGC. The differential expression genes analysis identified 15 of MGC specific genes. Furthermore, high expression of *GPR120*, and *B3GNT6* was related to favorable prognosis. MGC showed moderate-regulation of epithelial mesenchymal transition (EMT)-up signature with high of EMT-down signature that is related to favorable prognosis. Overall, the immune scores of MGC were similar to NM-DIF. However, microsatellite stable of MGC showed high cancer associated fibroblast and low *CD274* (PD-L1) gene expression compared to MSH-H of MGC that suggests immune checkpoint inhibitors may not be useful only for MSI-H of MGC.

**Conclusions:** MGC could be a surrogate for doing MSI but not doing EBV test in GC and its positive association to MSI-H GC, high expression of *GPR120* and *B3GNT6*, and high of EMT-down signature may lead to the favorable prognosis of MGC.

***Genetics and translational research***

IGCC22-ABS-1250

**TRANSCRIPTOME PROFILING IN GASTRIC CANCER PATIENTS AFFECTED BY PERITONEAL CARCINOMATOSIS.**

Luigina Graziosi<sup>1</sup>, Elisabetta Marino<sup>1</sup>, Silvia Marchianò<sup>2</sup>, Stefano Fiorucci<sup>2</sup>, Annibale Donini<sup>1</sup>

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**Objectives:** Gastric cancer (GC) peritoneal carcinomatosis (PC) is the most common pattern of tumor recurrences after macroscopically curative resection with a very poor prognosis. Therapy for gastric cancer remains largely suboptimal. Next-generation sequencing (NGS) has emerged as a powerful tool to identify potential oncogene targets for personal therapeutic intervention as part of precision medicine. We aimed to study the molecular profile of GC's PC.

**Methods:** Twenty-four patients, curatively and surgically treated in a single western center, were enrolled and analyzed. The transcriptome was assessed by RNAseq analysis and compared to the healthy gastric mucosa. **Results:** The results of this investigation demonstrated that the two groups show two different patterns of gene expression. From the analysis, 308 genes were found differentially expressed between gastric cancer mucosa with peritoneal carcinomatosis and healthy mucosa and 42 transcripts resulted modulated in gastric cancer mucosa without PC in comparison with healthy mucosa. We decided to focus on transcripts differentially modulated between PC and no-PC groups with higher fold change ( $>2$ ), that were 350. Inside this subset, we identified 81 upregulated genes and 269 downregulated. The pathway analysis demonstrated a high gene expression including PGC, OGN, LIFR, SFRP2, SH3GL2 that are involved in the tumoral progression, invasion, and metastasis. OGN participates in the tumor microenvironment (TME) regulating the immunotherapeutics response.

**Conclusions:** In summary, we have identified a subgroup of genes differentially regulated in GC peritoneal carcinomatosis patients that could be used to identify high-risk patients of developing peritoneal carcinomatosis. This gene signature might serve as an important clinical decision making. Novel targets and immune checkpoint proteins have been identified with the potential to be translated into clinics

**Genetics and translational research**

IGCC22-ABS-1295

**RESULTS OF CDH-1 SCREENING IN THE WEST**

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<sup>1</sup>Surgery, Dentistry, Maternity and Infant Department, University of Verona, Upper GI Surgery of Verona University, <sup>2</sup> Department of Pathology, University of Verona, Verona, <sup>3</sup>Biosciences Laboratory, Istituto Scientifico Romagnolo per lo Studio e la Cura dei Tumori (IRST) IRCCS, Meldola, Italy

**Objectives:** Hereditary Diffuse Gastric Cancer (HDGC) is an autosomal dominant cancer syndrome predominantly caused by loss-of-function germline mutations in the tumour suppressor gene CDH1. 1-3% of Gastric Cancers (GC) arise in the context of HDGC, however the screening for CDH1 germline mutations is not carried out systematically in Europe. The aim of the present study is to show the results of a 10-years screening in the West.

**Methods:** It is a retrospective observational study that involves two centres belonging to the Italian Research Group for GC (GIRCG). From January 2011 to April 2021, 33 patients, diagnosed with DGC at Upper GI Surgery of Verona and meeting the criteria of International Gastric Cancer Linkage Consortium for CDH1 germline mutations screening, were tested. Blood samples were collected and then analysed at Biosciences Laboratory, Istituto Romagnolo per lo Studio e la Cura dei Tumori (IRST) IRCCS, Meldola: from 2011 to 2018 (13 cases) the analyses were carried out by Trusight Cancer illumina panel, then (20 patients) by SOPHiA Hereditary Cancer Solution.

**Results:** In the first group (Trusight panel), 4 out of 13 subjects (30%) showed pathogenic CDH1 aberrations: 3 point mutations (c.781G>T p.Glu261Ter; c.360delG p.His121ThrsTer94; c.1137G>A p.Thr379=) and 1 deletion (DEL 1-2). In CDH1-negative patients, 2 showed a germline mutation in other cancer predisposition genes (BRCA1 and ATM). In the second group (Sophia panel), 2 out of 20 subjects (10%) show a pathogenic CDH-1 point mutation (c.1565+1G>A p.?; c.1062delG p.Leu355Ter). The screening of 40 relatives of index cases allowed the identification of 18 mutation carriers, 12 of them underwent prophylactic total gastrectomy.

**Conclusions:** The 10 years' experience highlights the need of CDH-1 mutations screening in the West. Different panels allowed the identification of CDH-1 aberrations. A prophylactic gastrectomy could be indicated in high number of CDH1 mutation carriers with a dramatic impact in controlling cancer development.

***Genetics and translational research***

IGCC22-ABS-1421

**AN M6A-RELATED LNCRNA SIGNATURE FOR PREDICTING PROGNOSIS AND IMMUNE RESPONSES IN GC**

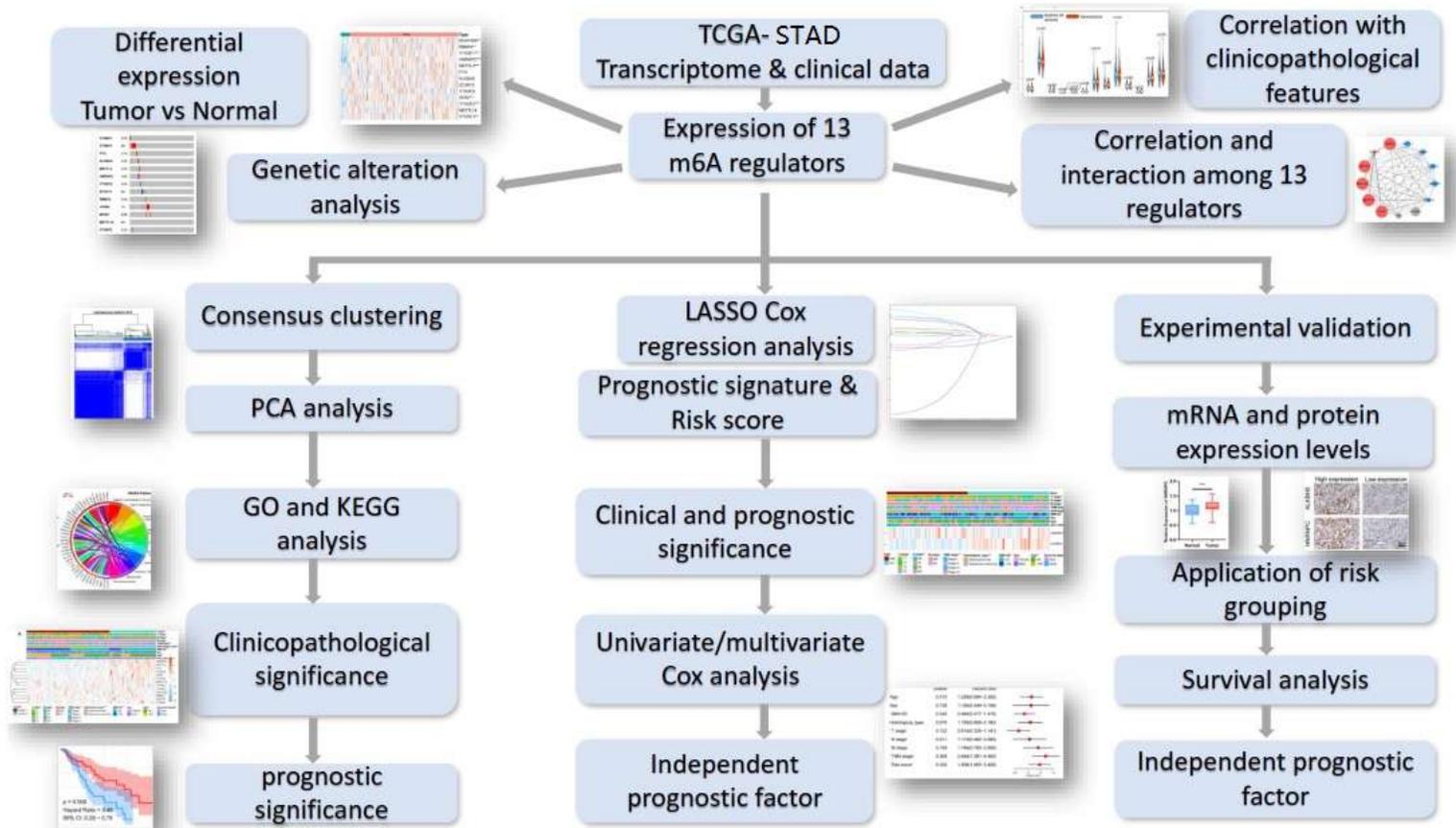
Hongda Pan\* <sup>1</sup>

<sup>1</sup>Department of Gastric Surgery, Fudan University Shanghai Cancer Center, Shanghai, China

**Objectives:** N6-methyladenosine (m6A) and long noncoding RNAs (lncRNAs) play important roles in the prognostic value and the immunotherapeutic response of GC. This study aimed to develop and validate an m6A-related lncRNAs signature for prediction of prognosis and immunotherapeutic responses in GC.

**Methods:** m6A-related lncRNAs were analyzed and obtained by coexpression. Univariate, least absolute shrinkage and selection operator (LASSO), and multivariate Cox regression analyses were conducted to construct an m6A related lncRNA model. Kaplan-Meier analysis, principal component analysis (PCA), functional enrichment annotation, and nomogram were used to analyze the risk model. Finally, the potential immunotherapeutic signatures and drug sensitivity prediction targeting this model were also discussed.

**Results:** The risk model comprising 8 m6A-related lncRNAs was identified as an independent predictor of prognoses. By regrouping the patients with this model, we can distinguish between them more effectively in terms of the immunotherapeutic response. Finally, candidate compounds aimed at GC subtype differentiation were identified. **Image:**



**Conclusions:** This risk model based on the m6A-based lncRNAs may be promising for the clinical prediction of prognosis and immunotherapeutic responses in GC patients.

***Genetics and translational research***

IGCC22-ABS-1118

**CHECKPOINT COEXPRESSION LANDSCAPE IN GASTROESOPHAGEAL ADENOCARCINOMA**

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**Objectives:** Obesity, measured by an increased body mass index (BMI), creates chronic inflammation, which leads to immune dysfunction in various cancers. We hypothesized that obesity-driven immune dysfunction manifests as changes in the checkpoint expression landscape. Our primary objective was to look at the coexpression of different known immune checkpoints in gastroesophageal adenocarcinoma (GEAC) and correlate them with BMI.

**Methods:** Targeted RNA-seq was performed on 46 metastatic GEAC tumors, and gene expression was measured for 394 immune transcripts. Coexpression analyses were conducted by calculating Pearson correlations for every possible pair of 15 checkpoint genes and clustering groups of similarly expressed genes. The immunogenic and microenvironmental effects of each checkpoint were also interrogated by calculating correlations with tumor immunogenic (TIGS) and cell proliferation (CP) signatures.

**Results:** The overweight (BMI $\geq$ 25) and normal (BMI $<$ 25) groups demonstrated distinct checkpoint coexpression patterns. Overweight patients had a larger amount of coexpression between almost all checkpoints, and normal BMI patients had fewer groups of coexpressing checkpoints. For overweight patients, checkpoint coexpression was divided into two groups: the single checkpoint GITR and all other checkpoints. In normal BMI patients, a total of seven small groups of coexpressing checkpoints were observed. TIGS was significantly correlated with 10 of the 15 checkpoints analyzed in the normal BMI group, while in the overweight group, it correlated with 14 of the 15 checkpoints analyzed. CP was only correlated with two checkpoints in the overweight group.

**Conclusions:** The increased checkpoint coexpression in overweight patients suggests that they have more immune escape mechanisms. Additionally, the increased association of TIGS with checkpoints suggests that in the presence of immune activity, immunosuppression is more common in overweight patients. Further studies are necessary to elucidate the exact mechanisms.

***Genetics and translational research***

IGCC22-ABS-1411

**A NOVEL IMMUNE-RELATED PROGNOSTIC SIGNATURE FOR PREDICTING SURVIVAL AND IMMUNOTHERAPY EFFICACY IN GC**

Hongda Pan\* <sup>1</sup>

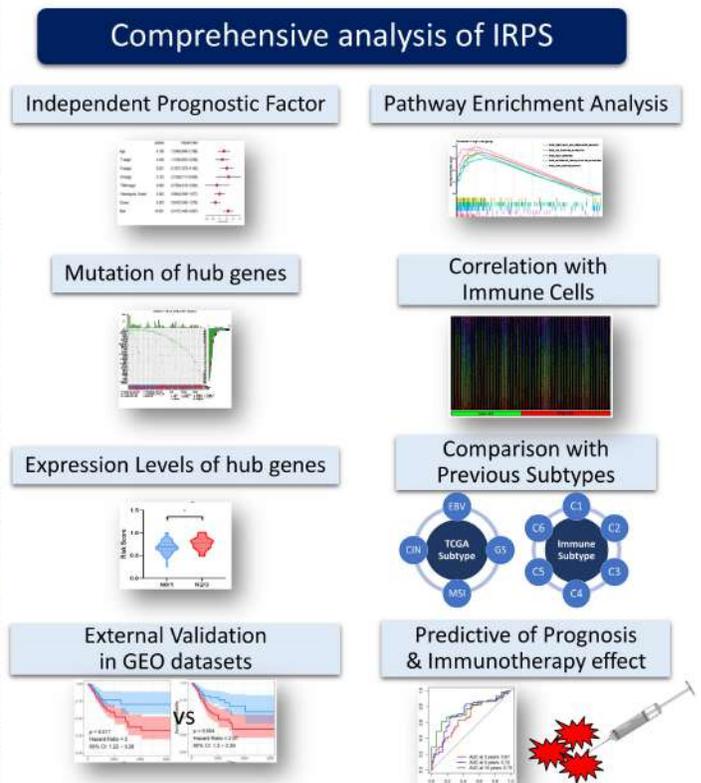
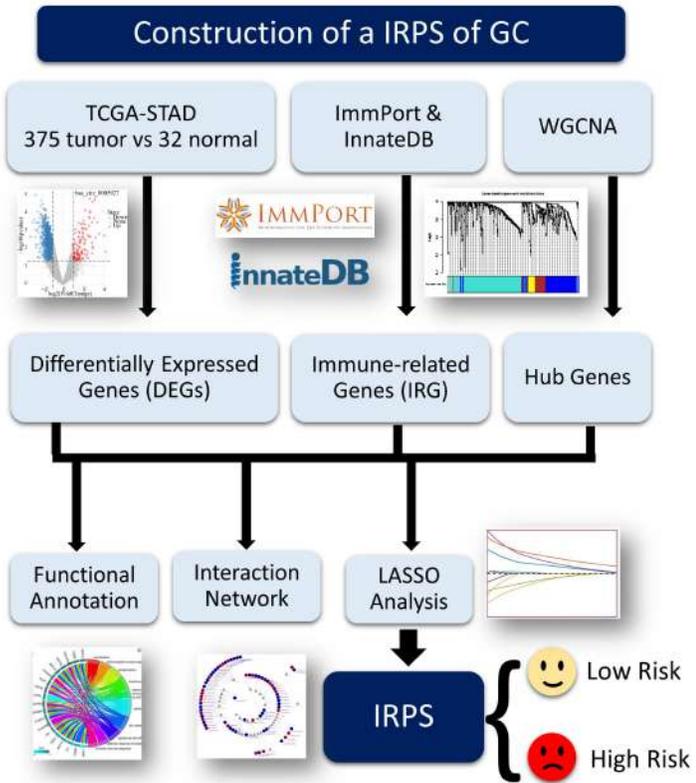
<sup>1</sup>Department of Gastric Surgery, Fudan University Shanghai Cancer Center, Shanghai, China

**Objectives:** To construct an immune-related prognostic signature (IRPS) for gastric cancer (GC) and clarify the molecular and immune characteristics and the benefit of immunotherapy in IRPS-defined subgroups of GC.

**Methods:** Based on The Cancer Genome Atlas (TCGA) stomach adenocarcinoma (STAD) dataset, differentially expressed immune-related hub genes were identified by weighted gene co-expression network analysis (WGCNA). Genes were identified to construct an IRPS by using the Cox regression method and validated with the Gene Expression Omnibus (GEO) dataset (GSE84437). Afterward, the molecular and immune characteristics and the benefit of immunotherapy in IRPS-defined subgroups were analyzed.

**Results:** The IRPS was constructed based on 8 genes (RNASE2, CGB5, INHBE, PTGER3, CTLA4, DUSP1, APOA1, and CD36). IRPS-high patients had a better overall survival (OS) than IRPS-low patients, consistent with the results in the GEO cohort. The comprehensive results showed that patients with high IRPS score were more likely to be benefit from Immunotherapy. In contrast, patients with low IRPS score were associated with cancer and metastasis-related pathways, higher TTN, TP53 and MUC16 mutation rate, high infiltration of CD8 T cells, and less benefit from immunotherapy.

**Image:**



**Conclusions:** IRPS is a promising biomarker to predict the prognosis, the molecular and immune characteristics, and the benefit from immunotherapy in GC.

***Genetics and translational research***

IGCC22-ABS-1253

**AN ORGANOID-BASED PRECLINICAL MODEL OF HUMAN GASTRIC CANCER**

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<sup>1</sup>General and Emergency Surgery, <sup>2</sup>Surgical and Biomedical Science, University of Perugia, Perugia, Italy

**Objectives:** Gastric cancer is the fifth most common cancer worldwide. Because of the poor GC response to various existing treatments, there is a strong need of performing large-scale drug screening that could identify potential target drugs. The organoid generation could help both the medical and surgical oncologist to identify the best regimen for each patient. Our purpose is to demonstrate the feasibility to generate a human gastric cancer organoid patient-derived and, secondly, to create a human organoid platform.

**Methods:** Organoid cultures have been established from fresh gastrectomy or biopsy specimens from patients undergoing surgical excision. Specifically, the gastric cancer organoid was generated from small pieces of gastric tumor and normal gastric organoids taken from the fresh gastrectomy specimen. The tissue pieces have been collected and stored in the operating room. Gastric glands, have been plated and a growth medium consisting of a cocktail of growth factors have been added. Molecular biology tests such as qPCR and whole-exome and transcriptome sequencing will be performed lately as well as specific drug tests.

**Results:** Normal gastric organoids have been established using the Bartfeld S and Clevers H. published protocol. Secondly, as normal organoid has grown, cancerous organoid cultures have been created as described in a previously published protocol and are now growing. Molecular characterization of the established patient-derived organoids, pharmacological screening for different chemotherapeutic agents will soon start, as well as immunohistochemical and genome analysis.

**Conclusions:** The development of these human GC organoid cultures will represent the first step that is required to establish in vivo and in vitro patient-derived organoid-based platforms for personalized medicine and to collect a comprehensive repertoire of organoids that cover nearly all known molecular subtypes and subtype-specific mutational profiles of gastric cancer.

**Genetics and translational research**

IGCC22-ABS-1276

**ARSENIC SULFIDE AND IRINOTECAN SYNERGISTICALLY INHIBIT GASTRIC CANCER THROUGH UBIQUITIN STRESS.**

Ting Kang\*<sup>1</sup>, Maolin Ge<sup>2</sup>, Shumin Lu<sup>1</sup>, Yu Cai<sup>1</sup>, Chuanying Zhu<sup>1</sup>, Zhuowei Feng<sup>1</sup>, Han Liu<sup>2</sup>, Siyu Chen<sup>1</sup>

<sup>1</sup>Department of Oncology, Xin Hua Hospital-School of Medicine-Shanghai Jiao Tong University, <sup>2</sup>Shanghai Institute of Hematology and State Key Laboratory of Medical Genomic, Rui Jin Hospital-School of Medicine- Shanghai Jiao Tong University, Shanghai, China

**Objectives:** Gastric carcinoma is a very common and intractable malignancy in the world, for which novel treatment options are urgently needed. Arsenic sulfide have cytotoxic activities in gastric cancer cells, however, the underlying mechanism is unclear and its clinical potential need to be explored.

**Methods:** For the *in vitro* study, gastric cancer cell lines were treated with arsenics and/or chemotherapeutic drugs. MTT assay, FACS, Western blotting, RNA-sequencing were used to detect viability, modulation of proteins and genes. For the *in vivo* study, we transplanted AGS cells into NOD-SCID mice and evaluated the efficacy of arsenic sulfide alone or combination with irinotecan.

**Results:** We previously showed that arsenic sulfide stimulates DNA damage by inhibiting NFATc3 in gastric cancer cells. Recently, we found that arsenic sulfide and irinotecan combination exhibited a strong synergistic tumor suppression effect (combination index: CI <0.3) in gastric cancer cell. Mechanistically, arsenic sulfide activates the non-classical UPR pathway to up-regulate XBP1u, causing ubiquitin stress, as reflected by the dramatic increase in conjuncted ubiquitin-protein. Meanwhile, the ubiquitylated H2B decreased thereby DNA repair was suppressed, transforming single-stranded DNA damage into more lethal double-stranded DNA damages. *in vivo* study have also shown that the combination works better. More inspiring, there are several patients, diagnosed as advanced gastric cancer failed in first-line treatment, achieved partial response (PR) with 1-2 cycles Realgar-Indigo Naturalis Formula (ingredients: realgar, Indigo Naturalis, and Salvia miltiorrhiza) combined with irinotecan treatment, and PFS was over 3.8 months with no additional side effects.

**Conclusions:** The combination of arsenic with irinotecan provides a feasible therapeutic strategy for patients with advanced or metastatic gastric cancer who failed from prior systemic therapies and warrants further studies.

***Pathology, biomarkers, liquid biopsy, molecular classification***

IGCC22-ABS-1296

**YAP/TAZ ACTIVATION IS A MECHANISM OF TUMOR PROGRESSION IN POORLY COHESIVE GASTRIC CANCER**

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**Objectives:** Poorly Cohesive Gastric Cancer (PC-GC), according with the latest WHO classification, has a poor prognosis and its relative incidence is increasing.

Disregulation of the Hippo pathway and/or activation of YAP/TAZ signaling pathway are emerging as central determinants for tumor initiation, progression and chemoresistance.

The role of YAP/TAZ in human Gastric Cancer (GC) has not been defined to date. We hypothesized that RhoA- YAP/TAZ axis is a mechanisms of tumor progression in PC-GC, influencing prognosis.

**Methods:** We retrospectively analysed 131 PC-GC patients, treated at two European surgical centres (University of Verona and Hospital del Mar) from 2004 to 2014.

YAP/TAZ nuclear expression was analysed with immunohistochemistry. Both YAP and TAZ nuclear expression was coded as "negative" (complete absence of nuclear reactivity) or "any positive" (both low and high nuclear expression).

**Results:** 21 patients showed absence of nuclear reactivity YAP-/TAZ-, while 110 showed any positivity: YAP+ (85/131=64.9%), TAZ+ (93/131=69.9%).

Pathological tumor stage were significantly earlier in YAP-/TAZ- patients; 38% of YAP-/TAZ- were pT1-2 compared with only 17% of cases showing any expression (p= 0.041). Patients without nuclear YAP/TAZ expression were pN0 in 55% of cases compared with 26% of cases with any positive nuclear reaction (p = 0.020).

In "negative" group 5-year OS was 57% compared with 29% in "any positive" group (p=0.030). 5- year survival was the highest in YAP-/TAZ- group, intermediate when only one of the two biomarkers was expressed, and the lowest in YAP+/TAZ+ group (p=0.010).

**Conclusions:** Nuclear negativity to both YAP and TAZ identify a subgroup of PC-GC with more favourable prognosis. Higher clinic-pathological stage and a worse OS was associated to YAP/TAZ positive patients supporting the involvement of this pathway in the progression of PC gastric carcinoma. Our results provide new insights into the role of YAP/TAZ signalling cascade as a mechanism of cancer progression in sporadic PC-GC.

*Pathology, biomarkers, liquid biopsy, molecular classification*

IGCC22-ABS-1060

## CLINICALLY CONSERVED SUBTYPES FROM META-ANALYSIS OF GENOMIC DATA FROM HUMAN GASTRIC CANCER

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**Objectives:** We aim to uncover robust subtypes having distinct biological characteristics associated with clinical outcome and identify subtype-specific therapeutic targets

**Methods:** Genomic data from 2527 gastric tumors are used to uncover clinically relevant molecular subtypes. Cluster of clusters assignment (COCA) approach was applied to integrate 8 genomic subtypes and uncover consensus subtypes. For validation, we identified 120 genes whose expression is highly specific to each subtype and used them to construct gastric cancer predictor of integrated consensus subtype with 120 genes (GPICS120)

**Results:** COCA analysis of genomic data revealed 6 consensus subtypes that showed marked interconnectivity among 8 independent classification systems. Consensus genomic subtype 1 (CGS1) is characterized by poorest prognosis, very high stem cell characteristics, and high IGF1 expression, but low genomic alterations. CGS2 showed canonical epithelial gene expression patterns. CGS3 and CGS4 are characterized by high copy number alterations and low immune activity. However, CGS3 and CGS4 are different in high HER2 activity (CGS3) and high lipid metabolic activity (CSG4). CGS5 has highest mutation rates and moderately high immune activity that is characteristics of MSI-high tumors. Most of CGS6 tumors are EBV-positive and shows extremely high methylation and high immune activity. Clinically, CGS1 and CGS4 are poor prognostic while prognosis of CGS2, CGS4, CGS5, and CGS6 is good. Interestingly, patients in CGS4 have very poor survival rate after relapse. By applying systematic analysis of genomic and proteomic data, we estimated potential response rate of each subtype to standard and experimental treatments such as radiation therapy, target therapy, and immunotherapy. In addition, we also identified potential therapeutic targets for each subtype

**Conclusions:** Consensus subtype is robust classification system and can be the basis for future clinical investigation of subtype-based targeted interventions

*Pathology, biomarkers, liquid biopsy, molecular classification*

IGCC22-ABS-1246

## **SPLICING-BASED CLASSIFIER FOR GASTRIC CANCER IDENTIFIES EPITHELIAL-MESENCHYMAL TRANSITION SUBTYPES**

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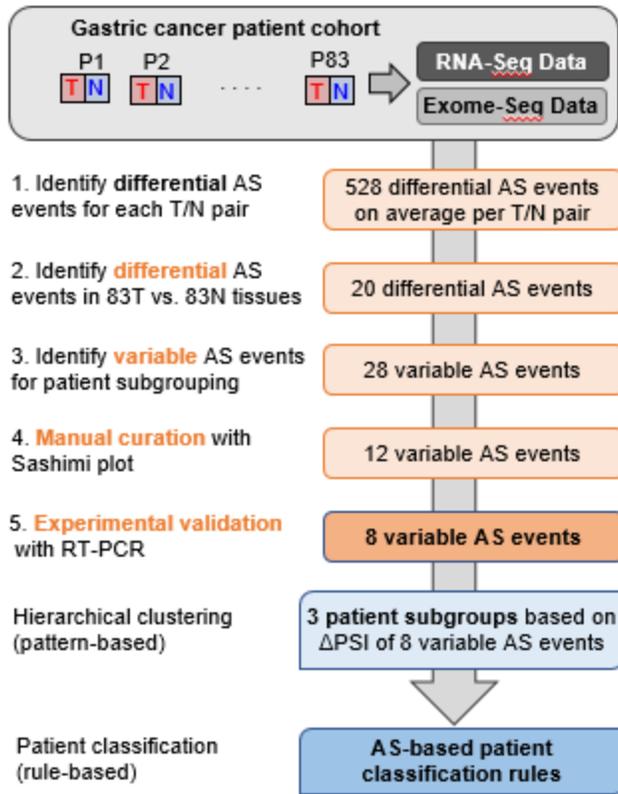
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**Objectives:** Alternatively spliced RNA isoforms are a hallmark of tumors, but their nature, prevalence, and clinical implications in gastric cancer are unknown. Here, we proceeded to alternative splicing (AS)-based classifications for gastric cancer patient outcomes or patient stratification related to therapeutic efficacy.

**Methods:** We performed RNA-sequencing (RNA-seq) of paired tumor and adjacent normal mucosa tissues from 83 gastric cancer patients. We used rMATS v4.0.2 to systematically profile the splicing landscape of 83 gastric tumors and matched normal mucosa, and experimentally validated the splicing patterns of eight target genes.

**Results:** : In this study, we confirmed that i) systematically profiled the AS landscape in gastric cancer, ii) identified RBPs that regulate tumor subtype-specific AS events, and iii) devised a patient classification scheme based on variable AS events or their regulatory RBPs. We detected on average 528 AS events in each tumor vs. matched normal pair and experimentally validated using RT-PCR for AS events in eight genes. According to this novel AS-event-based classification scheme, 83 patients divided into 43 EpiS, 22 Hybrid-Epithelial/Mesenchymal-Splicing (HybS), and 18 MesS subtypes. We investigated some RNA-binding proteins (RBPs) were differentially expressed between MesS and EpiS patient subtypes. Relapse free survival showed a marginal difference between the EpiS and MesS subtypes.

**Image:**



**Conclusions:** We systematically investigated the landscape and roles of AS in gastric cancer using RNA-Seq data from matched tumor and normal samples. Association of AS with the EMT program was firmly established and suggested AS-based patient stratification schemes, which highlighted the potential of AS analysis as a tool for precision medicine. To our knowledge, this study presents the most comprehensive analysis to date of AS in the context of patient classification, molecular mechanisms, and prognosis in gastric cancer.

***Pathology, biomarkers, liquid biopsy, molecular classification***

IGCC22-ABS-1294

**ASSOCIATION OF TUMOR INFILTRATING T-LYMPHOCYTES WITH SURVIVAL IN RESECTABLE GASTRIC CANCER**

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**Objectives:** Tumor infiltrating lymphocytes assessed by immunohistochemistry have shown prognostic relevance in many tumor types, but different combinations of biomarkers have been suggested to be associated with survival in gastrointestinal cancer. Here we included five frequently studied immune biomarkers to evaluate their prognostic relevance in gastric cancer.

**Methods:** Surgical resection specimens of 251 patients with resectable gastric cancer who participated in the Dutch D1/D2 trial were included in the study. None of the patients received (neo-)adjuvant chemo(radio)therapy. Immunohistochemistry for T-cell markers CD3, CD45RO, CD8, FOXP3 and Granzyme B (GZMB) was performed and digitally quantified using QuPath. Cancer specific survival (CSS) was calculated by Kaplan Meier analysis.

**Results:** Median cell densities were 720 cells/mm<sup>2</sup> for CD3, 548 cells/mm<sup>2</sup> for CD45RO, 553 cells/mm<sup>2</sup> for CD8, 46 cells/mm<sup>2</sup> for FOXP3 and 22 cells/mm<sup>2</sup> for GZMB. Cut-off points for dichotomization were calculated using maximally selected Log-Rank statistics. All dichotomized markers showed significant survival differences, with high densities being associated with favorable CSS. Median survival time in years (yrs) for high vs low cell densities was not reached vs 1.9 yrs for CD3, not reached vs 2.1 yrs for CD45RO, not reached vs 2.4 yrs for CD8, not reached vs 1.9 yrs for FOXP3, and not reached vs 2.0 yrs for GZMB. 52-92% of the Epstein bar virus (EBV+), 36-77% of microsatellite instable (MSI) tumors and 10-40% of the EBV-/MSS tumors were in the T-cell high groups.

**Conclusions:** High densities of all 5 T-cell markers were significantly associated with prolonged CSS. We will perform a CART analysis to select the combination of markers with best prognostic performance. High T-cell densities were associated with EBV+ and MSI-high. High T-cell densities found in a proportion of EBV-/MSS tumors support further investigation of response to immunotherapy in these subgroups.

*Pathology, biomarkers, liquid biopsy, molecular classification*

IGCC22-ABS-1129

## **FUNCTIONS OF CD8-POSITIVE T CELLS IN GASTRIC NON-SOLID TYPE POORLY DIFFERENTIATED ADENOCARCINOMA**

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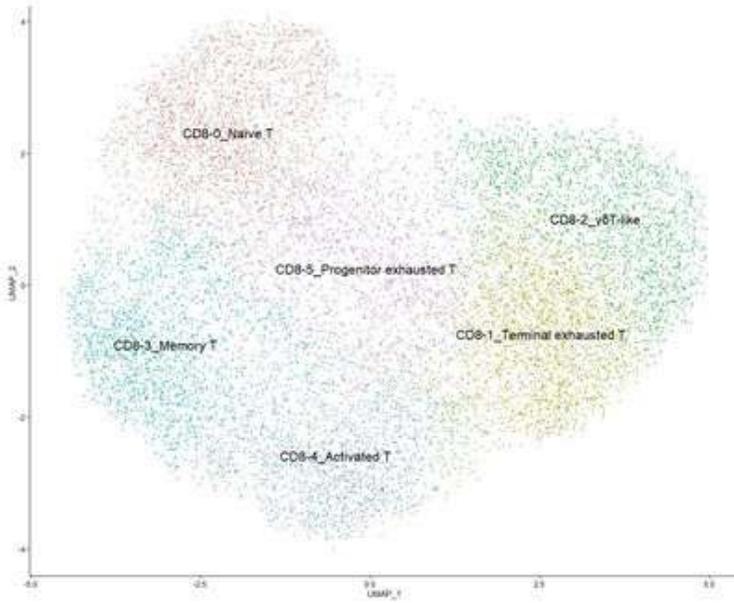
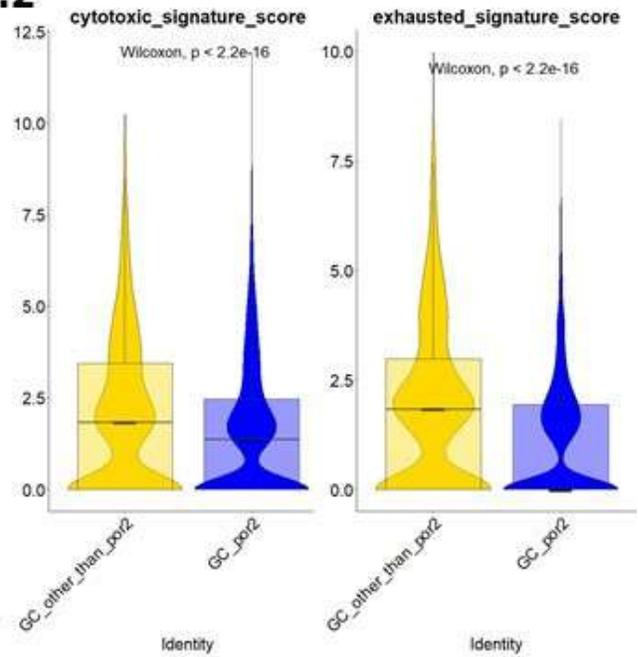
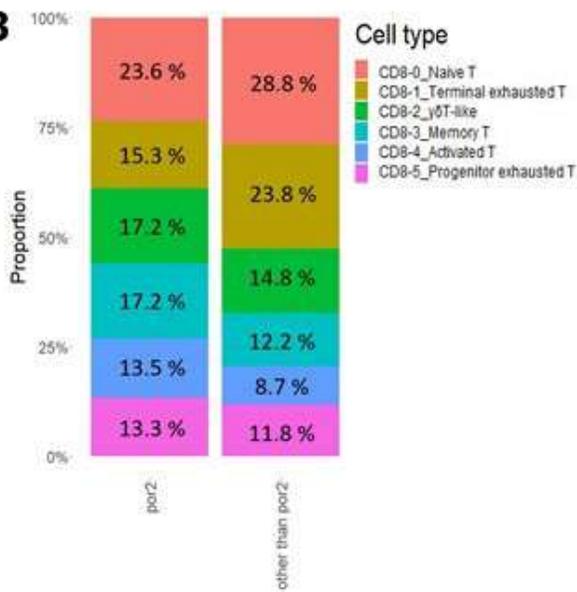
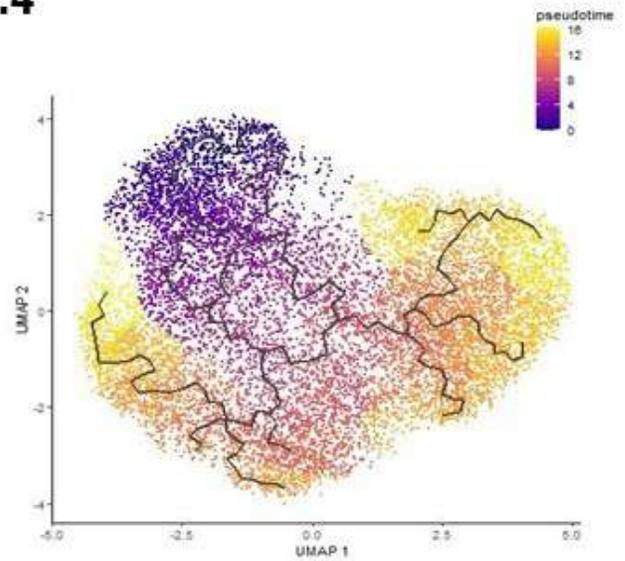
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**Objectives:** Gastric non-solid type poorly differentiated adenocarcinoma (por2) has a poorer prognosis than other types of gastric cancer (GC). No studies have evaluated the function of CD8-positive T cells in por2 GCs using single-cell RNA sequence (scRNA-seq).

**Methods:** We performed scRNA-seq analysis on 125898 cells from 12 tumors (including eight por2 GC) and ten non-tumor samples from patients who underwent gastrectomy.

**Results:** CD8-positive T cell cluster (n=11615) was extracted and reclassified into six clusters with different functions, classified based on mRNA expression of T-cell-related genes. This process allowed the definition of five major populations: terminally exhausted, progenitor exhausted, acutely activated,  $\gamma\delta$ T like and memory CD8-positive T cells. We defined progenitor exhausted T cells and terminal exhausted T cells as cytotoxic T cells. Por2 GCs were significantly less cytotoxic and exhausted than non-por2 GCs ( $p < 0.001$ ). Additionally, the proportion of cytotoxic T cells (28.6 % vs. 35.6 %) and naive T cells (23.6 % vs. 28.8 %) was lower in por2 GCs than in other GCs. The trajectory inferred using monocle3 indicated that exhausted T cells may follow a different pathway of differentiation from memory T cells and acutely activated T cells.

**Image:**

**Fig.1****Fig.2****Fig.3****Fig.4**

**Conclusions:** In the present study, we revealed CD8-positive T cells heterogeneity in GCs. Furthermore, we suggest that por2 GCs may be associated with a poor prognosis due to the less cytotoxic function of CD8-positive T cells.

*Pathology, biomarkers, liquid biopsy, molecular classification*

IGCC22-ABS-1362

## **CLINICOENDOSCOPIC AND HISTOPATHOLOGICAL PROFILE OF UPPER GASTROINTESTINAL CANCERS IN KASHMIR, INDIA**

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**Objectives:** To determine the clinical, endoscopic and Histopathological profile of oesophageal and gastric cancer patients of a high risk region of southern Kashmir of Indian state of Jammu and Kashmir.

**Methods:** This retrospective study of 15 years(2003-2018)was carried out at three different government hospitals of southern Kashmir viz..Anantnag,Shopian and Kulgam. Out of 3156 upper Gastrointestinal (GIT) cancer patients,there were 1723 Esophageal cancer (EC) patients (males=1122, females=601) and 1433 Gastric Cancer (GC) patients (males=1025, females=408). 483 patients had involvement of gastroesophageal junction. GIT cancers were diagnosed by upper Esophagogastroduodenoscopy(EGD) and confirmed by histopathological examination of biopsy tissue. **Results:** Majority of the patients were males (65.11% with EC and 71.8% with GC) in the age group of 38-80 years. The major presentation of EC was dysphagia(73.12%) whereas GC patients presented mainly with anorexia(69.08%) and anaemia(62.10%). 68 patients presented with metastasis. Lesser curvature was the most common site for GC(68.17%) whereas lower one-third of the esophagus and gastroesophageal junction growths were common in EC. 35.38% of pyloric growths were Helicobacter Pylori positive. Histopathologically 54.83% of the H.Pylori positive GC had intestinal type of adenocarcinoma.

**Conclusions:** Kashmir is emerging as a highly prevalent upper GIT cancer region(especially it's Southern part) with peculiar endoscopic and Histopathological patterns. Although the exact reason for the peculiarities and high prevalence is largely unknown yet the unique personal and dietary habits, socio-economic conditions, generic characteristics and other unknown factors have an important role in the pathogenesis of these cancers.

*Pathology, biomarkers, liquid biopsy, molecular classification*

IGCC22-ABS-1369

## **PREDICTIVE BIOMARKERS FOR CHEMOTHERAPY IN GASTRIC CANCERS USING PATIENT-DERIVED XENOGRAFT MODELS**

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**Objectives:** Gastric cancer (GC) is commonly treated by curative surgery, followed by systemic chemotherapy using 5-fluorouracil (5-FU) derivatives and platinum combination. However, clinically applicable biomarkers to predict the response to 5-FU and oxaliplatin-based chemotherapy remain lacking.

**Methods:** We developed patient-derived xenograft (PDX) models from 31 GC patients and treated with a combination of 5-FU and oxaliplatin, to determine predictive biomarkers associated with drug responsiveness. The PDX models were defined as either responders or non-responders, according to changes in tumor volumes following drug treatment. Genomic and transcriptomic markers associated with 5-FU responsiveness were assessed.

**Results:** The responsiveness of PDX models was significantly consistent with the respective clinical outcomes of the patients from which they were derived. An integrative genomic and transcriptomic analysis of PDX models revealed analogous pathway dysregulation in both cancer cells and the tumor microenvironment (TME), with pathways associated with cell-to-cell and cell-to-extracellular matrix interactions enriched among the non-responders, indicating the substantial role played by the TME in drug resistance. We develop a 30-gene prediction model to determine the responsiveness to 5-FU and oxaliplatin-based chemotherapy and confirm the significant poor survival outcomes among cases classified as non-responder-like in three independent GC cohorts.

**Conclusions:** Our study highlights the importance of interactions between cancer cells and the TME in treatment-resistant GC and may inform clinical decision-making when designing treatment strategies.

**Pathology, biomarkers, liquid biopsy, molecular classification**

IGCC22-ABS-1291

## **IDENTIFICATION OF MOLECULAR SUBTYPES OF POORLY COHESIVE GASTRIC CARCINOMAS**

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**Objectives:** Poorly cohesive (PC) gastric cancer (GC) exhibits variable clinical behavior, being extremely aggressive in most cases but more indolent at times. We hypothesized that the integrative genomic and gene expression characterization of a PC GC series could help identifying molecular subtypes with potential clinical implications.

**Methods:** 64 PC GCs were assessed for alterations in 409 genes and 30 cases were subjected to transcriptomic profiling of 20,815 genes.

**Results:** A median of 8.2 mutations per Mb (IQR 6.9-10.4) was found and a tumor mutational load >10 mut/Mb was significantly associated with patients' worse survival ( $p=0.0024$ ). The most frequent mutated genes were *CDH1* and *TP53* (each 32.8%) followed by *PIK3CA* (10.9%). In 15 samples (23.4%), at least one chromatin remodelling genes was mutated: *KMT2D* (5 cases); *ARID1A* and *BAP1* (4 cases each); *EZH2*, *KMT2A*, *PBRM1* (1 case each). Eight samples (12.5%) had fusion genes involving *CLDN18* gene. Gene expression profiling identified 4 different clusters: cluster A associated with epithelial to mesenchymal transition (EMT) signature; cluster B associated to proliferative signature and EMT; cluster C correlated to hedgehog signaling; cluster D showing no enrichment for any of the previous signatures. Notably, cluster A and B showed a worse prognosis compared with those of clusters C and D ( $p=0.0095$ ).

**Conclusions:** integrated genomic and transcriptomic analysis suggest the existence of 4 molecular subtypes of PC GC with prognostic significance where EMT features are associated with higher aggressiveness and worse outcome.

***Pathology, biomarkers, liquid biopsy, molecular classification***

IGCC22-ABS-1128

**FEMALES WITH MICROSATELLITE INSTABILITY IN GASTRIC CANCER SHOW INCREASED SURVIVAL AFTER CHEMOTHERAPY**

Meike Kohlruss<sup>1</sup>, Katja Ott<sup>2</sup>, Bianca Grosser<sup>1</sup>, Moritz Jesinghaus<sup>1</sup>, Julia Slotta-Huspenina<sup>1</sup>, Alexander Novotny<sup>3</sup>, Alexander Hapfelmeier<sup>4</sup>, Thomas Schmidt<sup>5</sup>, Matthias Gaida<sup>6</sup>, Wilko Weichert<sup>1</sup>, Gisela Keller\*<sup>1</sup>

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**Objectives:**

Knowledge about the influence of patient's sex and age on the effect of chemotherapy is limited and particularly little is known about variations related to specific molecular tumor subtypes. Here, we aimed to investigate patients with gastric/gastro-esophageal adenocarcinomas for sex and age specific differences regarding overall survival (OS) and response to neoadjuvant chemotherapy (CTx) under consideration of the molecular subtypes as microsatellite instability (MSI) and Epstein-Barr virus positivity (EBV+).

**Methods:**

Sex and age (55 year)-specific analysis was performed for overall 717 patients, including 426 patients treated with and 291 treated without neoadjuvant CTx. MSI and EBV+ were determined previously using DNA from formalin-fixed paraffin-embedded tissues and standard protocols. Hazard ratios (HR) were calculated by Cox regression analysis and survival was compared by log-rank tests.

**Results:**

Females demonstrated a significantly increased OS ( $p=0.035$ ), particularly in the subgroup treated with CTx ( $p=0.054$ ). No significant differences regarding age were found. In the molecular subgroups, no sex related differences were observed in the non-CTx group. However in the CTx group, females with MSI-high (H) tumors showed the best OS ( $p=0.043$ ) followed by the male MSI-H ( $p=0.198$ ) and female MSS ( $p=0.114$ ) group compared to the male MSS group as reference. The interaction between sex and MSI in this patient group was noticeable ( $p=0.053$ ) and was included as a relevant factor in multivariable analyses.

**Conclusions:**

Our results show an effect of sex on OS in gastric/gastro-esophageal cancer specifically after neoadjuvant CTx. The superior survival of women with MSI-H tumors treated with neoadjuvant CTx implies that this combined molecular and sex-based factor should be considered when choosing the adequate treatment for each individual patient.

Ref.: Kohlruss et al.: Cancers 2021, 13,1048

**Pathology, biomarkers, liquid biopsy, molecular classification**

IGCC22-ABS-1255

**MICROBIOME PROFILING THROUGH THE VARIOUS GASTROINTESTINAL ENVIRONMENT OF GASTRIC CANCER**

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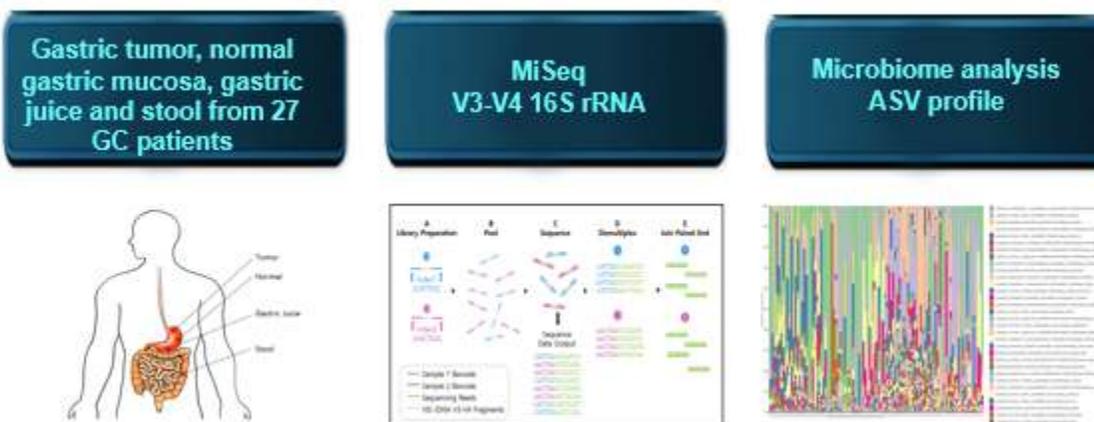
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**Objectives:** The association between cancer and microbiome dysbiosis across anatomically related multiple body sites has not been comprehensively investigated. The purpose of our study is to profile microbial diversity and composition through the various gastrointestinal environment of gastric cancer (GC).

**Methods:** We performed V3-V4 16S rRNA gene sequencing analysis for matched samples of gastric tumor, normal gastric mucosa, gastric juice and stool from 27 GC patients. Amplicon sequence variant (ASV) profile was compared among the four body sites at genus level.

**Results:** We found that mean alpha diversity was lowest in normal gastric mucosa and stool exhibited the largest amount of alpha diversity compared with others. Beta-diversity analysis showed significant differences in microbiota composition for each sample and permutational multivariate analysis of variance (PERMANOVA) results shows that the microbiome dysbiosis was significantly independent in gastrointestinal environment of gastric cancer. *Helicobacter* abundance in tumor tissue was significantly lower than in matched normal tissue and gastric juice while the trend was opposite for *Lactobacillus*. Additionally, the level of *Helicobacter* was considerably lower in patients with lymphatic invasion. The bacterial community that significantly correlated with tumor samples compared to normal mucosa, gastric juice, and stool were 49, 27, and 11 genus, respectively. *Lactobacillus* and *Delftia* had higher abundance and *Rothia* and *Collinsella* had lower abundance in tumor tissue compare with normal mucosa. Especially, *Delftia* was seen only in the tumor tissue not normal gastric mucosa, gastric juice and stool. Pentose phosphate pathway was significantly enriched in tumor tissue and normal mucosa.

**Image:**



**Conclusions:** In this study, we found that there is a unique microbiome pattern through the various gastrointestinal environment of gastric cancer. Our analysis shows enriched *Delftia* abundance only in the tumor tissue except other sample type.

***Pathology, biomarkers, liquid biopsy, molecular classification***

IGCC22-ABS-1282

**EFFECT OF CHEMOTHERAPY ON HISTOPATHOLOGICAL RESPONSE AND SURVIVAL IN MUCINOUS TYPE GASTRIC CANCER**

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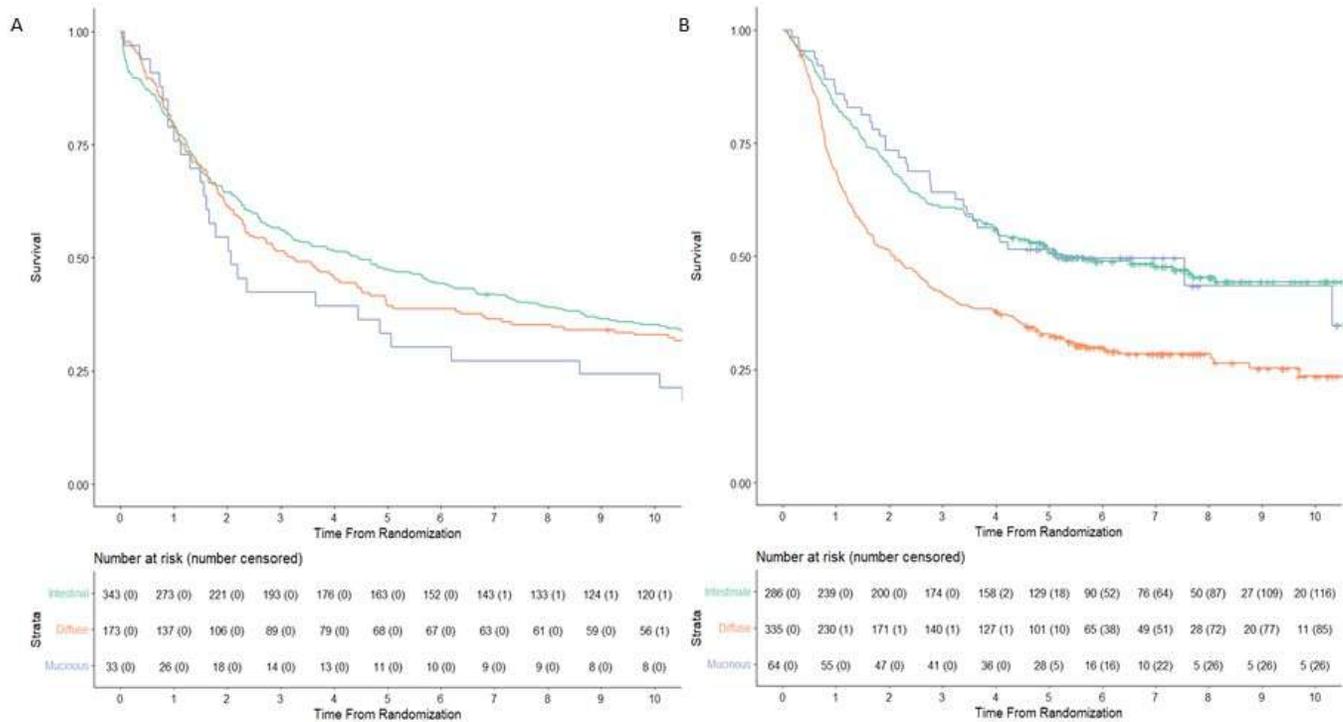
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**Objectives:** The effect of perioperative chemotherapy on mucinous gastric cancer (mucGC) is largely unknown. Here, we present the tumor characteristics and survival of intestinal (intGC), diffuse (difGC) and mucGC in cohorts of patients treated with curative intent before and after the introduction of perioperative chemotherapy.

**Methods:** Histological tumor types and tumor regression grade (TRG) from patients included in either the Dutch D1/D2 trial or the CRITICS trial were determined and correlated with survival. In the D1/D2 trial, patients underwent a gastrectomy without (neo-)adjuvant treatment. Patients in the CRITICS trial received neo-adjuvant chemotherapy and either adjuvant chemotherapy or chemoradiation.

**Results:** In the D1/D2 trial 33 of the 549 evaluable tumors were mucGC (6%), 343 (62%) intGC and 173 (32%) difGC. pT3/pT4 tumor stage and pN+ lymph node stage occurred more frequently in mucGC compared to intGC and difGC (81% vs 58% and 69%; p=0.002 and 76% vs 53% and 66%; p=0.002, respectively). In the CRITICS trial 64 of the 685 evaluable tumors were mucGC (9%), 286 intGC (42%) and 335 difGC (49%). pT and pN stage was available for 564 patients, TRG for 508 patients. pN+ was more frequently in mucGC compared to intGC and difGC (61% vs 44% and 54%; p=0.001). In mucGC 38% had a (near) complete response (TRG1-2) compared to 26% in intGC and 10% in difGC. (p<0.001). In the D1/D2 trial 5-year OS was 33% in mucGC, 48% in intGC and 39% in difGC (p=0.24, fig. 1a). In the CRITICS trial 5-year OS was 52% in mucGC, 51% in intGC and 33% in difGC, (p<0.001, fig. 1b).

**Image:**



**Figure 1.** (a) Overall survival since randomization in 549 patients of the D1/D2 trial; (b) Overall survival since randomization in 685 patients of the CRITICS trial.

**Conclusions:** Patients with mucGC more often present with pT3/pT4 and pN+ tumors and are associated with unfavorable outcome compared to intGC and difGC when treated with surgery only. However, mucGC showed highest pathological response after neoadjuvant chemotherapy and had a similar OS as intGC after perioperative treatment. These results will be validated using nationwide data from the Netherlands Cancer Registry and the Dutch Pathology Registry.

***Pathology, biomarkers, liquid biopsy, molecular classification***

IGCC22-ABS-1240

**PD-L1 EXPRESSION AT PRIMARY SITE VERSUS METASTATIC LYMPH NODE IN GASTRIC CANCER**

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**Objectives:** Anti-PD-1/PD-L1 therapy has demonstrated clinical activity in gastric cancer (GC). However, positivity can differ between metastatic sites and the primary tumor (PT), and assessing these differences may assist in the orientation of diagnostic biopsies and suggest different responses to therapy. Thus, this study aimed to compare PD-L1 positivity on PT and metastatic lymph nodes (LNM) in GC, and their clinicopathological characteristics.

**Methods:** We retrospectively reviewed 284 GC patients who underwent D2-gastrectomy. PD-L1 positivity was assessed through immunohistochemistry (clone SP142) using a combined positive score (CPS>1). All PD-L1+ GC stage as pN+ were also tested in LNM for PD-L1 expression, and PD-L1- GC pN+ were selected for comparison (2:1).

**Results:** Among the 284 GC evaluated, 45 (15.9%) PT had PD-L1+. Of these, 24 cases had pN+ and were enrolled in the study. As a comparison group, 44 CG PD-L1(-) in PT with pN+ were included in the final evaluation (sample loss of 4 cases). Of the PT PD-L1+, 54.2% (13/24 cases) were also PD-L1+ in the LNM. Regarding PD-L1(-) GC, 9.1% (4/44) had PD-L1+ in the LNM. According to the Kappa score, there was a moderate agreement between PT and LNM (*K-score*: 0.483). Larger lesions and moderate/severe peritumoral inflammatory response were associated with PD-L1 positivity in both sites. There was no statistical difference in overall survival (OS) between PD-L1 positive and negative groups for PT (median= not reached vs 29.6 months, respectively;  $p=0.166$ ) and between PD-L1 positive and negative for LNM (median: 33.3 vs 38.5 months, respectively;  $p=0.837$ ).

**Image:**

**Table 1:** Clinicopathological and surgical characteristics according to the positivity for PD-L1 in the primary tumor and in lymph node metastasis

Variables	Primary Tumor (PT)		$\rho$	Lymph node metastasis (LNM)		$\rho$
	PD-L1 Negative n=44 (%)	PD-L1 Positive n=24 (%)		PD-L1 Negative n=51 (%)	PD-L1 Positive n=17 (%)	
<b>Sex</b>			0.417			0.558
Female	14 (31.8)	10 (41.7)		19 (37.3)	5 (29.4)	
Male	30 (68.2)	14 (59.3)		32 (62.7)	12 (70.6)	
<b>Age (years)</b>			0.721			0.127
Mean (SD)	60.7 (11.8)	61.7 (12.3)		59.8 (12.4)	64.9 (9.7)	
<b>ASA (American Society of Anesthesiologists)</b>			0.733			0.702
I / II	38 (86.4)	20 (83.3)		44 (86.3)	14 (82.4)	
III / IV	6 (13.6)	4 (16.7)		7 (13.7)	3 (17.6)	
<b>Type of resection</b>			0.323			0.122
Subtotal	22 (50)	9 (37.5)		26 (51)	5 (29.4)	
Total	22 (50)	15 (62.5)		25 (49)	12 (70.6)	
<b>Tumor size (cm)</b>			<b>0.011</b>			<b>0.005</b>
Mean (SD)	5.8 (3.3)	8.1 (3.6)		5.9 (3.3)	8.7 (3.5)	
<b>Lauren type</b>			0.952			1.0
Intestinal	18 (40.9)	10 (41.7)		21 (41.2)	7 (41.2)	
Diffuse/mixed	26 (59.1)	14 (58.3)		30 (58.8)	10 (58.8)	
<b>Peritumoral inflammatory response</b>			<b>&lt;0.001</b>			<b>0.011</b>
Absent / mild	32 (72.7)	6 (25)		33 (64.7)	5 (29.4)	
Moderate / severe	12 (27.3)	18 (75)		18 (35.3)	12 (70.6)	
<b>pT status</b>			0.734			0.268
pT1/T2	8 (18.2)	3 (12.5)		10 (19.6)	1 (5.9)	
pT3/T4	36 (81.8)	21 (87.5)		41 (80.4)	16 (94.1)	
<b>pN status</b>			1.0			0.879
pN1	9 (20.5)	5 (20.8)		11 (21.6)	3 (17.6)	
pN2	18 (43.2)	11 (45.8)		23 (45.1)	7 (41.2)	
pN3	16 (36.4)	8 (33.3)		17 (33.3)	7 (41.2)	
<b>pTNM status</b>			1.0			0.299
I / II	9 (20.5)	5 (20.8)		12 (23.5)	2 (11.8)	
III / IV	35 (79.5)	19 (79.2)		39 (76.5)	15 (88.2)	
<b>Lymph node- CPS</b>			-			-
PD-L1 Negative	40 (90.9)	11 (45.8)		-	-	
PD-L1 Positive	4 (9.1)	13 (54.2)		-	-	
<b>Primary Tumor - CPS</b>			-			-
PD-L1 Negative	-	-		40 (78.4)	4 (23.5)	
PD-L1 Positive	-	-		11 (21.6)	13 (76.5)	
<b>Disease recurrence</b>			0.764			0.778
No	24 (54.5)	14 (58.3)		28 (54.9)	10 (58.8)	
Yes	20 (45.5)	10 (41.7)		23 (45.1)	7 (41.2)	
<b>Death</b>			0.294			0.888
No	18 (40.9)	13 (54.2)		23 (45.1)	8 (47.1)	
Yes	26 (59.1)	11 (45.8)		28 (54.9)	9 (52.9)	

SD, standard deviation

**Conclusions:** PD-L1 positivity rate was varied between PT and LNM, and the agreement across tumor sites is not necessarily the same. Patients without PD-L1 expression in the primary tumor were positive in lymph nodes in 9.1% of cases. Accordingly, LN testing can increase the number of potential candidates for immunotherapy based on PD-L1 expression and may be important to expand the therapeutic indication.

*Pathology, biomarkers, liquid biopsy, molecular classification*

IGCC22-ABS-1239

## **MAPPING OF PERIGASTRIC LYMPHATICS WITH INDOCYANINE GREEN FLUORESCENCE IMAGING AND TISSUE MARKING DYE**

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**Objectives:** Using indocyanine green (ICG) fluorescence imaging and tissue marking dyes (TMDs), perigastric lymphatic mapping and their pathological correlation were examined to evaluate whether ICG staining covers all metastatic lymph nodes (LNs) in advanced gastric cancer (AGC).

**Methods:** Patients with AGC who underwent open distal or total gastrectomy were enrolled. ICG was serially injected intraoperatively into the subserosa along the greater and lesser curvature sides. Stomach specimens were examined under a near-infrared camera. ICG-stained LNs were named, excised, and tattooed with different colored TMDs to retrace the exact location after pathological examinations.

**Results:** A total of 687 LNs and 69 LN stations were examined from 11 patients. The map of the perigastric lymphatic network showing the topography of ICG-stained and ICG-unstained LNs, including metastatic information, was successfully reconstructed. The average number of ICG-stained and ICG-unstained LNs were  $23.6 \pm 12.3$  (37.8%) and  $38.8 \pm 17.1$  (62.2%), respectively. LN metastases were present in 28 LN stations of 8 patients. Of 8 cases with LN metastases, 40% (11.1-75% per case) of metastatic LNs were stained by ICG. Of 28 metastatic LN stations, 21 (75.0%) were covered by ICG, and actual metastatic LNs were stained in 16 LN stations (57.1%). In 4/8 cases (50%), all metastatic LN stations showed ICG signals.

**Conclusions:** ICG fluorescence imaging and TMD are useful tools for visualizing the perigastric lymphatic network and retracing the exact location of ICG-stained LNs in AGC. However, ICG imaging is still not recommended for selective LN dissection in AGC because of the limited staining of perigastric LNs.

## Pathology, biomarkers, liquid biopsy, molecular classification

IGCC22-ABS-1321

### GASTRIC CANCER WITH MICROSATELLITE INSTABILITY DISPLAY INCREASED THYMIDYLATE SYNTHASE EXPRESSION

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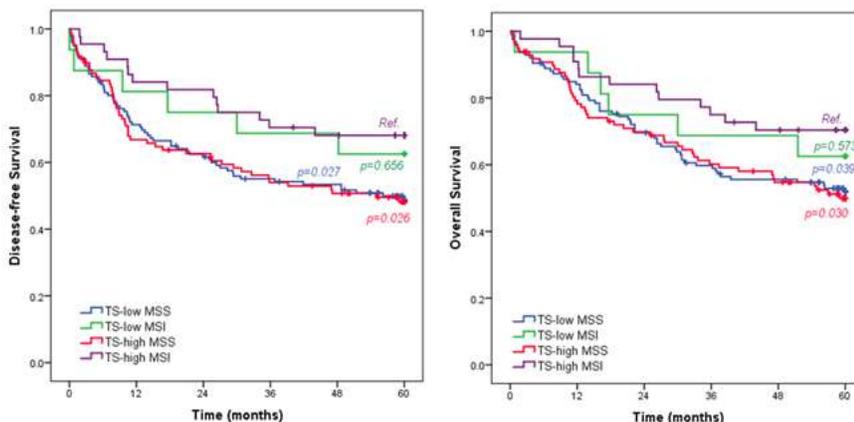
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**Objectives:** Gastric cancer (GC) with microsatellite instability (MSI) is recognized as a less aggressive disease and associates with resistance to 5-fluorouracil (5-FU)-based chemotherapy. Thymidylate synthase (TS) is inhibited by 5-FU, being another potential mediator of resistance to 5-FU. However, the reasons for the clinical behavior of MSI have not been fully elucidated, and no data is available regarding the MSI and TS association in GC. Therefore, this study aimed to analyze the relationship between MSI and TS in GC, their characteristics and survival.

**Methods:** We retrospectively evaluated patients with gastric adenocarcinoma who underwent D2-gastrectomy. MSI and TS expression were analyzed by immunohistochemistry. TS level was evaluated according to the intensity and percentage of cells staining (TS-score) and classified as TS-high/low based on the median value. We also investigated p53 and tumor-infiltrating lymphocytes, to reflect the host antitumor immune response.

**Results:** Of 284 GC, 60 (21.1%) were MSI. Median TS-score for all cases was 16.5. TS expression was significantly higher in MSI tumors compared to microsatellite-stable (MSS) GC (TS-score= 33.2 vs. 62.5,  $p<0.001$ ). Considering both status, GC were classified in 4 groups: 44 (15.5%) TS-high/MSI; 98 (34.5%) TS-high/MSS; 16 (5.6%) TS-low/MSI; and 126 (44.4%) low/MSS. TS-high/MSI GC were predominantly Lauren's intestinal type ( $p<0.001$ ), had less advanced TNM stage ( $p=0.005$ ), higher CD8 T cells levels ( $p<0.001$ ), and p53-normal ( $p<0.001$ ). Improved survival was observed in TS-high/MSI GC. Conversely, there was no difference in survival for TS-low/MSI compared to the others groups.

#### Image:



**Figure:** Disease-free survival and overall survival of gastric cancer patients according to the groups determined by microsatellite instability status (MSI) or microsatellite-stable (MSS) and Thymidylate Synthase (TS) level low or high.

**Conclusions:** MSI GC was associated with high TS-expression, suggesting that TS levels may explain resistance to 5-FU. Additionally, TS-high/MSI GC showed earlier stage at presentation and better survival. The greater infiltration of CD8 T cells and the retained p53 function may also elucidate why these tumors have a better prognosis.

**Pathology, biomarkers, liquid biopsy, molecular classification**

IGCC22-ABS-1087

**PROGNOSTIC IMPACT OF TILS AND NEUTROPHIL-LYMPHOCYTE RATIO IN GASTRIC CANCER**

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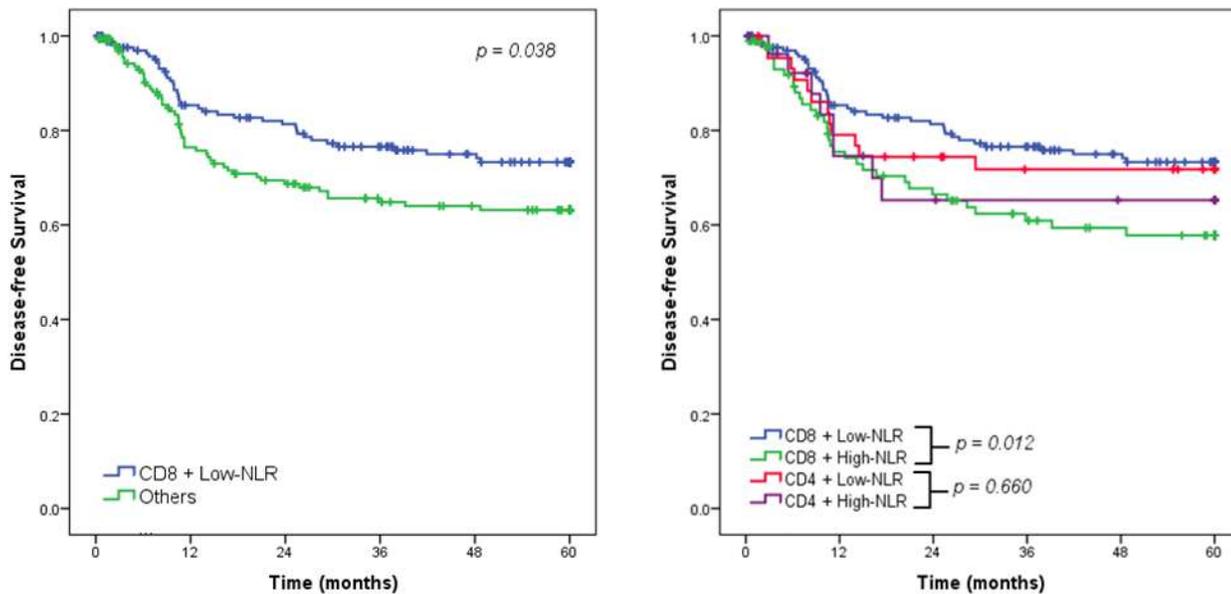
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**Objectives:** Recently, immunological status was proposed as prognostic factor in gastric cancer (GC). Tumor infiltrating lymphocytes (TILs) sub-sets, expressed as CD4+/CD8+ T cells tissue ratio, have been related to survival. This study aimed to evaluate the combination of TILs and NLR as prognostic parameters in GC.

**Methods:** We performed a retrospective analysis on a cohort of 336 GC patients who underwent gastrectomy with curative intent. The NLR in peripheral blood was assessed before surgery and classified in low or high (cutoff=2.5). The TILs density (reported as CD4+/CD8+ ratio) was evaluated by immunohistochemistry, and classified according to predominant lymphocyte subtype (CD8 for CD8≥CD4 or CD4 for CD8 < CD4)

**Results:** Among the GC evaluated, mean CD4+/CD8+ T cells tissue ratio was 1.2 (median: 0.7), and mean NLR was 2.71 (median: 2.05). Accordingly, cases were classified into four groups: 173 (51.5%); CD8+low-NLR; 92 (27.4%) CD8+high-NLR; 44 (13.1%) CD4+low-NLR; and 27 (8%) CD4+high-NLR. TILs/NLR groups were significantly different regarding sex (p<0.001), tumor size (p<0.001), perineural invasion (p=0.020), pT status (p=0.002), and postoperative complication (p=0.045). EBV-positivity was higher in CD8+low-NLR and CD8+high-NLR groups (p=0.021). Survival analyses showed that CD8+low-NLR had a significantly better disease-free survival (DFS) compared to other groups (73.3% vs 63.1%, p=0.038). Also, DFS and overall survival in CD8+high-NLR GC was worse than CD8+low-NLR group (p=0.012 and p=0.041, respectively). In multivariate analyses, pT, pN and CD8+low-NLR were independent factors associated to DFS.

**Image:**



**Conclusions:** Immunological status based on NLR and TILs correlates significantly with survival as well as distinct clinicopathological characteristics. High CD8+ infiltrating lymphocytes and low-NLR were associated with better DFS, suggesting a pivotal role of the systemic and tumor microenvironment in reflecting the immune response and predict recurrence in GC.

**Pathology, biomarkers, liquid biopsy, molecular classification**

IGCC22-ABS-1067

**PREDICTING RESPONSE TO IMMUNOTHERAPY IN GASTRIC CANCER VIA MULTI-DIMENSIONAL ANALYSES**

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**Objectives:** The use of a single biomarker is not adequate to stratify patients with gastric cancer who can benefit from anti-programmed cell death protein 1 (PD-1)[A1] /programmed death-ligand 1 (PD-L1) therapy, presumably due to the complexity of the tumor microenvironment. Moreover, the predictive value of tumor-infiltrating immune cells has not been definitively established in terms of density and spatial organization.

**Methods:** Multiplex immunohistochemistry was used to quantify *in situ* and at the subcellular resolution CD8, PD-1, TIM-3, LAG-3, CD4, FoxP3, CTLA-4, PD-L1, CD68, CD163, HLA-DR, stimulator of interferon genes (STING), CD20, and CD66b in tumor tissues from 80 patients with gastric cancer. Supervised machine learning methods trained classifiers to map the characteristics of immunotherapy response. We applied Cox proportional hazards regression to assess prognostic survival associations of tumor-infiltrating immune cells, while controlling for potential confounders, including stage and microsatellite instability status.

**Results:** High densities of CD8+PD-1+LAG-3+TIM-3+ T cells and CD68+STING+ macrophages were associated with inferior survival. The proximity of tumor-infiltrating immune cells to cancer cells was also correlated with patient survival. To predict the treatment response to immunotherapy, we established a multi-dimensional tumor-infiltrating immune cell signature by incorporating the density of CD4+FoxP3-PD-L1+, CD8+PD-1-LAG-3-, and CD68+STING+ cells and the spatial organization of CD8+PD-1+LAG-3- T cells. The tumor-infiltrating immune cell signature enabled the prediction of the objective response of gastric cancer to anti-PD-1/PD-L1 immunotherapy (the maximum and minimum area under the curves of four algorithms were 0.84 and 0.78, respectively) and patient survival.

**Conclusions:** Our findings highlight the potential of using a multi-dimensional tumor-infiltrating immune cell signature for selecting patients who can benefit the most from anti-PD-1/PD-L1 immunotherapy.

*Pathology, biomarkers, liquid biopsy, molecular classification*

IGCC22-ABS-1135

## **ELEVATED MICROSATELLITE INSTABILITY AT SELECTED TETRANUCLEOTIDE REPEATS (EMAST) IN GASTRIC CANCER**

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\* 1

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**Objectives:** Elevated microsatellite instability at selected tetranucleotide repeats (EMAST) specifically refers to instability at tetranucleotide microsatellite markers. It is not clear, if EMAST alone or in the context of classical microsatellite instability (MSI) represents a particular type of instability, which differentiates MSI into specific subgroups and/or represents a unique type of instability. Here we investigated the clinical impact of EMAST in the context of neoadjuvant chemotherapy (CTx) in gastric/gastro-esophageal adenocarcinomas.

**Methods:** We analysed 583 resected tumours (without and after CTx) and 142 tumour biopsies before CTx. If at least two or three of five tetranucleotide repeat markers tested showed instability, the tumours were defined as EMAST (2+) or EMAST (3+) respectively. Expression of mismatch repair (MMR) proteins, MSH2, MSH6, MLH1, PMS2 and MSH3 was analysed using immunohistochemistry. MSI and Epstein-Barr virus positivity were determined using standard assays.

**Results:** EMAST (2+) and (3+) was detected in 17.8% and 11.5% of the tumours respectively. EMAST (2+ or 3+) demonstrated a high overlap with high MSI (-H) (each overall  $p < 0.001$ ). Loss of expression of one or two of the MMR proteins MSH2, MSH6, MLH1 or PMS2 was exclusively found in MSI-H tumors. EMAST (2+ or 3+) alone in MSI-H and EBV negative tumours, demonstrated only an association of EMAST (2+) with negative lymph node status ( $p = 0.045$ ). EMAST alone in neither definition was significantly associated with survival of the patients nor with response to neoadjuvant CTx.

**Conclusions:** In conclusion, our results demonstrate a nearly complete intersection between MSI-H and EMAST and they indicate that EMAST alone is not a distinct instability type associated with noticeable clinical-pathological characteristics of gastric carcinoma patients.

*Pathology, biomarkers, liquid biopsy, molecular classification*

IGCC22-ABS-1166

## ROSIGLITAZONE SPECIFICALLY REPRESSES TUMOUR METASTATIC POTENTIAL IN FABP4-DEFICIENT GASTRIC CANCER

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**Objectives:** Efforts to prevent recurrence in gastric cancer (GC) patients are limited by incomplete understanding of pathological mechanisms. The present study aimed to identify novel tumour metastasis-associated genes and investigate potential value of these genes in clinical diagnosis and therapy.

**Methods:** RNA sequencing was performed to identify differentially expressed genes related to GC metastasis. The expression and prognostic significance of fatty acid binding protein 4 (FABP4) were evaluated in two independent cohorts of GC patients. Chromatin immunoprecipitation sequencing, diverse mouse models and assays for transposase-accessible chromatin with high-throughput sequencing were used to investigate the roles and mechanisms of action of FABP4.

**Results:** The results of the present multicentre study confirmed an association between a decrease in the expression of FABP4 and poor outcomes in GC patients. FABP4 inhibited GC metastasis but did not influence tumour growth *in vitro* and *in vivo*. Mechanistically, FABP4 binding with peroxisome proliferator-activated receptor  $\gamma$  (PPAR- $\gamma$ ) facilitated the translocation of PPAR- $\gamma$  to the nucleus. FABP4 depletion suppressed PPAR- $\gamma$ -mediated transcription of cell adhesion molecule 3 (CADM3), which preferentially governed GC metastasis. Notably, the PPAR- $\gamma$  agonist rosiglitazone reversed the metastatic properties of FABP4-deficient GC cells *in vitro* and demonstrated viable therapeutic potential in multiple mouse models. For GC patients with diabetes, low FABP4 portends better prognosis than high FABP4 after receipt of rosiglitazone treatment. Additionally, chromatin inaccessibility induced by HDAC1 reduced FABP4 expression at the epigenetic level.

**Conclusions:** Our findings suggest that chromatin inaccessibility orchestrates a reduction in FABP4 expression, which inhibits CADM3 transcription via PPAR- $\gamma$ , thereby resulting in GC metastasis. The antidiabetic drug rosiglitazone restores PPAR- $\gamma$ /CADM3 activation in FABP4-deficient GC and thus has promising therapeutic potential.

*Pathology, biomarkers, liquid biopsy, molecular classification*

IGCC22-ABS-1299

## **IN GASTRIC CANCER TCGA SUBGROUPS ARE PROGNOSTICALLY MORE RELEVANT THAN LAUREN'S HISTOLOGICAL SUBTYPE**

Hedde D. Biesma\*<sup>1</sup>, Tanya T. D. Soeratrani<sup>1</sup>, Hendrik F. van Essen<sup>1</sup>, Jos B. Poell<sup>1</sup>, Erik van Dijk<sup>1</sup>, Elma Meershoek - Klein Kranenbarg<sup>2</sup>, Henk H. Hartgrink<sup>2</sup>, Cornelis J. H. van de Velde<sup>2</sup>, Mark A. van de Wiel<sup>3</sup>, Bauke Ylstra<sup>4</sup>, Nicole C. T. van Grieken<sup>1</sup>

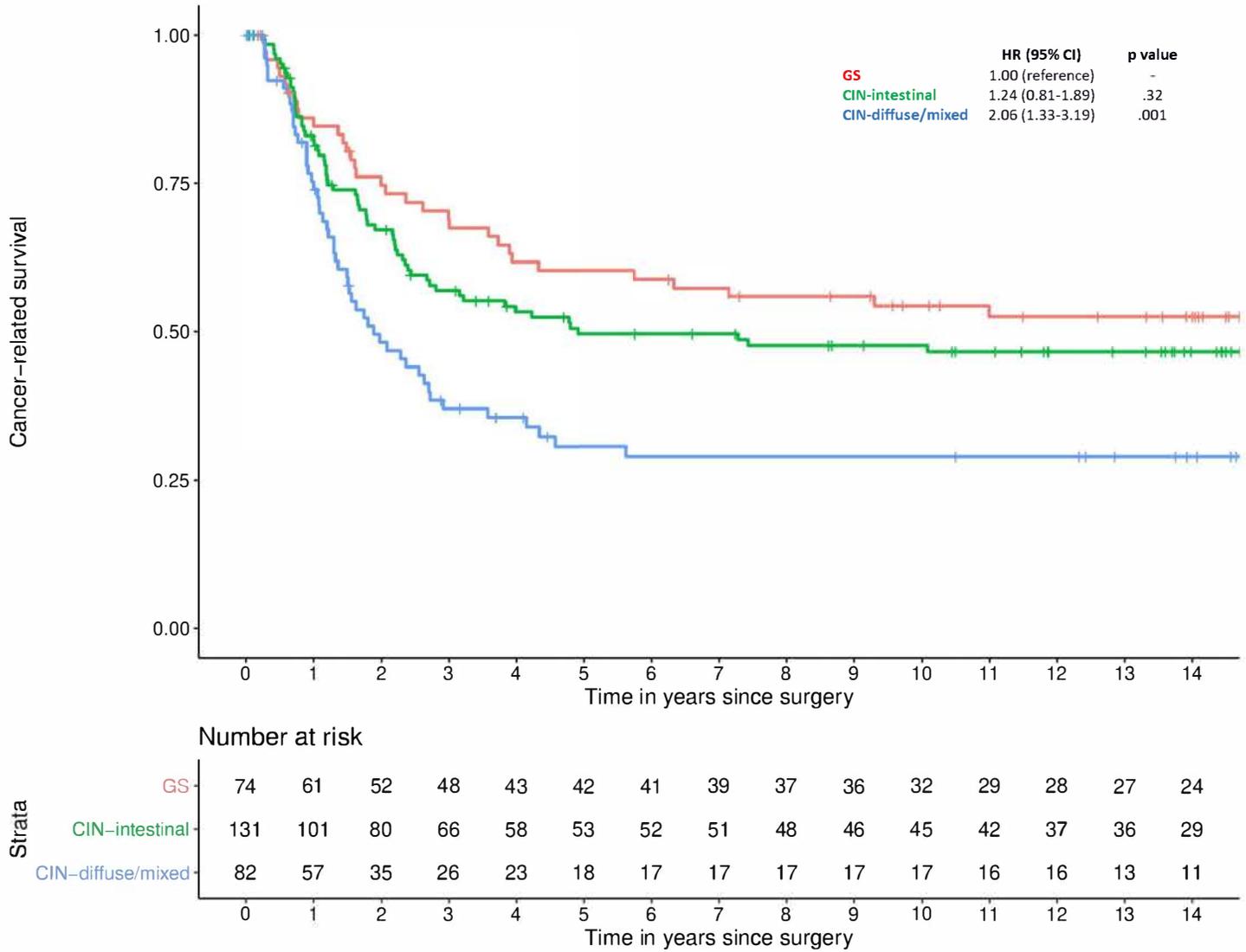
<sup>1</sup>Department of Pathology, Cancer Center Amsterdam, Amsterdam University Medical Centers, VU University, Amsterdam, <sup>2</sup>Department of Surgery, Leiden University Medical Center, Leiden, <sup>3</sup>Department of Epidemiology and Biostatistics, Amsterdam University Medical Centers, VU University, <sup>4</sup>Department of Pathology, Cancer Center Amsterdam, Amsterdam University Medical Centers, VU University, Amsterdam, the Netherlands, Amsterdam, Netherlands

**Objectives:** Data on the prognostic value of TCGA genomically stable (GS) and chromosomal unstable (CIN) subgroups are still limited, because exact definitions for them are lacking. Instead, other approaches to stratify tumors, such as Lauren's classification or p53 expression are frequently used. Here, we compare the prognostic value of GS and CIN based on copy number (CN) aberrations with these other approaches.

**Methods:** EBV negative and microsatellite stable (EBV-/MSS) tumors from patients treated with surgery without systemic treatment in the D1/D2 trial were assigned to subgroups by four methods: TCGA clustering of DNA CN sequencing data in GS or CIN, genome instability index (GII), Lauren's classification, and p53 immunohistochemistry. A classification and regression tree (CART) algorithm was used to identify subgroups with most distinct prognostic value.

**Results:** In total 287 patients were included. According to TCGA 74 (26%) tumors were GS and 213 (74%) were CIN. By GII 168 (59%) tumors were CN-high and 119 (41%) were CN-low. Histologically 151 (53%) tumors were intestinal and 136 (47%) were diffuse/mixed. 71 of 190 (37%) available tumors had aberrant p53 expression. GS and CIN by TCGA had the strongest cancer-related survival (CRS) difference. Lauren's classification had additional prognostic value, but only in the CIN group. The GS group included 54 diffuse/mixed and 20 intestinal type tumors, but without survival differences by Lauren's histotypes. GII or p53 expression did not show additional prognostic value to any of the classifications. Five-year CRS of GS (n=74), CIN-intestinal (n=131), and CIN-diffuse/mixed (n=82) were 60.3%, 49.6%, and 30.7%, respectively.

**Image:**



**Conclusions:** Males with MSI-high GC have repeatedly shorter OS compared to females in three independent cohorts. In addition, we show that MSI is only a favorable prognostic factor in female GC patients, but not in males. Therefore, sex differences should be taken into account in clinical trials in (MSI-high) GC. Translational studies are warranted to understand the biology underlying these sex differences.

*Pathology, biomarkers, liquid biopsy, molecular classification*

IGCC22-ABS-1427

## **ANALYSIS OF PROGNOSTIC VALUE AND IMMUNE INFILTRATION OF TIMP FAMILY IN STOMACH ADENOCARCINOMA**

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**Objectives:** Stomach adenocarcinoma (STAD) is one of the common malignant tumors worldwide. Tissue inhibitor of metalloproteinases (TIMP) family proteins is a multi-gene family of encoded proteins and are related to the development of various cancers by inhibiting matrix metalloproteinase family activity and promoting proliferation. However, the expression and prognosis of TIMP family and tumor-infiltrating lymphocytes in STAD have yet to be analyzed. **Methods:** Gene Expression Profiling Interactive Analysis (GEPIA), Kaplan-Meier plotter, cBioPortal, GeneMANIA, and TIMER2.0 were utilized to analyze differential expression, prognostic value, genetic alteration and immune cell infiltration of TIMPs in stomach adenocarcinoma patients.

**Results:** The expression levels of TIMP1/2 were significantly elevated in STAD tissues, whereas the expression levels of TIMP3/4 were reduced. TIMP3 was significantly associated with the pathological stage and short disease-free survival (DFS) in STAD patients. High mRNA expression of TIMP1/2/3 was associated with short overall survival (OS) in stomach adenocarcinoma patients. TIMP1/2/3 could be potential prognostic biomarkers for the survival of STAD patients.

Moreover, the functions of the differentially expressed TIMPs were primarily related to the matrix metalloproteinase signaling pathway. The expression of TIMPs were significantly correlated with the infiltration of diverse immune cells, including three types of CD4<sup>+</sup> T cells, CD8<sup>+</sup> T cells and macrophages in stomach adenocarcinoma.

**Conclusions:** Our study may provide novel insights for the selection of prognostic biomarkers of TIMP family in stomach adenocarcinoma.

**Pathology, biomarkers, liquid biopsy, molecular classification**

IGCC22-ABS-1103

**NEW PROGNOSTIC VALUE OF THE COMBINED INDEX OF PROGNOSTIC NUTRITIONAL INDEX AND D-DIMER**

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**Objectives:** It has been reported that both prognostic nutritional index (PNI) and the D-dimer are related to the degree of malignancy in various types of cancer. This study compared the combined index of PNI and D-dimer (PNI-D) with the other prognostic values for predicting the prognosis of patients with resectable gastric cancer.

**Methods:** We collected data on 1218 consecutive patients with gastric cancer who underwent curative gastrectomy. Patients were divided into three PNI-D score groups based on the following criteria: score 2, both low PNI ( $\leq 46$ ) and high D-dimer ( $> 1.0 \mu\text{g/ml}$ ); score 1, either low PNI or high D-dimer; and score 0, neither abnormality. The association between prognosis and PNI-D scores was evaluated using the Kaplan–Meier method and Cox multivariate analysis.

**Results:** PNI-D scores increased with tumor stage and significantly associated with pT ( $P < 0.0001$ ), pN ( $P < 0.0001$ ), and pStage ( $P < 0.0001$ ). PNI-D groups showed significantly different OS (log-rank  $P < 0.0001$ ) and recurrence-free survival (log-rank  $P < 0.0001$ ). High PNI-D scores groups had gradually worse RFS and OS than low PNI-D scores groups. The 5-year OS rate for the groups with PNI-D scores of 2, 1, and 0 was 64.7%, 80.7%, and 91.4%, respectively. The 5-year RFS rate for the groups with PNI-D scores of 2, 1, and 0 was 61.3%, 79.0%, and 90.2%, respectively. A Cox multivariate analysis of OS and RFS revealed that a high PNI-D score (2) was an independent prognostic factor ( $P = 0.006$ ,  $P = 0.0008$ , respectively).

**Conclusions:** PNI-D score was an independent prognostic factor in patients with gastric cancer.

**Pathology, biomarkers, liquid biopsy, molecular classification**

IGCC22-ABS-1440

## **CELL FREE DNA METHYLATION PROFILES AND H. PYLORI INFECTION ENABLE DIAGNOSIS FOR GASTRIC CANCER**

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**Objectives:** Gastric cancer (GC) is a common cancer around the world. In this study, we performed comprehensive epigenetic profiling of cell-free DNA (cfDNA) and analyzed *H. pylori* specific antibodies to identify a novel biomarker panel for GC detection.

**Methods:** Depending on the national Upper Gastrointestinal Cancer Early Detection Project in Linqu County, Shandong Province of China, a high-risk area for GC, we selected 52 controls with normal gastric mucosa or superficial gastritis (SG) and 42 GC patients. For large-scale screening of novel methylation biomarkers, we used the MCTA-seq (methylated CpG tandems amplification and sequencing) detect more than 200,000 CpG sites. For GC-related *H. pylori* specific antibodies selection, recomLine Helicobacter IgG assay was utilized to compare the seroprevalence of twelve different antibodies.

**Results:** MCTA-seq totally identified differentially methylated regions in more than 15,000 CpG Islands and 10,000 promoter areas by comparing plasma samples from GC and control subjects. We selected five candidate genes (CCDC179, GML, OR7E156P, CACNG5 and LRCH4) with top methylation fold changes and area under ROC curve (AUC) preliminarily. The five genes were selected to calculate a methylation score (M-score). From the twelve *H. pylori* specific antibodies, five high-risk antibodies (CagA, FliD, HpaA, Omp and HP0305) were found to be associated with GC. The five high-risk antibodies were used to calculate a protein score (P-score). The integrated model including age, sex, M-score and P-score can discriminate GC patients from normal controls with higher accuracy (AUC = 0.97) comparing to the model with only sex, age and total *H. pylori* IgG antibody (AUC = 0.65).

**Image:**

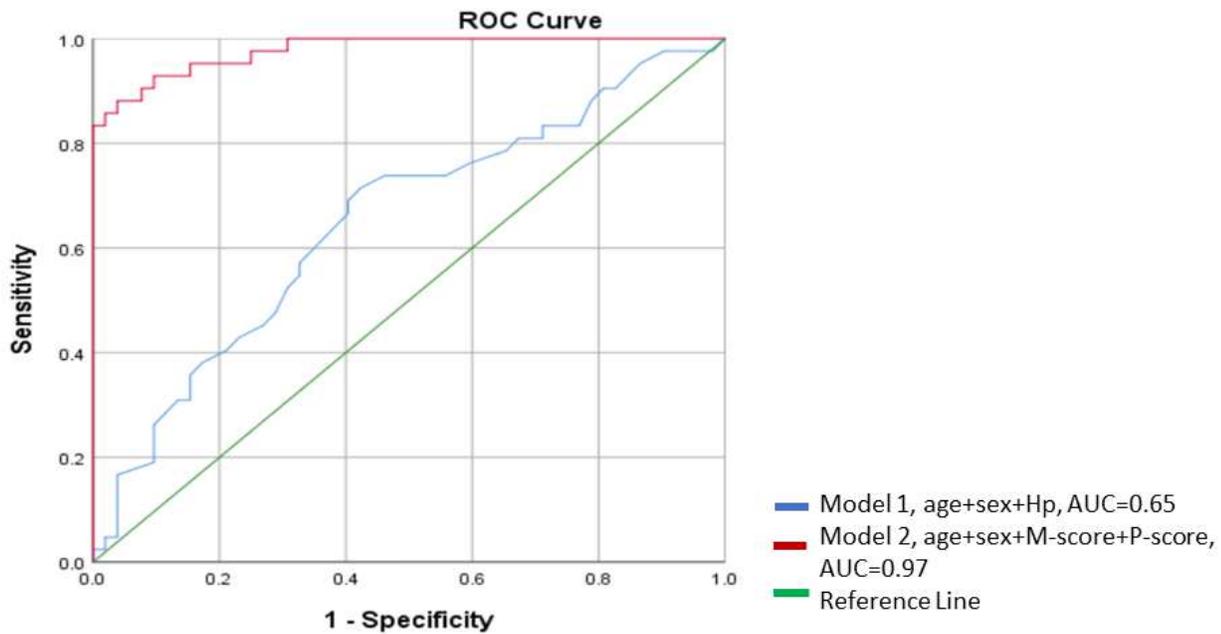


Fig 1. ROC curves and corresponding AUCs of age, sex, M-score and P-score

**Conclusions:** Our findings provide preliminary evidence that the combination of cfDNA methylation biomarkers and high-risk *H. pylori* specific antibodies may serve as a potential non-invasive multi-analyte assay for GC early detection. However, prospective and multi-center validation of the candidate biomarkers is still needed in the future.

*Pathology, biomarkers, liquid biopsy, molecular classification*

IGCC22-ABS-1085

## WHOLE TISSUE IMAGING USING MICRO-COMPUTED TOMOGRAPHY FOR PATHOLOGICAL EVALUATION OF GASTRIC CANCERS

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**Objectives:** Conventional pathological diagnosis (CPD) using glass slides, is made based on two-dimensional images. However, the reviewed slide is a part of cross-sections of the specimen, which potentially overlooks most invaded part or the closest tumor margins. Micro-computed tomography (Micro-CT) nondestructively provides three-dimensional, reconstructed, whole tissue images (WTIs) and thus, contributes to the precise pathological diagnosis. This study aimed to clarify what pathological information micro-CT could provide in the evaluation of gastric endoscopic submucosal dissection (ESD) specimens.

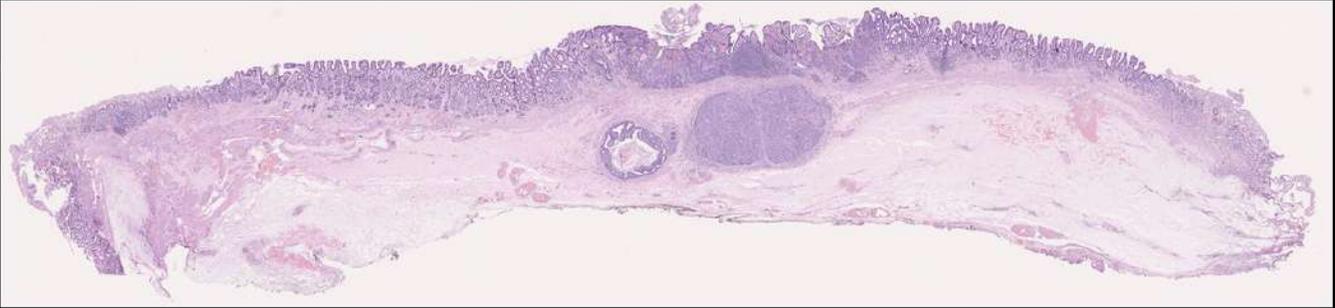
**Methods:** From November 2020 to May 2021, four cases with gastric cancer were treated by ESD at our institution. The specimens were soaked with 10% buffered formalin and Lugol's iodine, and then scanned using a micro-CT scanner for 10 minutes to obtain WTIs. We retrospectively evaluated the image quality, tumor-extension, the presence of tumor at the resection margin, and lymphovascular invasion by correlating WTIs with glass slides prepared for CPD.

**Results:** Clear visualization of mucosal glands was obtained in all cases. Clear submucosal images were achieved in three of the four cases.

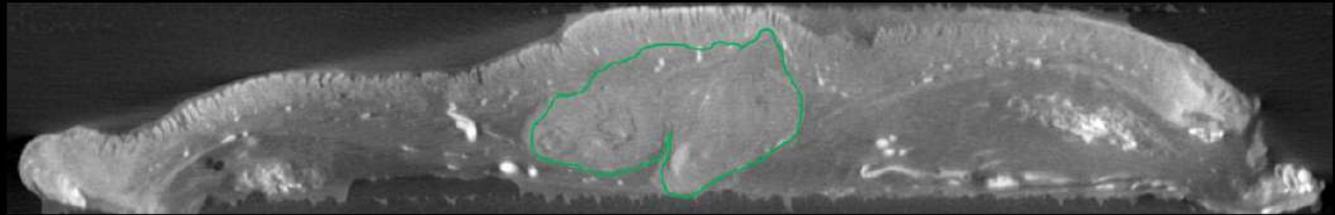
CPD showed that the histological type of resected lesion (tub1/por2) was 3/1. Evaluation of horizontal tumor-extension by WSIs was difficult because similar gland structures were observed between cancerous and normal glands. Vertical resection margin was clearly visualized and one case was diagnosed as positive, which was consistent with CPD. Two cases with submucosal invasion were detected by WSIs with the consistency of results of CPD. Furthermore, deeper submucosal invasion was detected by WTIs, in which the submucosal invasion was partly observed in CPD and a deeper submucosal invasion appeared in recut slides. Two cases with lymphovascular invasion were seen in CPD, which were not detected by WTIs.

**Image:**

HE slide for conventional pathological diagnosis. Submucosal invasion was partly observed.



One slice of micro-CT images. Massive submucosal invasion was seen (green area).



**Conclusions:** A combination of WTIs and CPD could provide a more accurate diagnosis in gastric ESD specimens.

*Pathology, biomarkers, liquid biopsy, molecular classification*

IGCC22-ABS-1151

## **A PLASMA EXTRACELLULAR VESICLE SCORE PREDICTS & MONITORS IMMUNOTHERAPY OUTCOMES OF GASTRIC CANCER**

Cheng Zhang<sup>1</sup>, Xiaoyi Chong\*<sup>1</sup>, Fangli Jiang<sup>1</sup>, Meng Fan<sup>2</sup>, Jin An<sup>2</sup>, Xuan Liu<sup>2</sup>, Xiaotian Zhang<sup>1</sup>, Lin Shen<sup>1</sup>

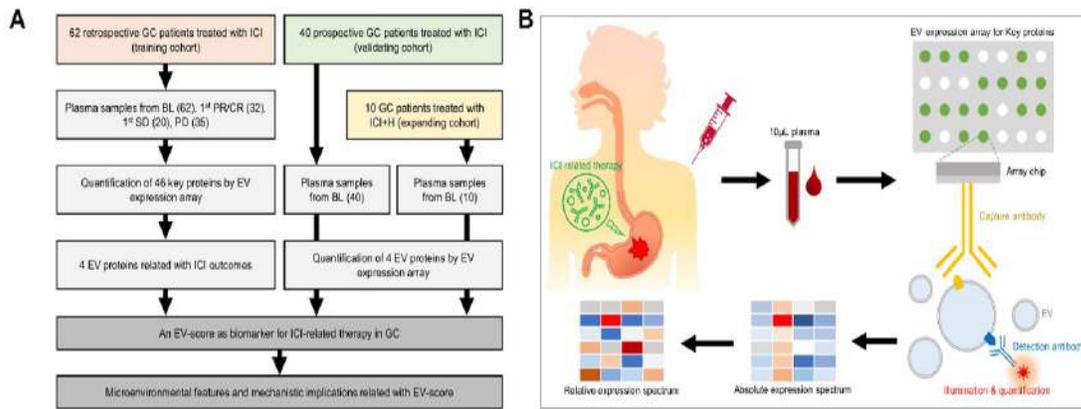
<sup>1</sup>Gastrointestinal Oncology, Key laboratory of Carcinogenesis and Translational Research (Ministry of Education/Beijing), Peking University Cancer Hospital & Institute, <sup>2</sup>Research and Development Department, EVbio Technology Co.,Ltd., Beijing, China

**Objectives:** Immune checkpoint inhibitors (ICIs) exert significant clinical effect on GC patients. However, due to the lack of proper biomarkers, the selection of patients for ICIs remain to be improved, which severely impedes patient benefit. Extracellular vesicles (EV) are known as transferring multiple bioactive cargos, directing cell-cell or cell microenvironment communications. Since proteins are the direct performer of biological activities, the tumor microenvironmental changes induced by immunotherapy can be recorded & presented by EV-derived proteins. Hence, we aimed to explore EV-derived proteins' roles in GC patients receiving ICIs.

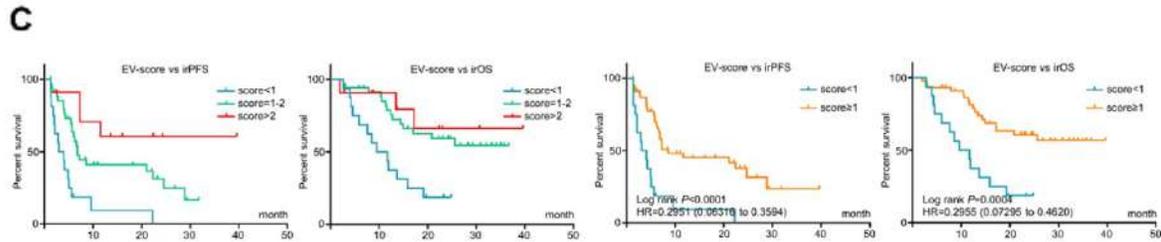
**Methods:** In our study, GC patients received ICI-related regimens were recruited as three independent cohorts for analysis. Through applying a plasma-based protein expression array, we described the profiles of 42 crucial EV-derived proteins. We assessed the correlation of plasma EV-derived proteins with the outcomes of ICIs or ICI-derived therapeutic combinations.

**Results:** 112 GC patients received ICI or ICI-related therapy were investigated retrospectively and prospectively in form of three cohorts. We identified four plasma EV-derived proteins from 42 candidates and combined them to generate a signature score that robustly predicting immunotherapeutic outcomes at baseline and dynamically monitoring disease progressions along with the whole treatment. High EV-score reflected activated immune microenvironment, characterized by more activated CD8<sup>+</sup> T cells, NK cells, higher expressions of IFN- $\gamma$ , perforin, granzymes in paired peripheral blood, which might be the mechanical explanation for the predictive role of EV-score.

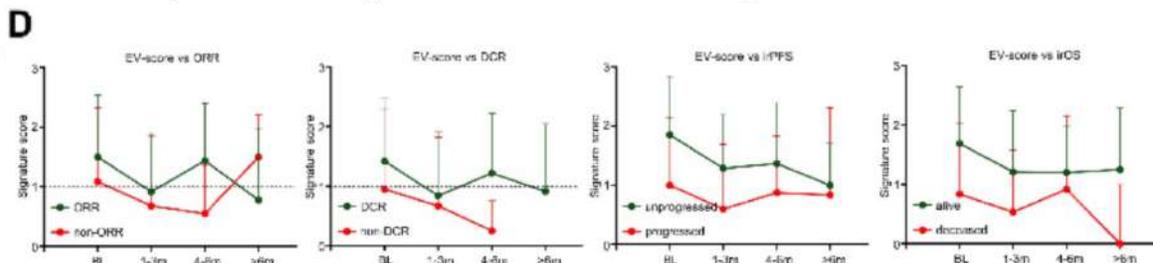
**Image:**



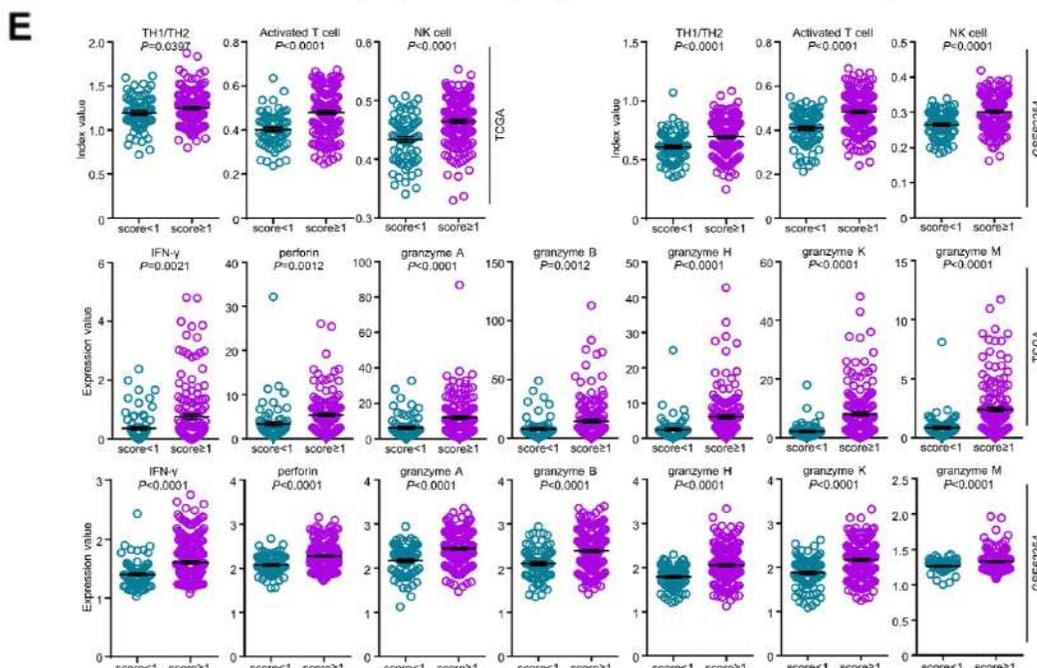
(A) An overall work flow of the whole study. (B) A sketch map for the procedures of EV expression array.



(C) The prognostic correlations of EV-derived ARG1, CD3, PD-L1 and PD-L2 at BL were assessed by Kaplan-Meier survival analysis. These four genes were further combined to generated an EV-score.



(D) Dynamic changes of EV-score along with the timeline of ICI treatment were compared between ORR/non ORR, DCR/non DCR, un-progressed / progressed and alive/deceased patients.



(E) The tissue-based TH1/TH2 ratio, activated T cell and NK cell were classified by tissue-score in TCGA and GSE62254 datasets. The tissue-based transcriptomic IFN- $\gamma$ , perforin and granzyme A/B/H/K/M expressions were classified by tissue-score in TCGA and GSE62254 datasets.

**Conclusions:** Our work proposed a plasma EV-score on protein level that powerfully predicting & monitoring ICIs outcomes of GC. Our work may potentially facilitate clinical applications like patient selection and decision-making, and provide mechanistical insights for immunotherapy-related microenvironmental changes and future improvements for current regimens.

*Pathology, biomarkers, liquid biopsy, molecular classification*

IGCC22-ABS-1388

## **SYNE1 ALTERATIONS ARE CORRELATED WITH TUMOR MUTATION BURDEN IN GASTRIC CANCER**

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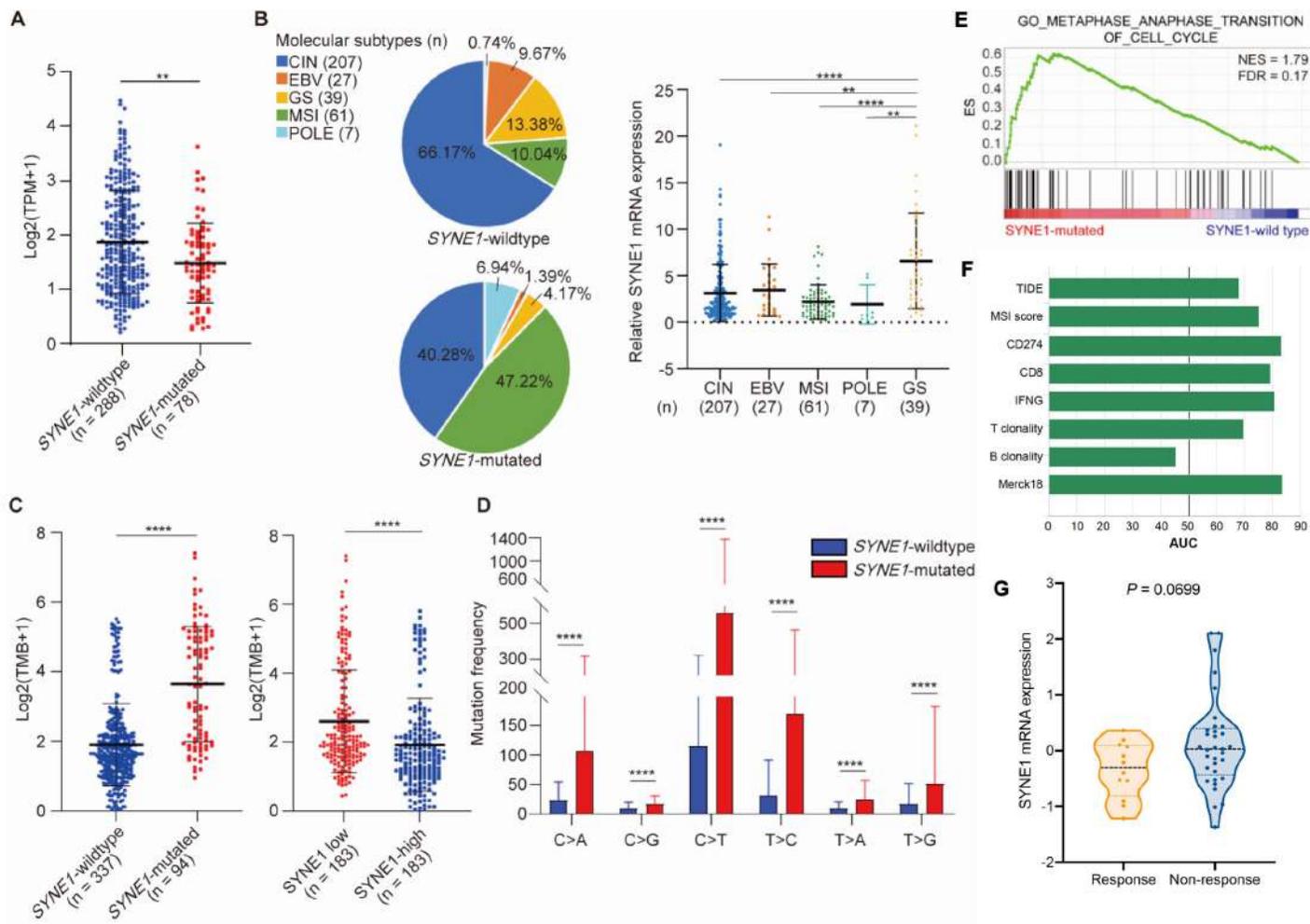
<sup>1</sup>Department of Surgical Oncology, <sup>2</sup>Department of Medical Oncology, First Affiliated Hospital of Zhejiang University, School of Medicine, Hangzhou, China

**Objectives:** SYNE1 is one of the most frequently mutated genes in gastric cancer. This study aims to investigate the correlation between SYNE1 (nesprin-1) alterations and tumor mutation burden (TMB) in gastric cancer (GC), and explore its potential to predict response to immune checkpoint inhibitor (ICI).

**Methods:** The correlation between SYNE1 alterations and other genomic characteristics were analyzed based on TCGA-GC database and our validation cohort of 70 GC cases. GO and KEGG analysis were conducted to analyze differentially expressed genes between SYNE1-upregulated and SYNE1-downregulated GC. The TIDE algorithm was used to predict response to ICI.

**Results:** SYNE1 is frequently mutated in GC and its mutation rate positively correlates to age at diagnosis. Somatic mutation of SYNE1 is associated with reduced expression of SYNE1. According to TCGA molecular classification of GC, SYNE1-mutated GC consists of significantly higher proportion of MSI and POLE subtypes than SYNE1-wildtype GC, while the mRNA expression of SYNE1 is reduced in GC of MSI and POLE subtypes. Somatic mutation and reduced expression of SYNE1 are associated with significantly higher TMB ( $P < 0.01$ ). GCs with SYNE1 mutation harbor more frequent C>T substitution. Pathway analysis revealed that SYNE1 is associated with cell cycle regulation. Analysis using TIDE algorithm showed that SYNE1 mutation correlates with multiple existing biomarkers for response to ICI. In a clinical trial of PD-1 inhibitor therapy for GC, GC cases with good response tended to have lower expression of SYNE1 than non-responders ( $P = 0.0699$ ,  $n = 45$ ).

**Image:**



**Conclusions:** Somatic mutation and reduced expression of SYNE1 are associated with high TMB in GC, and could potentially serve as a predictive biomarker for ICI therapy.

*Pathology, biomarkers, liquid biopsy, molecular classification*

IGCC22-ABS-1136

### **IMMUNE PROFILE IN P53-MUTATED AND P53-WILD TYPE GASTRIC CANCER PATIENTS**

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María Paz Rodríguez<sup>3</sup>, Patricio Manque<sup>3</sup>, Juvenal A. Ríos<sup>3</sup>, Marcelo Garrido<sup>3</sup>

<sup>1</sup>Masters Program of Research in Health Sciences, School of Medicine, Pontificia Universidad Católica de Chile, <sup>2</sup> Translational Medicine Laboratory, Fundación Arturo López Pérez Cancer Center, <sup>3</sup>Precision Oncology Center, School of Medicine, Faculty of Sciences, Universidad Mayor, Santiago, Chile

**Objectives:** Gastric cancer (GC) incidence and mortality rates are characterized by their geographical heterogeneity. In Chile, GC is the second leading cause of death by neoplasms. To date, GC patients' response to standard therapies remains limited. Herein, we obtained clinical data, immune profiles, protein expression and P53 genetic status in a cohort of Chilean patients.

**Methods:** From 91 GC patients, we studied a subset of 23 patients with stage III disease at diagnosis, availability of protein expression results according to gastric cancer molecular classification, and P53 genetic status. Protein expression was analyzed by a Tissue MicroArray. We performed Next Generation Sequencing to assess p53 status (WT or Mutated). The immune profile was determined by multiplexed immunofluorescence on FFPE tissue samples. Kaplan-Meier method was used to calculate OS. Distribution of immune markers was tested by two-sample Kolmogorov-Smirnov test.

**Results:** After excluding GC patients categorized as EBV, MMRd, and EMT-like subtypes, we defined 2 GC subgroups according to p53 gene status: p53-WT (n=14; 60.9%) or p53-Mutated (n=9; 39.1%). Clinical characteristics including age at diagnosis, height, weight, location of primary tumor, and histological type were similar between both groups. HER2+ was predominant in p53-Mut patients (n=4, 44.4%) compared to p53-WT (n=1, 7.1%)(p=0.0343). Median overall survival were 25 months (95% CI: 18-NA) for p53-Mutated and 44.5 months (95% CI: 26-NA) for p53-WT (p=0.68). We found higher counts of immune markers in p53-WT samples compared to p53-Mut, including PD1, PDL1, CD3, CD8, CD45 and CD68 (Table 1).

**Image:**

**Table 1.** Total counts of immune markers by p53 genetic status (n=23).

Immune marker		p53-Mut n=9	p53-WT n=14	P-value
PD1	Mean (SD)	411 (742)	854 (951)	<0.001
	Median [Min, Max]	35.0 [2.00, 2300]	529 [16.0, 3220]	
PDL1	Mean (SD)	207 (255)	1390 (3600)	<0.001
	Median [Min, Max]	98.0 [12.0, 823]	240 [4.00, 13700]	
CD3	Mean (SD)	514 (619)	1510 (2580)	<0.001
	Median [Min, Max]	200 [71.0, 1850]	707 [12.0, 9560]	
CD8	Mean (SD)	654 (1290)	1590 (2130)	<0.001
	Median [Min, Max]	141 [6.00, 3970]	293 [26.0, 5980]	
CD45	Mean (SD)	620 (682)	1430 (2390)	<0.001
	Median [Min, Max]	307 [90.0, 2060]	559 [11.0, 8340]	
CD68	Mean (SD)	179 (152)	375 (428)	<0.001
	Median [Min, Max]	151 [16.0, 454]	221 [40.0, 1410]	

**Conclusions:** Our study suggests distinctive immune profiles between p53-Mut and p53-WT. Although having a higher frequency of HER2+, p53-Mut subgroup displayed poorer survival. Future studies should explore actionable targets in these subsets in order to improve their survival and expand the determination at diagnosis of HER2 and PDL1 in localized GC.

*Pathology, biomarkers, liquid biopsy, molecular classification*

IGCC22-ABS-1163

## **CDK5RAP3 ACTS AS A TUMOUR SUPPRESSOR IN GASTRIC CANCER THROUGH THE TUMOUR-ASSOCIATED MACROPHAGES**

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**Objectives:** We have demonstrated that CDK5RAP3 exerts a tumour suppressor effect in gastric cancer, but its role in regulating tumour-associated macrophages (TAMs) has not yet been reported.

**Methods:** Immunohistochemistry (IHC) was used to detect the expression of CD68, CD206, and CDK5RAP3 in human gastric cancer tissues. The polarization characteristics of M1 and M2 macrophages were detected by RT-PCR, IHC and flow cytometry. The effects of CDK5RAP3 on the polarization of TAMs were studied in vitro and in vivo. CDK5RAP3-targeting cytokines/pathways were analysed through public data sets and further confirmed by coculture assay, RT-PCR, and Western blot. Plate cloning, Western blotting, RT-PCR, and a mouse xenograft tumour model were used to verify the effect of MMP2 secreted by macrophages on the invasion, migration and metastasis of gastric cancer.

**Results:** In the present study, we found that CDK5RAP3 is related to the infiltration and polarization of macrophages. CDK5RAP3 in gastric cancer inhibited the polarization of TAMs to M2 macrophages and promoted the polarization of the M1 phenotype. CDK5RAP3 in gastric cancer reduces the recruitment of circulating monocytes to infiltrate tumour tissue by inhibiting the CCL2/CCR2 axis. Blocking CCR2 reduced the growth of xenograft tumours and the infiltration of monocytes. CDK5RAP3 in gastric cancer inhibits the nuclear transcription of NF- $\kappa$ B, thereby reducing the secretion of the cytokines IL4 and IL10 and blocking the polarization of M2 macrophages. In addition, the absence of CDK5RAP3 in gastric cancer cells allows macrophages to secrete more MMP2 to enhance the EMT process of gastric cancer cells, thereby enhancing the invasion and migration ability of gastric cancer cells.

**Conclusions:** The absence of CDK5RAP3 in gastric cancer allows tumour-associated macrophages to infiltrate tumour tissue and present a cancer-promoting phenotype. CDK5RAP3 may be involved in the regulation of immune activity in the tumour microenvironment.

**Pathology, biomarkers, liquid biopsy, molecular classification**

IGCC22-ABS-1204

**NEUTROPHIL-LYMPHOCYTE RATIO IS CORRELATED WITH PATHOLOGICAL RESPONSE TO CHEMO IN GASTRIC CANCER**

Marina A. Pereira<sup>1</sup>, Daniel J. Szor<sup>1</sup>, Marcus F. K. P. Ramos<sup>1</sup>, André R. Dias<sup>1</sup>, Leonardo Cardili<sup>2</sup>, Bruno Zilberstein<sup>1</sup>, Sergio C. Nahas<sup>1</sup>, Venancio A. F. Alves<sup>2</sup>, Ulysses R. Júnior<sup>1</sup>, Evandro S. de Mello<sup>2</sup>

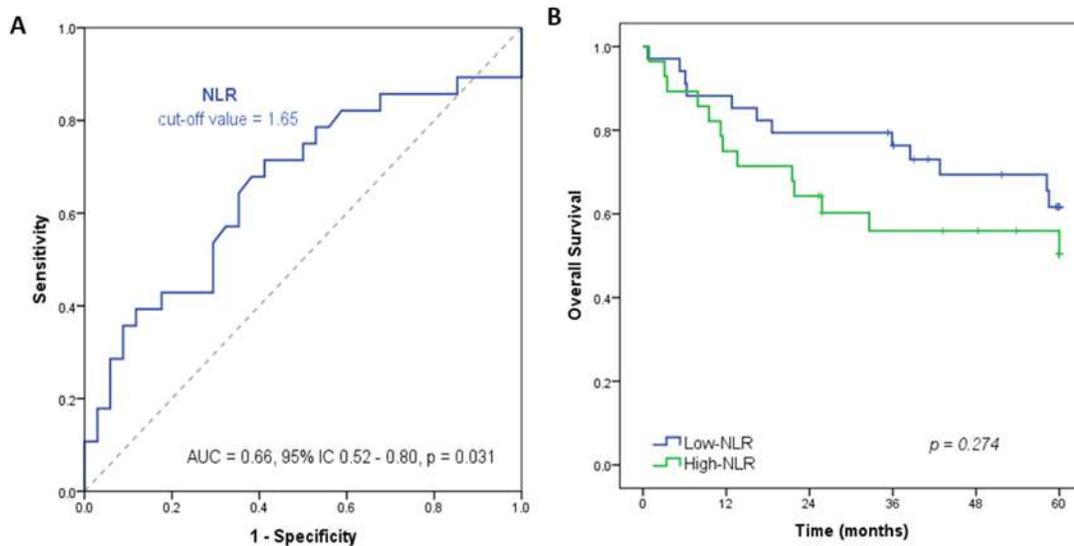
<sup>1</sup>Department of Gastroenterology, <sup>2</sup>Department of Pathology, Instituto do Câncer do Estado de São Paulo, São Paulo, Brazil

**Objectives:** To investigate whether pretreatment neutrophil-lymphocyte ratio (NLR) is associated with pathological response in curative resected gastric cancer (GC) following chemotherapy (CMT).

**Methods:** We performed a retrospective analysis of GC patients who received preoperative CMT followed by gastrectomy. NLR cutoff value was determined to identifying patients likely to achieve pathological response using receiver operating characteristic (ROC) curve. Tumor response was evaluated according to the Tumor Regression Grading (TRG) proposed by the AJCC. For analysis, patients were classified in pathological responders (PR) (TRG0/1/2) and non-pathological responder (non-PR) (TRG3).

**Results:** A total of 62 GC patients were eligible for analysis. The mean age was 62.6 years, and 46 (74%) patients were male. Mean lymph node retrieval was 40.7, and 64.5% of cases had nodal involvement. Mean NLR was  $2.18 \pm 1.97$ , and 28 (45.2%) GCs were classified as PR and 34 (54.8%) as non-PR. Complete PR was achieved in 2 (3.2%) cases. An optimal NLR cut-off value of 1.65 was identified, with an accuracy of 66% (AUC=0.66, 95%IC 0.52-0.80,  $p=0.031$ ). Accordingly, 34 (54.8%) and 28 (45.2%) patients were determined as low-LNR and high-LNR, respectively. We found that high-NLR group values were significantly associated with ASAIII (28.6% vs 5.9%,  $p=0.016$ ), total gastrectomy (82.1% vs 44.1%,  $p=0.002$ ), ypN2/N3 (60.7% vs 32.4%,  $p=0.026$ ), and advanced ypTNM stage (ypTNMIII = 64.3% vs 35.3%,  $p=0.023$ ). Low-NLR had a higher frequency of PR than high-LNR group (58.8% vs 28.6%,  $p=0.017$ ). No difference in overall survival was observed between low and high-NLR groups ( $p=0.274$ ); Logistic regression analyses indicated that high-NLR (OR:6.89,  $p=0.006$ ) and intestinal type (OR:8.41,  $p=0.003$ ) were independent factors related to non-PR in GC.

**Image:**



**Conclusions:** NLR was associated with response to CMT in GC patients. Preoperative high-NLR was independently related with non-PR GC, and may be used to predict benefit from chemotherapy and improve patient selection.

*Pathology, biomarkers, liquid biopsy, molecular classification*

IGCC22-ABS-1079

## **MIR-605-3P-MEDIATED EXOSOMES RELEASEMENT AND CONTENT PROMOTE PRE-METASTATIC NICHE FORMATION**

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**Objectives:** Cancer induced pre-metastatic niche (PMN) formation in distal tissues and organs facilitate tumor metastasis and angiogenesis is considered to be the initial step of PMN formation.

**Methods:** The expression of miR-605-3p was investigated by qRT-PCR in gastric cancer (GC) patients. Its correlation with the clinicopathological characteristics and prognosis was analyzed in GC. Functional assays were performed to examine angiogenesis in vitro and in vivo. Related molecular mechanisms were clarified by RNA-seq, immunofluorescence, transmission electron microscopy, Nanoparticle tracking analysis, Elisa, luciferase reporter, zebrafish model and bioinformatics analysis assays.

**Results:** P53 activated miR-605-3p was screened, and was negative correlation with microvessel density (MVD) in GC. Low miR-605-3p expression predicted shorter overall survival and disease-free survival in GC. miR-605-3p-mediated GC-secreted exosomes regulate angiogenesis by regulating exosomal NOS3 derived from GC cells. Mechanistically, miR-605-3p targeted Rab11a to inhibit the motility of multivesicularbodies thus inhibited exosomes release in GC cells. Furthermore, miR-605-3p targeted NOS3 and decreased enrichment of GC-secreted exosomal NOS3 suppresses angiogenesis. In vivo, exosomal NOS3 was responsible for GC pre-metastatic niche formation in the lung and liver. Clinically, exosomal NOS3 in plasma was associated with metastasis in GC patients.

Cancer induced pre-metastatic niche (PMN) formation in distal tissues and organs facilitate tumor metastasis and angiogenesis is considered to be the initial step of PMN formation.

**Conclusions:** miR-605-3p is involved in PMN formation and miR-605-3p-mediated exosomal NOS3 may be used as a blood-based biomarker for GC metastasis.

**Pathology, biomarkers, liquid biopsy, molecular classification**

IGCC22-ABS-1349

**ASSOCIATION OF LRP1B MUTATIONS WITH HIGH TUMOR MUTATION BURDEN AND WORSE SURVIVAL IN GASTRIC CANCER**

Xiao Meng Ji<sup>1, 2</sup>, Shuhang Xu<sup>3</sup>, Jianyong Shao<sup>1, 4</sup>, Yongming Chen<sup>1, 5</sup>

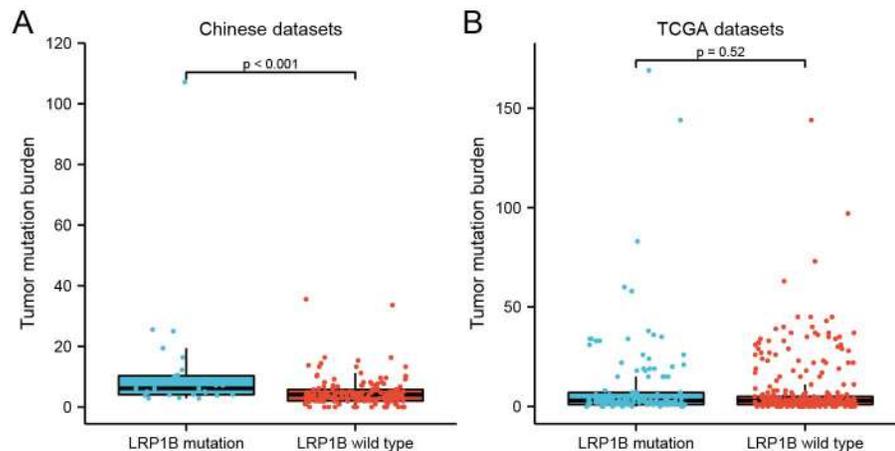
<sup>1</sup>State Key Laboratory of Oncology in South China, <sup>2</sup>Department of Medical Oncology, Sun Yat-sen University Cancer Center, <sup>3</sup>Department of Ultrasound, The Third Affiliated Hospital of Sun Yat-Sen University, <sup>4</sup>Department of Molecular Diagnostics, <sup>5</sup>Department of Gastric Surgery, Sun Yat-sen University Cancer Center, Guangzhou, China

**Objectives:** High tumor mutational burden (TMB) was an effective biomarker to Immune checkpoint inhibitors (ICIs) treatment, however, of which the rate is low in gastric cancers (GCs). More effective biomarkers are needed to be explored. LRP1B is a potential biomarker with few reports focus on. In our study, we investigated whether LRP1B mutations (LRP1B-m) are associated with TMB, providing a useful biomarker for ICIs in GC.

**Methods:** Next-generation sequencing (NGS) was used to explore the relationship between LRP1B and TMB in tumor specimens and matched blood samples. The whole genome sequencing (WGS), clinical and demographic data were downloaded from TCGA. Somatic mutations for samples in TCGA datasets was downloaded from Genome Data Commons.

**Results:** A total of 178 patients were collected in Sun Yat-sen University Cancer Center from January 2018 to August 2020. 431 patients from TCGA database were included. The percentage of LRP1B mutation (LRP1B-m) was 15.7% (28/178), 30.2% (130/431) in our and TCGA dataset, respectively. Patients harboring LRP1B-m presented significantly higher TMB than that with wild type ( $P < 0.001$ ). However, the result in TCGA datasets is meaningless ( $P = 0.52$ ). The OS was numerically shorter in the patients with LRP1B-m than the rest of the patients in the TCGA datasets. The DFS was shorter in the patients harboring LRP1B-m than that with wild type in Chinese datasets.

**Image:**



**Conclusions:** LRP1B mutation is associated with higher TMB and is an inferior prognostic factor for GC. In consideration of the association with TMB-h and higher response rates after ICIs therapy, it is a hint that LRP1B may be an effective biomarker for ICIs therapy in GC.

*Pathology, biomarkers, liquid biopsy, molecular classification*

IGCC22-ABS-1423

## **GASTRIC ADENOCARCINOMA IN TWO DIFFERENT DECADES - CLINICAL AND HISTOPATHOLOGICAL PROFILE**

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**Objectives:** Evaluate if the epidemiological and histological features changes observed worldwide, also occurred in our service.

**Methods:** Retrospective observational study from 1997 to 2018. The epidemiological, histological, clinical, surgical and oncological data analyzed. The variables analyzed were age, gender, tumor locations, Laurén type and the histopathological subclassification, TNM stage by the 7<sup>th</sup> UICC edition, operability, global mortality. The patients were divided in 2 groups: group A – from 1997 to 2006 and group B – from 2007 to 2016. For statistical analysis, the Mann-Whitney, Chi-square test or Fisher's exact test were used.

**Results:** A total of 968 patients were analyzed, 298 in group A and 670 in group B. No difference could be noticed concerning age (average of 62 years) and gender during the 2 periods analyzed. Male gender prevails in both groups in approximately 62%. In group A, diffuse histological type is present in 62.5% and poorly differentiated signet ring cells in 38.8%; similar results could be found in group B, 63.8% and 33.1% respectively. Concerning the operability, 30.9% were inoperable in group A, and 31.3% in group B. The global mortality shows a decrease of 16.7% in the second decade studied ( $p < 0.0001$ ). The TNM stage distribution was similar in the two groups. Group A: Stage I = 22.1%, Stage II = 12%, Stage III = 32.5% and Stage IV = 33.2%; and in group B: I = 20.5%, II = 12.6%, III = 33.2%, IV = 33.4%. Finally, regarding the tumor locations: distal lesions that invade the duodenum decreased 5.7% in group B ( $p = 0.0002$ ); Tumors invading the whole stomach (LMU) were less present in group B ( $p = 0.0413$ ); and proximal lesions (U) were slightly more present in group B ( $p = 0.045$ ).

**Conclusions:** Despite worldwide gastric cancer changes that has been observed in the past years, no major changes could be observed yet in our service. There are still high rates of advanced gastric cancer.

**Pathology, biomarkers, liquid biopsy, molecular classification**

IGCC22-ABS-1100

**USE OF PREDICTIVE BIOMARKERS IN GASTRIC CANCER PATIENTS IN A SINGLE CENTRE DAILY PRACTICE**

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**Objectives:** Novel treatments and clinical trials in gastric cancer (GC) patients, increasingly ask for biomarker testing, such as HER2, Mismatch repair (MMR) and Epstein-Barr Virus (EBV). Currently, clinical guidelines solely include testing HER2 for metastatic GC. In this study, the current use of potential predictive biomarkers in the diagnostics and their role in treatment of GC patients is evaluated.

**Methods:** This retrospective monocentre study evaluated testing for HER2, MMR and EBV status in 302 GC patients referred to our institute between January 2017 and February 2021. Data on genomic sequencing was separately analysed.

**Results:** In 91% of the tumours, at least one biomarker was tested and in 56% all three biomarkers were tested. Testing percentage increased from 74% in 2017 to 97% in 2020/2021. HER2 was most frequently tested (86%), followed by MMR (79%) and EBV (61%). Testing was performed in comparable frequency between locally advanced and metastatic/irresectable GC patients (87% vs. 96%). In 50% of the 44 patients with a positive test led the outcome to changes in therapy. Genome sequencing was performed in 46 patients; in 34 (74%) patients, genomic alterations were identified. TP53 mutation was most common (54%), followed by PIK3CA (17%) and KRAS (13%) mutations.

**Image:**

**Table 1**

**Patients with gastric cancer 2017-2021**

		n=302	%
<b>Patients tested for biomarkers</b>		275	91%
<b>HER2</b>	Tested	261	86%
	Tested positive	28	11%
	Treatment adjusted to HER2 status	15	54%
<b>MMR deficiency</b>	Tested	239	79%
	Tested positive	14	6%
	Treatment adjusted to MMR status	6	43%
<b>EBV</b>	Tested	184	61%
	Tested positive	2	1%
	Treatment adjusted to EBV status	1	50%

HER2 =human epidermal growth factor 2 receptor , MMR = mismatch repair deficiency, EBV = Epstein-Barr virus

**Conclusions:** Biomarker testing was common in a group of GC patients referred to our institute and it often affected treatment decisions. Whether biomarker testing helps to improve overall GC survival will follow the results of clinical trials.

*Pathology, biomarkers, liquid biopsy, molecular classification*

IGCC22-ABS-1156

## **M6A METHYLATION MEDIATES LHPP ACETYLATION AS A TUMOR AEROBIC GLYCOLYSIS SUPPRESSOR IN GASTRIC CANCER**

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**Objectives:** LHPP, a histidine phosphatase, has been implicated in tumor progression. However, its role, underlying mechanisms, and prognostic significance in human gastric cancer (GC) are elusive.

**Methods:** We obtained GC tissues and corresponding normal tissues from 8 patients and identified LHPP as a downregulated gene via RNA-seq. qRT-PCR and western blotting were applied to examine LHPP levels in normal and GC tissues. The prognostic value of LHPP was elucidated using tissue microarray and IHC analyses in two independent GC cohorts. The functional roles and mechanistic insights of LHPP in GC growth and metastasis were evaluated in vitro and in vivo.

**Results:** The results showed that LHPP expression was significantly decreased in GC tissues at both the mRNA and protein level. Multivariate Cox regression analysis revealed that LHPP was an independent prognostic factor and effective predictor in patients with GC. The low expression of LHPP was significantly related to the poor prognosis and chemotherapy sensitivity of gastric cancer patients. Moreover, elevated LHPP expression effectively suppressed GC growth and metastasis in vitro and in vivo. Mechanistically, the m6A modification of LHPP mRNA by METTL14 represses its expression; LHPP inhibits the phosphorylation of GSK3b through acetylation, and mediates HIF1A to inhibit glycolysis, proliferation, invasion and metastasis of gastric cancer cells.

**Conclusions:** LHPP is regulated by m6A methylation and regulates the metabolism of GC by changing the acetylation level. Thus, LHPP is a potential predictive biomarker and therapeutic target for GC.

*Pathology, biomarkers, liquid biopsy, molecular classification*

IGCC22-ABS-1260

## **CIRCTDRD3 REGULATING BY ATF4 PROMOTES GASTRIC CANCER PROGRESSION THROUGH MIR891B/PI3K/AKT PATHWAY**

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**Objectives:** In this study, we hope to expand the ceRNA mechanism, verify AFT4's regulation of circRNA TDRD3 cyclization, and regulate PI3K/AKT signaling pathway through circRNA, providing new ideas for precise treatment of gastric cancer.

**Methods:** The combination of Twist1 and pre-TDRD3 was verified by CHIP experiment. The existence of circTDRD3 was verified by agarose gel electrophoresis, RNA enzyme digestion and FISH. QPCR was used to verify its expression level in gastric cancer cells and specimens. CCK8, EDU, flow cytometry, scratch test, Transwell, Western blot and other verification functions were performed. Bioinformatics screened downstream of circTDRD3, verified candidate miRNA after pulldown of circTDRD3, and verified binding with co-location, double luciferin and biotin labeling. Bioinformatics screened the protein regulated by miR891b, and ITGA2 was screened as the downstream protein by TCGA. A rescue experiment was designed to verify the ceRNA axis.

**Results:** AFT4 can combine the promoter region of pre-TDRD3 to enhance cyclization ability. CCK8, EDU, flow cell cycle, nicks test, Transwell, Western blot, subcutaneous tumorigenesis and other experiments showed that high expression of circTDRD3 could promote the proliferation, migration and invasion of gastric cancer cells. In the pull down results of circTDRD3, miR891b expression was the highest. Meanwhile, circTDRD3 and miR891b were co-located in the cytoplasm, and the double luciferase assay and biotin labeling showed high activity. The most differentially expressed ITGA2 was screened from gastric cancer data in TCGA. The integrity of ceRNA axis was verified by rescue experiment. When ITGA2 expression was knocked out, WB showed low activity of key proteins in the PI3K/AKT pathway even though circTDRD3 was overexpressed.

**Conclusions:** AFT4 promotes the transformation of circTDRD3 by binding the promoter region of pre-TDRD3. Highly expressed circTDRD3 acting as a sponge of miR891b promotes the malignant progression of gastric cancer by activating the PI3K/AKT pathway.

*Pathology, biomarkers, liquid biopsy, molecular classification*

IGCC22-ABS-1193

## **DOWN-REGULATED EXPRESSION OF CDK5RAP3 AND UFM1 SUGGESTS A BAD PROGNOSIS IN GASTRIC CANCER PATIENTS**

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**Objectives:** The relationship between the CDK5RAP3 and UFM1 expression and the prolonged outcomes of patients which received gastric cancer (GC) surgery was investigated.

**Methods:** Single-sample gene set enrichment analysis (ssGSEA), unsupervised clustering and other methods were used to verify the relationship between CDK5RAP3 and UFM1 in GC through public databases. Additionally, CDK5RAP3 and UFM1 expression in cancerous and paracancerous tissues of GC was analysed in the context of patient prognosis.

**Results:** CDK5RAP3 and UFM1 expression was downregulated synchronously, the interaction was existed between the two proteins, and UFM1 and CDK5RAP3 expression was found to be inversely associated to AKT pathway activation.. Prognostic analysis showed that the prognosis is poorer for low CDK5RAP3 and UFM1 patients, than for high CDK5RAP3 and/or UFM1 ( $p < 0.001$ ) patients, and this expression pattern was an independent predictor for overall survival of GC. Coexpression of CDK5RAP3 and UFM1 combined with TNM staging can improve the accuracy of prognosis prediction for patients ( $p < 0.001$ ).

**Conclusions:** It is confirmed in our findings that a combination of CDK5RAP3 and UFM1 can produce a more precise prediction model for GC patients' survival.

**Pathology, biomarkers, liquid biopsy, molecular classification**

IGCC22-ABS-1457

**HISTOLOGICAL LAURÉN TYPE AS A PROGNOSTIC FACTOR**

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<sup>1</sup>Department of Surgery, Gastric Division, <sup>2</sup>Pathology Department, <sup>3</sup>Oncology Department, Santa Casa de São Paulo, São Paulo, Brazil

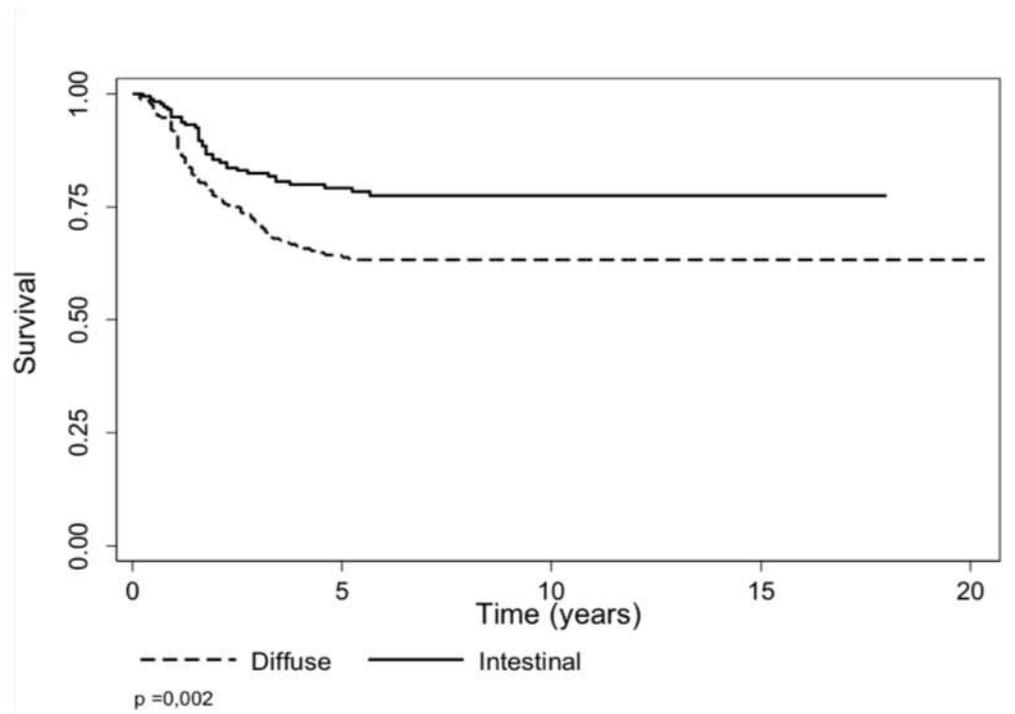
**Objectives:** There are some pathologic classifications for gastric adenocarcinoma. Despite the fact that the WHO's classification is used and recommended nowadays, the historic Laurén classification (1965) is also largely used and very practical day by day.

The main objective is analyze the disease specific survival according to Laurén type in gastric adenocarcinoma.

**Methods:** Retrospective study comparing Laurén diffuse type and intestinal type, in patients who underwent curative gastrectomy D1 or D2, staging I-IIIc from January 1998 to December 2016.

**Results:** Out of 462 patients, 267 (57.8%) were the diffuse type and 195 (42.2%) were the intestinal type (p=0.92). The 5-year disease specific survival in Lauren classification accounted for 63.81% for the diffuse and 79.19% for the intestinal (p<0.01).

**Image:**



**Conclusions:** Laurén diffuse type has worse prognosis than the intestinal type.

**Pathology, biomarkers, liquid biopsy, molecular classification**

IGCC22-ABS-1358

**PROGNOSTIC SIGNIFICANCE OF CYCLIN A1 PROMOTER METHYLATION IN GASTRIC CANCER**

Xiao Meng Ji<sup>1, 2</sup>, ziming Du<sup>1, 3</sup>, weijie Zhu<sup>1, 3</sup>, jianyong Shao<sup>1, 3</sup>

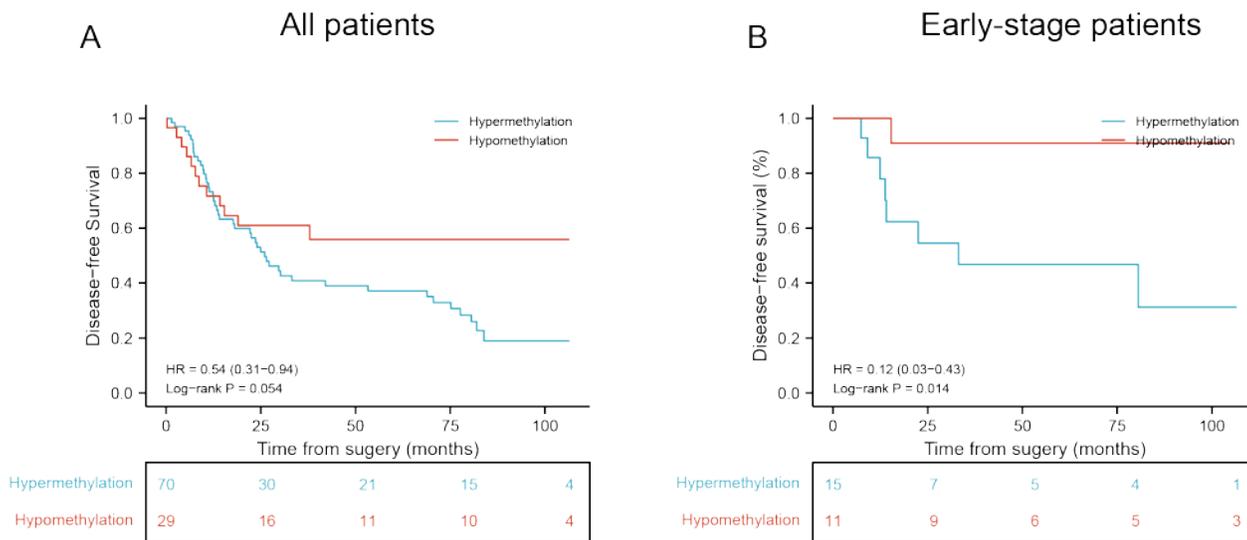
<sup>1</sup>State Key Laboratory of Oncology in South China, <sup>2</sup>Department of Medical Oncology, <sup>3</sup>Department of Molecular Diagnostics, Sun Yat-sen University Cancer Center, Guangzhou, China

**Objectives:** Surgery for curative purposes is the standard of care for gastric cancer (GC). Prognostic biomarkers are needed to improve postoperative management. Here, we evaluated the prognostic role of Cyclin A1(CCNA1) promoter methylation in patients with gastric cancer.

**Methods:** Retrospective investigation was performed on specimens from 99 GC patients who underwent surgical resection between May 2012 and August 2012. The promoter methylation levels of CCNA1 in GC cell lines and tissues were detected by Droplet Digital Polymerase Chain Reaction(ddPCR). The prognostic value of CCNA1 promoter methylation in the cohort of 99 GC patients, which was assessed by Kaplan-Meier survival analysis and Cox regression analysis.

**Results:** The results indicated CCNA1 promoter methylation level was abnormally high in the GC cell lines. Significantly higher CCNA1 promoter methylation level was also observed in primary gastric cancers compared to their adjacent normal tissues ( $P < 0.001$ ). 6.28% was determined as the optimal cut-off of methylation level in predicting the survival outcome by the X-tile software. CCNA1 promoter hypermethylation correlated with poor survival of gastric cancer patients than those hypomethylation (HR, 1.85; 95% CI, 1.06 to 3.21;  $P = 0.054$ ). Especially in the early stage, Patients harboring hypermethylation presented significantly lower Disease-Free Survival (DFS) than that with hypomethylation (HR, 8.69; 95% CI, 2.35 to 32.12;  $P = 0.014$ ). In addition to this, high CCNA1 methylation level was an independent risk factor for predicting DFS in GC patients ( $P = 0.040$ ).

**Image:**



**Conclusions:** ddPCR can be used to quantify CCNA1 promoter methylation in GC tissue. Higher CCNA1 methylation levels indicate poor prognostic factors for GC, especially in the early stages.

*Pathology, biomarkers, liquid biopsy, molecular classification*

IGCC22-ABS-1158

## **AN IMMUNOSUPPRESSIVE STATUS CLASSIFIER TO PREDICT RECURRENCE IN GASTRIC CANCER**

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**Objectives:** Suppression of the immune microenvironment is a crucial cause of postoperative tumor recurrence. We constructed an immune infiltration classifier based on immunosuppressive indicators to predict recurrence and guide postoperative treatment for gastric cancer (GC).

**Methods:** Immunohistochemical analysis was performed for 825 GC tissues to evaluate immunosuppressive indicators. An immunosuppressive recurrence score (IRS) based on six immunosuppressive indicators was determined using the Lasso Cox method to predict recurrence outcomes. The association between immune infiltration and IRS was assessed using immunohistochemistry and multiplexed immunofluorescence staining. A nomogram predicting recurrence-free survival (RFS) was constructed by integrating IRS and significant clinicopathological features using the Cox regression model.

**Results:** The IRS and IRS-based nomogram showed remarkable accuracy and reliability for predicting the recurrence outcome. Moreover, elevated IRS was associated with locoregional recurrence and failure of postoperative adjuvant chemotherapy. We also identified that the increased IRS indicated the inhibition of anti-tumor effect of CD8<sup>+</sup> tumor-infiltrating lymphocytes (TILs) in the invasive margin (IM).

**Conclusions:** IRS can predict the recurrence outcome of GC patients by comprehensively distinguishing the immune infiltration status, which assists in the selection of different adjuvant treatment options.

***Pathology, biomarkers, liquid biopsy, molecular classification***

IGCC22-ABS-1202

**THE MECHANISM OF PDK4 IN REGULATING THE MALIGNANT PROGRESSION OF GASTRIC CANCER**

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**Objectives:** Ferroptosis is a form of programmed cell death caused by iron-dependent oxidative damage, and its mechanism is caused by the inactivation of glutathione peroxidase 4 (GPX4). In addition, the lack of glucose can inhibit the ferroptosis induced by Erastin or RSL3, indicating that glucose is necessary for cell ferroptosis. In summary, we believe that cell glucose-lipid metabolism can regulate cell ferroptosis and affect tumor progression.

**Methods:** 1. *in vitro* :

①. Cell culture ②. Flow cytometry to detect cell ferroptosis or apoptosis ③. RT-qPCR ④. Western blotting experiment ⑤. Lactic acid and glucose metabolism experiment

2. *in vivo* :

①. Nude mice subcutaneous tumors ②. Tail vein injection

**Results:** 1. PDK4 expression is correlated with clinicopathological factors and prognosis of gastric cancer

PDK4 is highly expressed in gastric cancer tissues and cell lines. It is shown that PDK4 is positively correlated with the degree of malignancy of gastric cancer patients and negatively correlated with the degree of differentiation of gastric cancer tissues.

2. PDK4 improves the motility of gastric cancer cells and inhibits the death of gastric cancer cells

Through shRNA-PDK4 transfection into cell lines, we have tested that down-regulation of PDK4 can inhibit the migration and invasion of gastric cancer cells. It is shown, and found that PDK4 is down-regulated. Can promote the cell death by flow cytometry.

3. PDK4 up-regulates GPX4 and affects the ferroptosis of gastric cancer cells

It was detected that down-regulation of PDK4 can inhibit the death of gastric cancer cells and up-regulate the expression of GPX4.

**Conclusions:** PDK4 is highly expressed in gastric cancer, promotes the proliferation, migration, invasion of gastric cancer cells and inhibits the ferroptosis of gastric cancer cells, thereby affecting the malignant progression of gastric cancer.

**Pathology, biomarkers, liquid biopsy, molecular classification**

IGCC22-ABS-1219

**ANASTOMOTIC LEAK AND PREDICTIVE VALUE OF C-REACTIVE PROTEIN IN PATIENTS UNDERGOING GASTRECTOMY**

Audrey Létourneau<sup>1</sup>, Lamarie Meloche-Dumas<sup>1</sup>, Alexis Charron<sup>2</sup>, Guy Leblanc<sup>1</sup>, Mai-Kim Gervais<sup>1</sup>

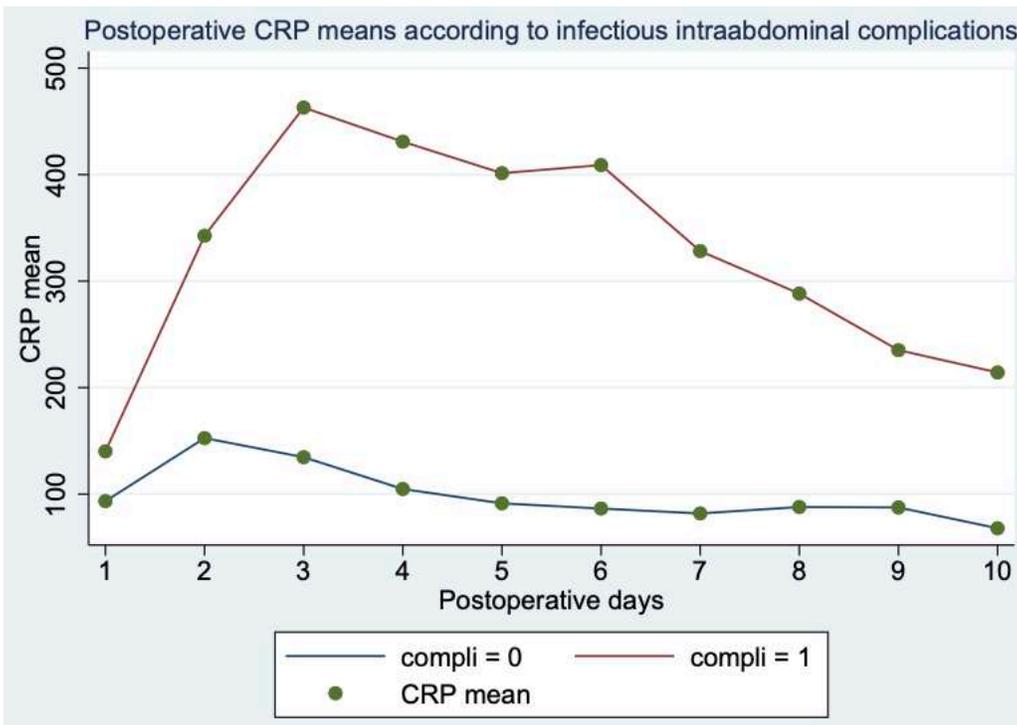
<sup>1</sup>Division of Surgical Oncology, Department of Surgery, Maisonneuve-Rosemont Hospital, <sup>2</sup>Faculty of Medicine, Université de Montréal, Montreal, Canada

**Objectives:** Anastomotic leak represents one of the major complications following gastrointestinal resection. C-reactive protein (CRP) has a high negative predictive value to assess the presence of infectious complications in postoperative colorectal surgery. This study aims to determine whether CRP measurement can detect intra-abdominal infectious complications such as anastomotic leakage after gastric resection.

**Methods:** Between June 2017 and June 2021, patients presenting with gastric cancer who underwent gastrectomy were included in this single center prospective observational study. CRP and white blood cell counts were measured on postoperative days (PODs) 1 to 7. Anastomotic leak, intra-abdominal abscess, other infectious complications, need for reoperation and length of hospital stay were reviewed.

**Results:** Thirty-one patients were included. The mean age at surgery was 65 years old and the mean body mass index was 27.2 (23-30) kg/m<sup>2</sup>. Adenocarcinoma (58%) and gastrointestinal stromal tumor (26%) constituted the majority of our patient population. Various surgical procedures were performed, including partial and total gastrectomy, D2 lymphadenectomy, Roux-en-Y and Billroth 2 reconstruction, hyperthermic intraperitoneal chemotherapy for peritoneal carcinomatosis and multivisceral resections. Two (6%) patients developed postoperative intraabdominal abscess, one of which required percutaneous drainage. The mean CRP at PODs 3, 4 and 5 were 134.7, 104.8 and 91.4 mg/L in patients without infectious complications, compared to 462.9, 430.9 and 401.4 mg/L in patients with complications, respectively. Figure 1 shows postoperative CRP trends for both groups.

**Image:**



**Conclusions:** This study demonstrated clinically different postoperative CRP value in patients who developed intraabdominal infections, contributing to early detection and prompt treatment for those patients.

***Pathology, biomarkers, liquid biopsy, molecular classification***

IGCC22-ABS-1132

**WHY SO AFRAID OF CONSIDERING GASTRIN IN GASTRIC CARCINOGENESIS?**

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**Objectives:** A general positive trophic effect of gastrin on the oxyntic mucosa was shown by Zollinger and Ellison, and a specific trophic on the ECL cell was established man around 1985. Hypergastrinemia induces ECL- cell neuroendocrine tumors (NETs) both in man and animals. Patients with hypergastrinemia (perncious anaemia) are predisposed not only to develop ECL cell NETs but also gastric carcinomas.

**Methods:** Tumors from more than 100 patients patients with gastric carcinomas were examined with histochemistry (silver staining (Sevier-Munger), immuno-histochemistry (chromogranin A, synaptophysin, histidine decarboxylase (HDC), different mucins and gastrin receptor), immuno-electron microscopy , and in-situ hybridization. Tyramide signal amplification (TSA)) was used to improve sensitivity.

**Results:** Sevier-Munger, chromogranin A, synaptophysin and HDC positive tumor cells were mainly found in the carcinomas of diffuse type. Mucin was not expressed in the PAS-positive cells of gastric carcinomas of diffuse type or in the subgroup of signet ring cell carcinomas. Particularly in signet ring cells, neuroendocrine markers including HDC, were expressed. Gastrin receptor was expressed in a proportion of tumor cells. When examining eight gastric carcinomas from patients with perncious anaemia, the tumor cells from seven, being negative for chromogranin A without TSA, became positive with TSA. Furthermore, we followed a patient with perncious anaemia who had a gastric ECL cell NET removed endoscopically, but died of a highly malignant neuroendocrine carcinoma five years later,

**Conclusions:** The inclusion of gastric cancers of diffuse type among adenocarcinomas is solely based on the presence of PAS positivity presumed to be specific for mucin. However, PAS positivity only reflects presence of glycoproteins. , There is positivity for neuroendocrine including ECL cell markers in the tumor cells indicating neuroendocrine carcinoma. The role of the ECL cell as cell of origin incriminates gastrin in gastric carcinogenesis.

***Pathology, biomarkers, liquid biopsy, molecular classification***

IGCC22-ABS-1150

**PURE SIGNET RING CELL GASTRIC CARCINOMA DEVELOPED IN THE HELICOBACTER PYLORI UNINFECTED STOMACH**

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**Objectives:** According to the recent decrease of *Helicobacter pylori* (HP) infection, gastric cancers (GCs) which arise in HP uninfected stomach are getting recognized, although the incidence of those is still very low. Pure signet ring cell carcinoma (SRC) is one of the typical histologic types of HP uninfected GCs, and the tumor characteristics and the pathophysiology of the pure SRC is not well understood.

**Methods:** We present a case of pure SRC developed in the HP uninfected stomach which is surgically resected with lymph node (LN) dissection.

**Results:** A 37-year-old male patient visited our hospital with a diagnosis of early gastric cancer. A flat white lesion of 15mm in diameter was found in the lower gastric body by the upper gastrointestinal endoscopy, and the biopsy of the lesion revealed SRC. Endoscopic submucosal dissection (ESD) was performed. Pathological findings showed that cancer cells are all consisted of signet ring cells (pure SRC) and spread only in the middle to superficial layer of the mucosa. No submucosal invasion but only a slight tumor cell invasion into mucosal microvessels was found. Additional surgical resection with LN dissection was performed because of the vessel infiltration. The final pathological findings of the surgical specimens revealed no residual tumor nor LN metastasis (0/37).

In the literature, the pure SRCs developed in the HP uninfected stomach are usually described to have very slow proliferation speed and have very low invasive potential. As most cases are diagnosed as very early mucosal lesions and curatively resected by ESD, only few cases are reported to be surgically resected with LN dissection, therefore risk factors of LN metastases of the pure SRC are unknown.

**Conclusions:** The indication for surgical resection with LN dissection for the very early mucosal SRC in HP uninfected stomach is uncertain. The data accumulation of natural history and risk factors of LN metastases for this very uncommon GC is awaited.

***Pathology, biomarkers, liquid biopsy, molecular classification***

IGCC22-ABS-1301

**MIXED ADENONEUROENDOCRINE CARCINOMA IN A PATIENT WITH ULCERATIVE COLITIS**

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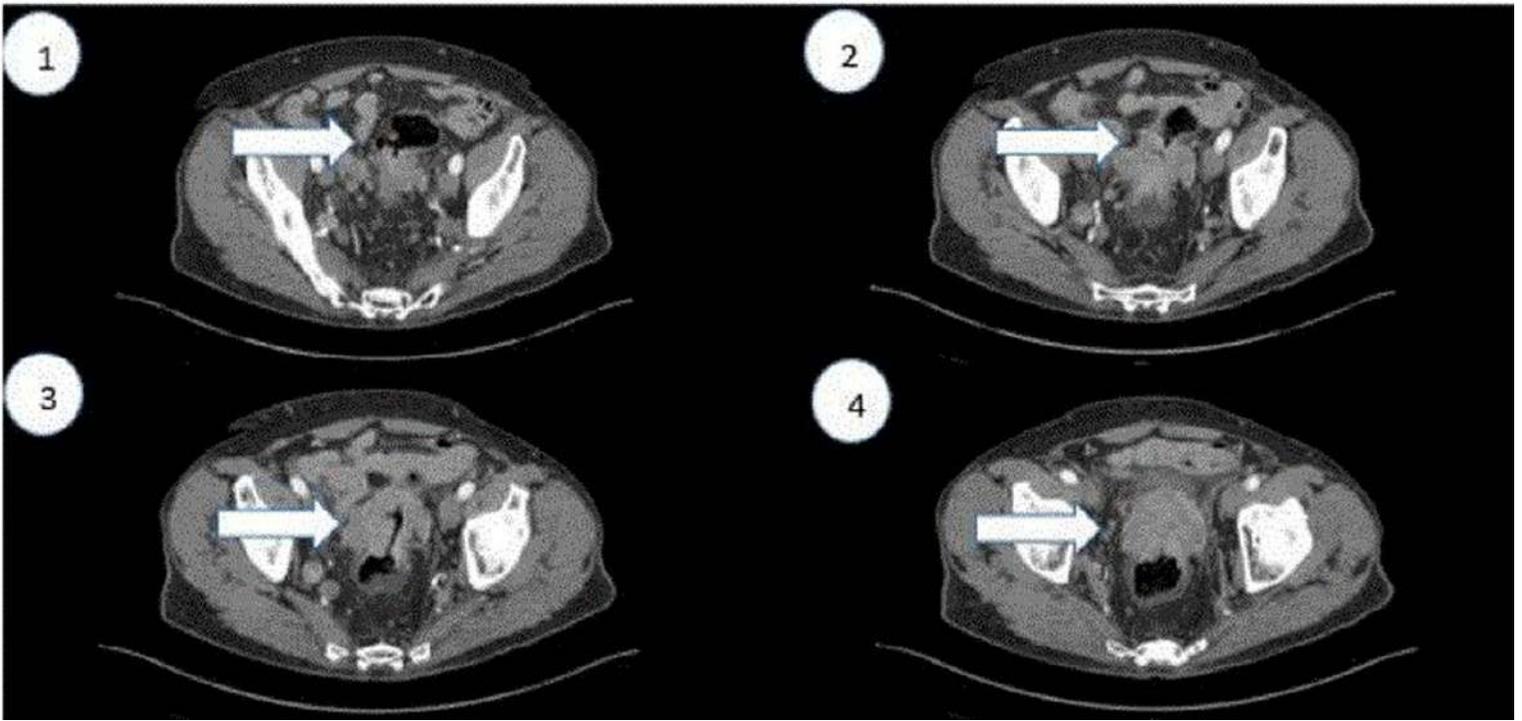
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**Objectives:** Mixed adenoneuroendocrine carcinomas are very rare tumors of gastrointestinal tract.

**Methods:** 65 years male, with history of ulcerative colitis, presented with abdominal pain, alternating diarrhea and constipation, dyschezia and hematochezia. Examination showed tenderness in bilateral lower abdominal quadrants. CT scan showed a circumferential mass in the sigmoid colon, measuring 7.2 x 6.3 cm along with subcentimeter hepatic hypodensity, mesenteric lymphadenopathy and bilateral pelvic nodal masses concerning for metastatic cancer. Colonoscopy with biopsy showed a 14 cm adenocarcinoid tumor displaying hybrid morphology between adenocarcinoma and neuroendocrine tumor with submucosal nests and rosettes expressing synaptophysin but lined with cells exhibiting columnar morphology and numerous goblet cells. Immunohistochemistry showed synaptophysin, CDX2, CK20 and GATA3 coexpression. Tumor was moderately differentiated without any areas of necrosis. Mitotic activity was brisk and a Ki-67 stain highlighted > 90% of the tumor cell nuclei. Patient established with oncology and started on chemotherapy. With decrease in tumor burden, patient will follow with general surgery for surgical resection of the tumor.

**Results:** Mixed adenoneuroendocrine carcinomas (MANECs) exhibit at least 30% adenocarcinoma and neuroendocrine sections. They are very aggressive tumors and as seen in our patient, present at an advanced age with metastasis. Colonoscopy and biopsy is necessary for diagnosis. As in our case, patients with IBD have a high risk of colorectal carcinoma with risk factors including amount and duration of disease, active inflammation and family history. Unlike adenocarcinoma, MANECs are extremely rare in IBD and develop likely due to chronic inflammation damaging neuroendocrine cells. Treatment include surgical resection and chemotherapy.

**Image:**



**Conclusions:** The case focuses on presentation and diagnosis of these rare and important tumors that are very uncommon to develop in patients with inflammatory bowel disease.

***Prevention and early detection***

IGCC22-ABS-1110

**TROP2+CD133+CD166+ DYSPLASTIC STEM CELLS DRIVE DYSPLASIA TRANSITION TO GASTRIC ADENOCARCINOMA**

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**Objectives:** Gastric dysplasia is considered the greatest risk of developing adenocarcinoma in intestinal-type gastric carcinogenesis. However, molecular and cellular mechanisms for neoplastic transformation of dysplastic cells remain largely unknown. We previously identified two putative dysplastic stem cell (DSC) populations, CD44v6<sup>neg</sup>/CD133<sup>+</sup>/CD166<sup>+</sup> (DP) and CD44v6<sup>neg</sup>/CD133<sup>-</sup>/CD166<sup>+</sup> (TP), which may contribute to cellular heterogeneity in dysplasia. Here, we investigated whether the DSCs are responsible for maintaining dysplastic cell lineages and evolution of dysplasia to cancer.

**Methods:** Isolated DSCs from dysplastic organoids established from active Kras-induced mouse stomachs were used for transcriptome analysis, differentiation and tumorigenicity assessments. Single-cell RNA-seq and immunostaining were performed to analyze cellular heterogeneity of DSC-driven tumors, and genetic alterations during the DSC evolution were examined by whole-exome seq. Human tissue microarrays were used to identify the presence of DSCs in human dysplasia and both mouse and human dysplastic organoids were utilized for a therapeutic approach.

**Results:** Molecular profiles between DP- and TP-DSCs were highly similar, but DP-DSCs showed more dynamic stem cell activity than TP-DSCs through ligand-independent Wnt pathway activation. DP-DSCs evolved to multiple tumor types including high-grade invasive adenocarcinoma in mice, and additional genetic mutations related to human gastric cancers were acquired during the DSC evolution. We confirmed the presence of DSCs in human dysplasia. Growth and survival of both mouse and human dysplastic organoids were controlled by Pyrvinium which targets CK1 $\alpha$ , a downstream intermediate of Wnt pathway.

**Conclusions:** We conclude that clonal evolution of DSCs lead dysplasia evolution to gastric adenocarcinoma and can be targeted by CK1 $\alpha$  regulation. This study will provide important insights to guide the future intervention strategies by targeting DSCs as cancer-initiating cells in patients with dysplasia.

## ***Prevention and early detection***

IGCC22-ABS-1119

### **EAST-ASIA AND WEST-EUROPE SURVIVAL DISPARITIES IN EARLY GASTRIC CANCER: REASONS AND BIOMARKERS**

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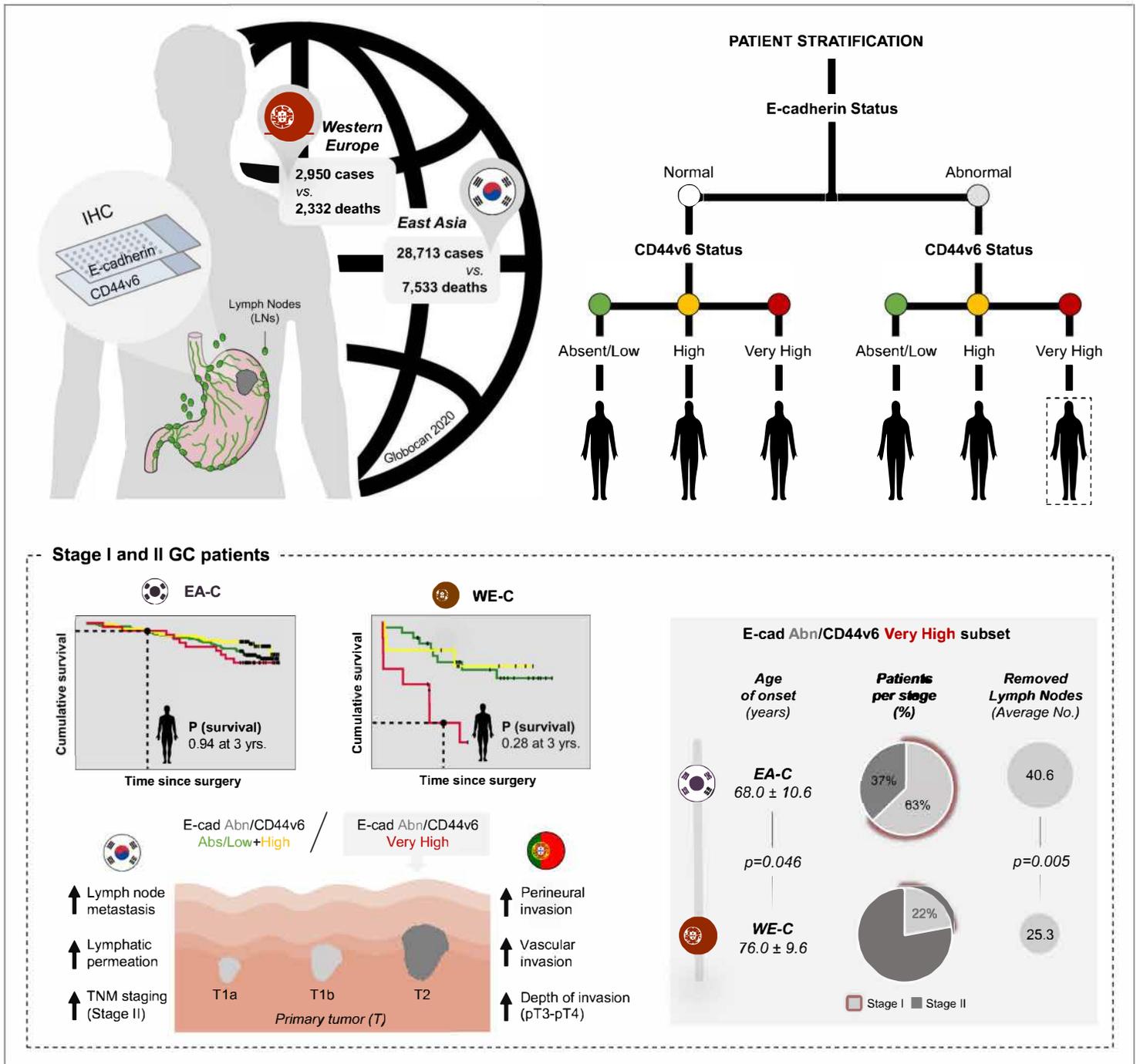
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**Objectives:** Surgical resection with lymphadenectomy and peri-operative chemotherapy is the universal mainstay for curative treatment of gastric cancer (GC) patients with loco-regional disease. However, GC survival remains asymmetric in West- and East-world regions. We hypothesize this asymmetry derives from differential clinical management. Therefore, we collected chemo-naïve GC patients from Portugal and South-Korea to explore specific immunophenotypic profiles related to disease aggressiveness, and clinicopathological factors potentially explaining associated overall survival (OS) differences.

**Methods:** Clinicopathological and survival data were collected from chemo-naïve surgical cohorts from Portugal (West-Europe cohort (WE-C); n=170) and South-Korea (East-Asia cohort (EA-C); n=367), and correlated with immunohistochemical expression profiles of E-cadherin and CD44v6 obtained from consecutive tissue microarrays sections.

**Results:** Survival analysis revealed a subset of 12.4% of WE-C patients, whose tumors concomitantly express E-cadherin<sub>abnormal</sub> and CD44v6<sub>very-high</sub>, displaying extremely poor OS, even at TNM stages I and II. These WE-C stages I and II patients were particularly aggressive compared to all other, invading deeper into the gastric wall ( $p=0.032$ ) and more often permeating the vasculature ( $p=0.018$ ) and nerves ( $p=0.009$ ). A similar immunophenotypic profile was found in 11.9% of EA-C patients, but unrelated to survival. Stage I and II EA-C patients displaying both biomarkers also permeated more lymphatic vessels ( $p=0.003$ ), promoting lymph node (LN) metastasis ( $p=0.019$ ), being diagnosed on average 8-years earlier and submitted to more extensive LN dissection than WE-C.

**Image:**



**Conclusions:** Concomitant E-cadherin\_abnormal/CD44v6\_very-high expression predicts aggressiveness and poor survival of stage I and II GC submitted to conservative lymphadenectomy.

***Prevention and early detection***

IGCC22-ABS-1359

**PLASMA LIPIDS SIGNIFY GASTRIC LESION PROGRESSION TO GASTRIC CANCER: A PROSPECTIVE LIPIDOMICS STUDY**

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**Objectives:** Early detection of gastric cancer (GC) remains a public health challenge. Robust biomarkers are urgently required to distinguish individuals of gastric lesions that have progression potential to GC. Perturbated lipid metabolism, particularly *de novo* lipogenesis, is involved in gastric carcinogenesis. We conducted the first prospective lipidomics study exploring lipidomic signatures for the risk of gastric lesion progression and early GC.

**Methods:** Our two-stage cohort study of targeted lipidomics enrolled 400 subjects from the National Upper Gastrointestinal Cancer Early Detection Program in China, including 200 subjects of GC and different gastric lesions within Correa's cascade of gastric carcinogenesis in the discovery stage, and another 200 subjects in the validation stage. Of them, 152 cases of different gastric lesions were prospectively followed for the progression of gastric lesions by up to 1204 days. We examined the lipidomic signatures, including key lipids and their latent profiles associated with the risk of advanced gastric lesions and their progression to GC, and constructed risk prediction models, leveraging the multi-time point prospective follow-up of subjects.

**Results:** A total of 16 plasma lipids were significantly associated with GC. Of them, 12 key lipids were further inversely associated with the risk of gastric lesion progression to GC. These lipids were integrated as latent features to train XGBoost models, which significantly improved the ability to predict the progression potential of gastric lesions (AUC: 0.82 vs 0.68, DeLong's test  $P=4.6 \times 10^{-4}$ ) and risk of early GC (AUC: 0.83 vs 0.55, DeLong's test  $P=6.3 \times 10^{-5}$ ), as compared to models only including age, sex, baseline gastric histopathology, and *H.pylori* infection.

**Conclusions:** Our study revealed the lipidomic signatures associated with the risk of gastric lesion progression and GC occurrence. Decreased plasma lipids show promise as noninvasive biomarkers for early detection of GC, exhibiting translational implications for GC prevention.

## *Prevention and early detection*

IGCC22-ABS-1454

### **PREDICTION OF POSTOPERATIVE COMPLICATIONS BY MEASURING IL-6 AND TNF-A IN GASTRIC CANCER SURGERY**

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**Objectives:** Inflammatory cytokines such as IL-6 and TNF- $\alpha$  are produced by systemic or local inflammation and are known to be increased in blood and drainage fluid in the early postoperative period. Therefore, we investigated the usefulness of measuring these cytokines on the day after surgery for early prediction of the postoperative complications.

**Methods:** A total of 81 patients who underwent gastrectomy for gastric cancer in our hospital between November 2020 and July 2021 were enrolled. We measured IL-6 and TNF- $\alpha$  using serum and ascites from drain in the upper pancreas on the day after surgery, and compared the AUC values of the ROC curve for the predictive ability of intra-abdominal abscess and all complications above Clavien-Dindo classification grade II. We also examined the positive predictive value (PPV) and negative predictive value (NPV), after calculated each cutoff using the Youden index.

**Results:** The median values of IL-6 in serum/drained ascites, TNF- $\alpha$  in serum/ drained ascites, and serum CRP on the day after surgery were 26.6/14800 pg/mL, 0.57/0.94 pg/mL, and 3.74 mg/dL, respectively. Intra-abdominal abscesses occurred in 5 patients (6%), and the incidence of all complications was 20%. The highest AUC value for prediction of intra-abdominal abscess was IL-6 in drained ascites (AUC value of serum IL-6: 0.630, ascites IL-6: 0.751, serum TNF- $\alpha$ : 0.686, ascites TNF- $\alpha$ : 0.623, and serum CRP: 0.659). On the other hand, for predicting all complications, the highest AUC value was serum TNF- $\alpha$  (IL-6: 0.567, ascites IL-6: 0.591, serum TNF- $\alpha$ : 0.712, ascites TNF- $\alpha$ : 0.539, and serum CRP: 0.631). When we set the cutoff values of ascites IL-6 and serum TNF- $\alpha$  14500 pg/mL and 0.56 pg/mL, the PPV/NPV were 12.2%/100% and 31.0%/92.3%, respectively.

**Conclusions:** The results suggest that IL-6 in drained ascites and serum TNF- $\alpha$  levels on the day after gastric cancer surgery may be useful in predicting intra-abdominal abscess and all complications, respectively.

## ***Prevention and early detection***

IGCC22-ABS-1339

### **VOLATILOMIC SIGNATURES OF AGS AND SNU-1 GASTRIC CANCER CELL LINES**

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**Objectives:** The analysis of volatile organic compounds (VOCs) released by the human body opens up new perspectives for gastric cancer screening. VOCs form specific chemical signatures that exhibit distinct and immediate changes when diverse abnormal processes occur in the organism including cancer. The strategic goal of this research was to identify specific volatilomic signatures of two gastric cancer cell lines (AGS, SNU-1) and to pinpoint possible differences between their volatilomic patterns.

**Methods:** In this study, headspace needle trap extraction (HS-NTE), as the pre-concentration method, and gas chromatography with mass spectrometric detection (GC-MS) have been applied to sequentially capture and analyse the headspace above the gastric cancer (AGS: Human gastric adenocarcinoma, SNU-1: Human gastric Carcinoma) and normal (GES-1: Normal *gastric* mucosa) cell lines.

**Results:** In total 10 sets of cultures (three cultures containing different lines and medium without cells) were prepared. Preliminary analyses demonstrated that six species (2-methylpropanal, methacrolein, 2-methylbutanal, 3-methylbutanal, pentanal and 2-ethyl-furan) were found to be consumed and seven (2-methyl-2-propanol, 2-methyl-1-pentene, 2-ethoxy-2-methylpropane, ethyl acetate, 2-methyl-1-propanol, 2-methyl-2-butanol, 2-pentanone and 2-ethyl-1-hexanol) were produced by all lines under study. Interestingly, AGS-1 cells emitted a number of unique VOCs (2-tridecanone, 2-pentadecanone and 2-heptadecanone).

**Conclusions:** The results derived from this study provide evidence that gastric cancer modifies the VOC profiles of the cell lines under study. The observed volatiles might have a value as biomarkers for gastric cancer diagnosis (via e.g. breath or urine analysis) based on sensitive mobile platforms (e.g. e-nose).

***Prevention and early detection***

IGCC22-ABS-1046

**ASSOCIATION OF COMMON MEDICATIONS & THE RISK OF EARLY ONSET GASTRIC CANCER: A POPULATION BASED STUDY**

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**Objectives:** Early-onset gastric cancer (EOGC, age  $\leq$  60 years at diagnosis) rates have increased the United States. It is hypothesized that chronic acid suppression with proton-pump inhibitors (PPIs) may promote tumorigenesis, while other medications including statins, non-steroidal anti-inflammatory drugs (NSAIDs), metformin and cyclooxygenase-2 (COX-2) inhibitors have been proposed as protective. We aimed to assess for an association between use of the aforementioned commonly prescribed medications and EOGC development.

**Methods:** We used a population based medical record linkage system to identify cases of EOGC in Olmsted County, Minnesota (MN) between January 1, 1995-December 31, 2020. Patients were matched 1:1 with controls based on age at diagnosis, sex, smoking status and body mass index (BMI). Conditional logistic regression was used to examine odds ratios (OR) for associations of medications with the odds of EOGC development; p-value  $<$  0.05 considered significant.

**Results:** Ninety-six cases of EOGC were identified during the study period (**Table 1**). On both univariate and multivariate regression analysis, there was no significant association between use of PPIs, statins, NSAIDs or metformin and EOGC development (**Table 1**). In a final multivariable model, there was a significant reduction in odds of EOGC with COX-2 inhibitor use (OR=0.39, 95% CI 0.16-0.94 p=0.04). We also observed a trend towards increased EOGC crude incidence rate in patients 30-39 years old beginning after 2004 through 2020.

**Image:**

**Table 1: Demographic and Clinical Characteristics of EOGC and Control Groups**

	<b>EOGC Patients (n = 96)</b>	<b>Control Patients (n = 96)</b>	<b>Odds Ratio</b>	<b>95% Confidence Interval</b>
<b>Age at Index Cancer Diagnosis</b>	51 [43, 55]	-	-	-
<b>Sex (% Male)</b>	65 (67.7%)	65 (67.7%)	-	-
<b>Racial Demographics</b>			-	-
<b>White</b>	74 (77.1%)	78 (81.2%)		
<b>Black</b>	6 (6.2%)	5 (5.2%)		
<b>Hispanic/Latino</b>	3 (3.1%)	1 (1.0%)		
<b>Asian</b>	4 (4.1%)	2 (2.1%)		
<b>Other</b>	3 (3.1%)	1 (1.0%)		
<b>Unknown</b>	6 (6.2%)	9 (9.3%)		
<b>BMI (kg/m<sup>2</sup>)</b>	29.15 [25.0, 34.2]	29.5 [26.9, 34.3]	-	-
<b>Smoking Status at time of diagnosis</b>			-	-
<b>Never</b>	44 (45.8%)	43 (44.7%)		
<b>Former</b>	24 (25.0%)	34 (35.4%)		
<b>Current</b>	28 (29.1%)	19 (19.8%)		
<b>PPI Use ≥ 6 months</b>	27 (28.1%)	21 (21.8%)	1.37	0.72- 2.62
<b>H2RA use ≥ 6 months</b>	8 (8.3%)	2 (2.1%)	2.35	0.37-14.8
<b>History of <i>H. Pylori</i> infection</b>	7 (7.2%)	2 (2.1%)	8.87	<b>1.03- 76.68</b>
<b>History of GERD</b>	42 (43.8%)	27 (28.1%)	1.94	<b>1.06- 3.54</b>
<b>Prior stomach surgery</b>	6 (6.2%)	0	9.35	0.41-213.2
<b>Metformin use ≥ 6 months</b>	4 (4.2%)	9 (9.4%)	0.54	0.15- 1.99
<b>NSAID use ≥ 6 months</b>	23 (24.0%)	23 (24.0%)	1.00	0.52- 0.92
<b>COX-2 inhibitor use ≥ 6 months</b>	12 (12.5%)	22 (22.9%)	0.39	<b>0.16- 0.94</b>
<b>Statin use ≥ 6 months</b>	15 (15.6%)	14 (14.6%)	1.1	0.47-2.59

**Table 1:** BMI = body mass index. Age and BMI described as median with [interquartile range]. Discrete variables expressed as counts (percent). PPI = proton pump inhibitor, H2RA = H2-receptor antagonist, GERD = gastroesophageal reflux disease, NASID = non-steroidal anti-inflammatory agent, COX-2 inhibitor = cyclooxygenase-2 inhibitor, statin = HMG-CoA Reductase inhibitor. EOGC = early onset gastric cancer, defined as index cancer diagnosis at age ≤ 60 years old. Association of each medication with odds of developing EOGC are described as odds ratios with 95% confidence interval (CI).

**Conclusions:** In this retrospective, population-based study of individuals in Olmsted County, MN, we found a significantly reduced odds of EOGC development associated with COX-2 inhibitor use, but no association between EOGC development and use of PPIs and other commonly prescribed medications.

*Prevention and early detection*

IGCC22-ABS-1114

**ASSOCIATION BETWEEN GASTRIC CANCER AND THE FAMILY HISTORY OF GASTRIC CANCER: A CROSS-SECTIONAL STUDY**

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**Objectives:** The risk of gastric cancer based on a family history of gastric cancer remains unclear. The purpose of this study was to investigate the relationship between gastric cancer and family history of gastric cancer within a large cohort in Korea.

**Methods:** 211,708 participants were recruited in Korean Genome and Epidemiology Study (KoGES) during 2001-2013, and divided into a group with self-reported personal history of gastric cancer (n=930) and a 1:40 matched control group (n=37,200). We examined the family history of gastric cancer in first-degree relatives for cross-sectional analysis. Logistic regression was used to estimate the odds ratios (ORs) of gastric cancer according to family history, using four models that were adjusted for different confounding variables, including the interaction among a family history of gastric cancer.

**Results:** After matching the two groups for age and sex, the gastric cancer group had a significantly higher proportion of family history in each relative than the controls ( $P < 0.001$ ). In the adjusted model, the ORs (95% CI) for gastric cancer with a history of an affected father, mother, and sibling were 1.80 (1.38–2.34), 1.95 (1.42–2.69), and 2.98 (2.31–3.83), respectively, compared with those in the control group. There was no statistically significant interaction among a family history of gastric cancer in each relative.

**Conclusions:** A history of gastric cancer in siblings, among first-degree relatives, is strongly associated with an increased risk of gastric cancer. Regular follow-up and early treatment are recommended for those with a family history of gastric cancer.

**Prevention and early detection**

IGCC22-ABS-1210

**GC IS ASSOCIATED WITH TUMOR MICROBIOTA AND CD8+ TISSUE-RESIDENT MEMORY T CELLS IN TUMOR TISSUE**

Rui Peng<sup>1</sup>, Shuai Liu<sup>2</sup>, Guangli Sun<sup>1</sup>, Chao Yue<sup>1</sup>, Gang Li<sup>1</sup>, Huanqiu Chen<sup>1</sup>

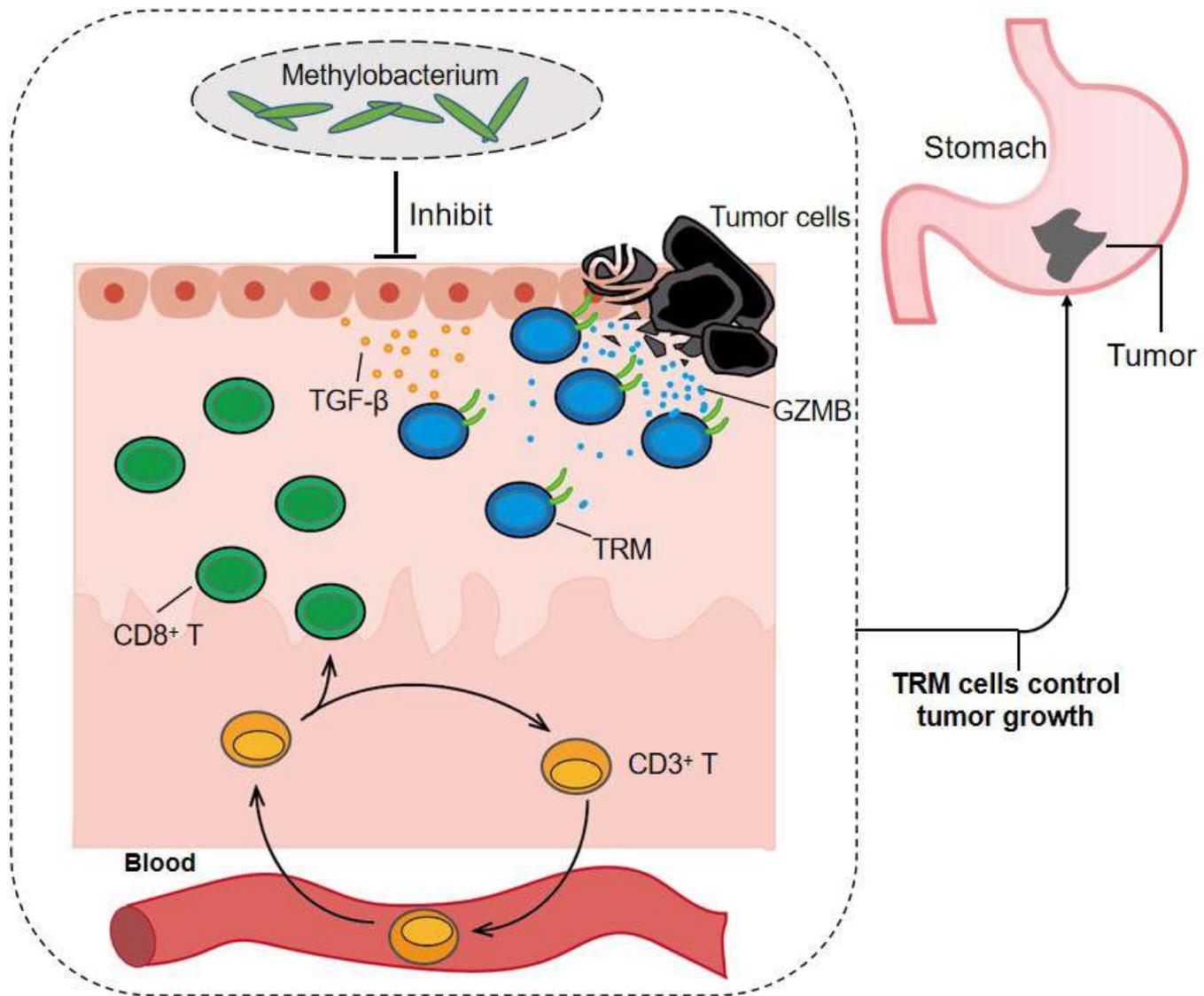
<sup>1</sup>Department of General Surgery, The Affiliated Cancer Hospital of Nanjing Medical University & Jiangsu Cancer Hospital & Jiangsu Institute of Cancer Research, <sup>2</sup>Department of immunology, Nanjing Medical University, Nanjing, China

**Objectives:** Recent evidence indicated microbiota was tightly associated with tumor initiation and progression in multiple solid tumors including gastric cancer (GC). The aim of this study is to investigate the potential association between the tumor microbiota and immune system in GC.

**Methods:** The tumor microbiota of 53 patients with GC and 30 patients with chronic gastritis was analyzed by 16S rRNA gene sequencing. We determined the differential bacteria based on sequencing results. The effect of microflora on tumor microenvironment (TME) was studied by Single-cell sequencing, immunohistochemistry, multiplex immunofluorescence staining and flow cytometry.

**Results:** GC microbiota was characterized by reduced microbial diversity and enrichment of *Oceanobacter*, *Methylobacterium* and *Syntrophomonas* genus. Of note, Kaplan–Meier survival analysis for both OS and RFS showed that intra-tumoral *Methylobacterium* was significantly associated with poor prognosis of GC patients ( $p=0.023$  for OS,  $p=0.013$  for RFS). And we demonstrated that *Methylobacterium* was inversely correlated with the CD8+ tissue-resident memory T (TRM) cells in TME of GC samples. At last, we found TGF- $\beta$  was significantly reduced in GC samples with higher abundance of *Methylobacterium*. We finally developed a model depicting the correlations among the specific bacterial taxa, circulating mononuclear cells, immune cells in TME, and cytokines /chemokines, which were possibly involved in gastric carcinogenesis.

**Image:**



**Conclusions:** Our results suggest that GC microbiota and CD8<sup>+</sup> TRM cells in TME are significantly correlated and *Methylobacterium* may play a potential role in the process of gastric carcinogenesis.

### ***Prevention and early detection***

IGCC22-ABS-1352

## **URINE PROTEOMIC SIGNATURES PREDICTING GC AND THE PROGRESSION OF PRECANCEROUS GASTRIC LESIONS .**

Hua Fan\*<sup>1</sup>, Xue Li<sup>1</sup>, Wei-Cheng You<sup>1</sup>, Kai-Feng Pan<sup>1</sup>, Jun Qin<sup>2</sup>, Wen-Qing Li<sup>1</sup>

<sup>1</sup>Department of Cancer Epidemiology, Peking University Cancer Hospital & Institute, <sup>2</sup>State Key Laboratory of Proteomics, Beijing Proteome Research Center, National Center for Protein Sciences(Beijing), Beijing Institute of Lifeomics, Beijing, China

### **Objectives:**

we examined the urine proteomic signatures and identified protein biomarkers that predict the progression of gastric lesions and risk of GC.

### **Methods:**

Our study enrolled a total of 255 subjects from Linqiu , a known high risk area for GC in China, including 119 with superficial gastritis or chronic atrophic gastritis, 104 with intestinalmetaplasia or low grade intraepithelialneoplasia, and 32 with GC. Among them,we prospectively followed 60 subjects with gastriclesions for 297 to 857 days. Proteomic profiling of urinesamples was conducted using liquid chromatography tandem mass spectrometry.

### **Results:**

There was a clear distinction in urine proteomic profilesbetween subjects with precancerous gastric lesions andGC. We identified a total of 104 differentially expressedproteins ( $P < 0.05$  & VIP score  $> 1$ ), of which 80 were upregulated and 24 were down regulated in GC compared with mild gastric lesions (SG or CAG). Leveraging our prospective follow up of subjects, 7 urine proteins,including ANXA11, ATIC, ATP6V1B2, CDC42, NAPA,SLC25A4 and VDAC3 were further positively associatedwith the progression of gastric lesions. We found the riskof gastric lesion progression was increased by 2.46 fold and the risk ofGC was increased by 1.05 fold , per one SD increase of a risk scorecombining these 7 proteins. Integrating the urinaryprotein risk score with age, sex, and baseline gastrichistology, prediction models showed outstanding performance in predicting the progression of gastriclesions (AUC=0.85, 95% CI: 0.70-1,  $P = 1.02 \times 10^{-14}$ ) andrisk of GC (AUC=0.80, 95%CI: 0.71-0.90,  $P = 1.83 \times 10^{-15}$ ).

### **Image:**

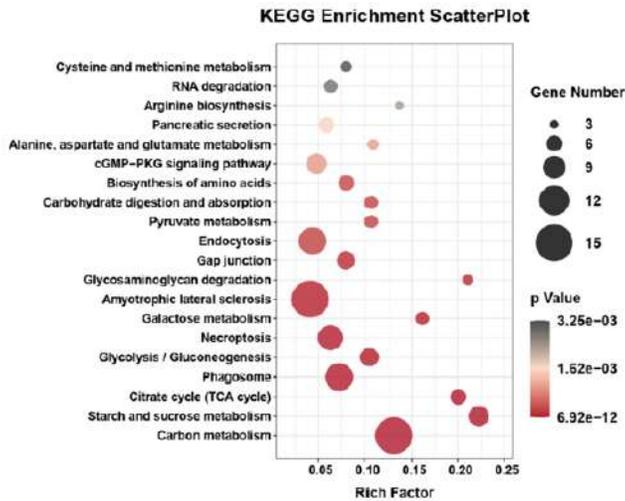


Fig 1. Dot plot displaying the KEGG pathway enrichment analyses for 104 proteins associated with advanced gastric lesions and GC.

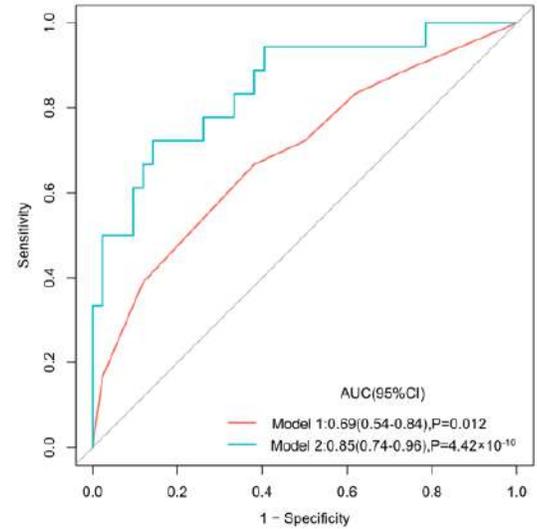


Fig 2. ROC curve of prediction models for the risk of gastric lesion progression. Model 1: age, sex and baseline histology (for the progression of gastric lesions). Model 2: additionally including protein score.

### Conclusions:

Our study revealed distinct urine proteomic profiles and a panel of protein biomarkers that may predict the progression of gastric lesions and risk of GC. These biomarkers based on a non-invasive approach may have translational significance by opening new avenues for defining high-risk populations of GC and its early detection, improving potential for targeted GC prevention.

***Prevention and early detection***

IGCC22-ABS-1241

**EXPANSION OF SCREENING INTERVAL FOR ENDOSCOPIC SCREENING FOR GASTRIC CANCER**

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**Objectives:** Biennial endoscopic screening for gastric cancer is recommended as a national program in Japan. To avoid endoscopic screening harms and provide equal access is to define the appropriate screening interval.

**Methods:** A single-arm cohort of endoscopic screening started to expand screening interval from more than two years for the low-risk group. At the baseline screening, the participants underwent endoscopic screening, *Helicobacter pylori* (*H. pylori*) antibody test, and serum pepsinogen test (first year). Follow up are carried out two years later and then four. We also assessed *H. pylori* infection and atrophy status on images of upper gastrointestinal endoscopy at the baseline. A new screening model will be developed by dividing the participants into high-risk and low-risk groups based on demographics, history of *H. pylori* eradication, serological testing, and endoscopic atrophy diagnosis. The cumulative gastric cancer incidence after negative results at baseline is compared between the low-risk group on the 3rd screening round after four years from baseline and the entire screening group on the 2nd screening round after two years. Suppose the cumulative gastric cancer incidence in the low-risk group on the 3rd screening round is lower than that in the entire screening group on the 2nd screening round. In that case, the screening interval can be expanded to 4 years in the low-risk group. The estimated sample was expected to be 12000 for detection of statistical significance.

**Results:** Recruitment for the study has continued since 2017 nationwide and will be completed by 2023. The total number of recruitments is 8519 in 12 cities at the end of September 2021.

**Conclusions:** The screening interval of endoscopic screening can be changed if the individual risks for *H. pylori* infection are clarified. Our goal in this study is to obtain relevant data that can be used to improve the efficient use of endoscopic screening for gastric cancer by referring to individual risks in Japan.

## ***Prevention and early detection***

IGCC22-ABS-1374

### **IDENTIFICATION OF VOLATILE BIOMARKERS IN GASTRIC CANCER TISSUES USING GC-MS FOR CANCER DETECTION**

Manohar Prasad Bhandari<sup>1</sup>, Daria Slefarska<sup>2, 3</sup>, Linda Mezmale<sup>1, 4, 5</sup>, Anna Marija Lescinska<sup>1, 4, 5</sup>, Linda Anarkulova<sup>1, 6, 7</sup>, Pawel Mochalski<sup>2, 3</sup>, Mārcis Leja<sup>1, 4, 5, 8</sup>

<sup>1</sup>Institute of Clinical and Preventive Medicine, University of Latvia, Riga, Latvia, <sup>2</sup>Institute for Breath Research, University of Innsbruck, Dornbirn, Austria, <sup>3</sup>Institute of Chemistry, Jan Kochanowski University, Kielce, Poland, <sup>4</sup>Faculty of Medicine, University of Latvia, <sup>5</sup>-, Riga East University Hospital, Riga, <sup>6</sup>-, Liepaja Regional Hospital, Liepaja, <sup>7</sup>Faculty of Residency, Riga Stradins University, <sup>8</sup>-, Digestive Diseases Centre "GASTRO", Riga, Latvia

**Objectives:** The identification of volatile organic compounds (VOCs) related to gastric cancer can help to detect this disease. Profiles of VOCs released by gastric cancer and non-cancerous tissues were investigated toward the identification of potential volatile markers of gastric cancer.

**Methods:** Headspace solid phase microextraction (HS-SPME) in combination with gas chromatography-mass spectrometry (GC-MS) were used to analyze the VOCs from cancer and non-cancerous tissue samples. The study included 45 cancer patients, 33 men and 12 women. The extracted compounds were identified by comparing their spectra with the NIST mass spectral library and comparing retention indices of peaks of interest with retention times of reference standards. Clinical data and confounding factors e.g. *H. pylori* status, smoking habit of the patients were recorded.

**Results:** The typical profiles of GC-MS chromatograms identified several VOCs emitted from gastric cancer and non-cancerous tissue samples. 51 compounds were detected in headspace of the tissue samples. The major categories of VOCs belong to hydrocarbons, aldehydes, ketones, heterocyclics, esters, alcohols, acids, aromatics and sulfur containing compounds. The headspace concentrations of 2-butanone, 2-pentanone, 2-heptanone, methyl acetate, 2-methyl-2-propanol, pyrrole and 6-methyl-5-hepten-2-one were significantly higher in cancer tissues whereas isoprene, butyrolactone, ethyl acetate and D-limonene were higher in non-cancerous tissues. Wilcoxon signed rank test was used to differentiate between the VOCs from cancer and normal tissues ( $p < 0.05$ ). 1-propanol and dodecane were contaminants from sampling site conditions; pyrrole was associated with presence of *H. pylori*; and pyridine, 3-methyl-pyridine, ethylbenzene and p-xylene were linked to tobacco smoking.

**Conclusions:** The comparison between VOCs in gastric cancer and non-cancerous tissues can help to identify VOCs associated with gastric cancer and their origin. The analysis of VOCs using GC-MS is an easy, non-invasive method for the detection of gastric cancer.

**Prevention and early detection**

IGCC22-ABS-1459

**TIME LOST IN DIAGNOSIS AND INITIATION OF TREATMENT IN PATIENTS WITH GASTRIC CANCER**

Alejandro Alfaro Goldaracena <sup>1</sup>, Damariz X. Zapien Lopez<sup>1</sup>, Pablo A. Gasca León<sup>1</sup>, Gabriela del Ángel Millán<sup>1</sup>

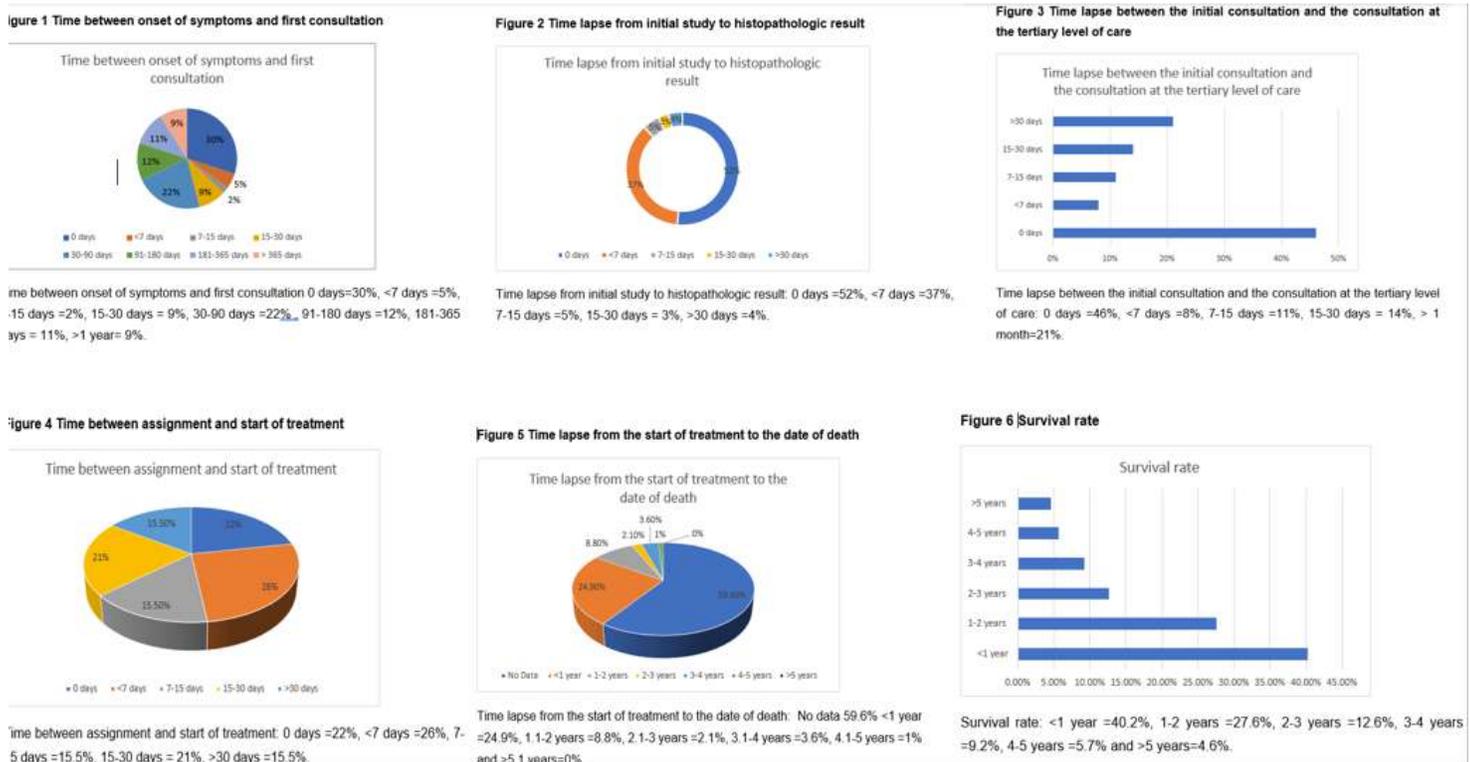
<sup>1</sup>Cirugía oncológica, Instituto Nacional de Ciencias Médicas y Nutrición Salvador Zubirán, Ciudad de México, Mexico

**Objectives:** Gastric cancer is the sixth most prevalent type of cancer worldwide. Among Latin American countries, Mexico has the second highest mortality rate for this neoplasm. Currently, in spite of the decrease in incidence and mortality figures, gastric cancer continues to represent a public health problem.

**Methods:** Retrospective study on gastric cancer during the period from 2015 to 2021. All records of these 193 patients, the variables analyzed are gender, hereditary family history, onset of symptomatology, initial diagnosis of suspicion, initial treatment, first diagnostic study, histopathological study, stage, referral to a third level of health, initiation and type of treatment at the third level of health, patient evolution, death or follow-up.

**Results:** 53% participants are male gender and 47% to the female gender, 52% have hereditary family history of cancer, the main symptomatology 32% with abdominal pain, dysphagia 13%, pyrosis 10%, Initial diagnostic suspicion is gastric adenocarcinoma= 42%, Gastroesophageal reflux disease= 20%. Most frequent localization is a major curvature 41%, minor curvature 40%, antrypiloric region 31% and esophagogastric junction 31%. Main stage is 4=65%, Since the time of consultation of 30% of patients is 0 days from the onset of symptoms and in 22% 30 to 90 days, Therefore, a histopathological study was performed where 52% of the patients had results the same day of the study and 37% took less than 7 days, 46% of the patients were sent or were already in consultation of a third level of health care and 21% took more than a month, at this level 26% of the patients were assigned and began treatment in less than 7 days and 22% in 0 days, 24% of the patients died in less than 7 days and 22% 0 days. The survival rate in 40% of the participants is less than one year and 27.6% between 1-2 years.

**Image:**



**Conclusions:** 65% of these patients were diagnosed late with stage 4, this could be due to the diffuse nature of the symptoms and the few protocols that exist at the national level for the timely diagnosis of gastric cancer.

***Prevention and early detection***

IGCC22-ABS-1464

**EPIDEMIOLOGICAL CHARACTERISTICS OF GASTRIC CANCER AT A REFERENCE HOSPITAL**

Alejandro Alfaro Goldaracena<sup>1</sup>, Damariz X. Zapien López<sup>1</sup>, German E. Sánchez Morales<sup>2</sup>, Pablo A. Gasca León<sup>1</sup>, Gabriela Del Angel Millán<sup>3</sup>, Luis G. Gallegos Portillo<sup>3</sup>

<sup>1</sup>Cirugía oncológica, <sup>2</sup>Cirugía Hepatopancreatobiliar, <sup>3</sup>Cirugía general, Instituto Nacional de Ciencias Médicas y Nutrición Salvador Zubirán, Ciudad de México, Mexico

**Objectives:** Gastric cancer is the sixth most prevalent type of cancer worldwide. Among Latin American countries, Mexico has the second highest mortality rate for this neoplasm. Currently, in spite of the decrease in incidence and mortality figures, gastric cancer continues to represent a public health problem.

**Methods:** A total of 609 patients with histological diagnosis of gastric cancer treated during the period 1987-2020 were included. Electronic and physical records were reviewed to obtain clinical and epidemiological characteristics, and a retrospective cross-sectional study was performed with these data.

**Results:** Of the 609 patients studied, 53.9% were women and 46.1% men. Most cases occurred in patients over 50 years of age (46%). Of the registered cases 53% were clinical stage IV, while 17.2%, 9.5% and 3.8% were clinical stages III, II, and I respectively. A total of 301 (49.4%) patients underwent surgical treatment, of which 23.6% were palliative. Distal gastrectomy was the most frequently documented procedure, in up to 46.5% (140) of cases.

**Image:**

Table 1 Surgical characteristics of patients diagnosed with gastric cancer

Procedure	n	%
Distal gastrectomy	140	46.5
Subtotal gastrectomy	90	29.9
Total gastrectomy	20	6.6
Aborted procedure	44	14.6
Not specified	7	2.3
<b>Surgical approach</b>		
Palliative surgery	71	23.6
Open	188	62.5
Laparoscopic	14	4.7
Laparoscopic with conversion	1	0.3
Not specified	98	32.6
<b>Type of Lymphadenectomy</b>		
D1	6	2.0
D2	46	15.3
Not specified	249	82.7
Positive margins	48	7.9
	<b>Average</b>	<b>range</b>
Cosecha ganglionar Nodal harvest	21.5	1-56
Number of positive nodes	6.4	0-36
Duration of surgery (minutes)	247.0	40-600
Bleeding (milliliters)	318.0	10-1500
Days of hospital stay	18.05	2-124
	<b>n</b>	<b>%</b>
Re-hospitalization during the first 30 days	12	4.0
Reintervention during the first 30 days	33	11.0
Administration of HIPEC	5	1.7

Table 1 Surgical characteristics of patients diagnosed with gastric cancer (n 301) Percentage (%), Number (n), hyperthermic intraperitoneal chemotherapy (HIPEC), lymphadenectomy level 1 (D1), lymphadenectomy level 2 (D2).

**Conclusions:** The incidence of gastric cancer has decreased in the last decade; however, due to the fact that patients are diagnosed in late stages of the disease, this neoplasm still has high mortality rates, which maintains it as a serious public health problem in Mexico.

***Diagnosis and staging***

IGCC22-ABS-1176

**CLINICOPATHOLOGICAL CHARACTERISTICS AND PROGNOSTIC MODEL FOR HEPATOID ADENOCARCINOMA OF THE STOMACH**

Zu-Kai Wang<sup>1</sup>, Jian-Xian Lin<sup>1</sup>, Jian-Wei Xie<sup>1</sup>, Ping Li<sup>1</sup>, Chao-Hui Zheng<sup>1</sup>, Changming Huang<sup>1</sup>

<sup>1</sup>Department of Gastric Surgery, Fujian Medical University Union Hospital, Fuzhou, China

**Objectives:** Few studies have examined the clinicopathological characteristics and prognosis of hepatoid adenocarcinoma of the stomach (HAS). We aimed to establish a nomogram to predict the overall survival (OS) of HAS.

**Methods:** Data of 315 cases of primary HAS diagnosed between April 2004 and December 2019 at 16 centers in China were retrospectively analyzed, of which 137 were simple HAS (SHAS) and 178 were mixed HAS (MHAS). In total, 220 patients were randomly selected as the derivation cohort and 95 as the validation cohort.

**Results:** SHAS had a higher level of preoperative alpha-fetoprotein than MHAS and higher rate of preoperative liver metastasis (16.8% vs. 6.2%,  $P=0.003$ ). The 3-year OS rates of SHAS and MHAS were comparable (56.0% vs. 60.0%,  $P=0.646$ ). Multivariate Cox analysis in the derivation cohort showed that perineural invasion, preoperative carcinoembryonic antigen  $\geq 5$  ng/mL, and pN category were independent risk factors for OS, and a nomogram to predict postoperative OS was established. Overall, the C-index was higher and Akaike's information criterion was lower in the nomogram than in the pTNM stage and clinical model (pTNM stage + adjuvant chemotherapy). Based on the nomogram cut-off point, the whole cohort was divided into high- and low-risk groups. The 3-year OS rate of patients in the high-risk group was significantly lower than that of those in the low-risk group (29.7% vs. 75.9%,  $P<0.001$ ).

**Conclusions:** We established an individualized nomogram to predict OS for HAS, which has good prognostic value and can compensate for the shortcomings of the current TNM stage.

## ***Diagnosis and staging***

IGCC22-ABS-1272

### **DEVELOPMENT OF THE CANADIAN NATIONAL GASTRIC CANCER DATABASE**

Victoria Delibasic<sup>1</sup>, Natalie Coburn<sup>1,2,3</sup>, Carolyn Nessim<sup>4</sup>, Trevor Hamilton<sup>5</sup>, Mai-Kim Gervais<sup>6</sup>, Savtaj Brar<sup>7</sup>, Winson Cheung<sup>8</sup>, Daniel Schiller<sup>9</sup>

<sup>1</sup>Evaluative Clinical Sciences, Sunnybrook Research Institute, <sup>2</sup>Odette Cancer Centre, Sunnybrook Health Sciences Centre, <sup>3</sup>Department of Surgery, University of Toronto, Toronto, <sup>4</sup>Division of General Surgery, The Ottawa Hospital, Ottawa, <sup>5</sup>Department of Surgery, University of British Columbia, Vancouver, <sup>6</sup>General Surgery, Hpital Maisonneuve-Rosemont, Montreal, <sup>7</sup>General Surgery, University of Toronto, Toronto, <sup>8</sup>Department of Oncology, University of Calgary, Calgary, <sup>9</sup>Department of Surgery, University of Alberta, Edmonton, Canada

**Objectives:** In Canada, there are limited database reports on long-term clinical outcomes, clinicopathological factors and treatment patterns for gastric cancer (GC) patients. We developed a national collaborative GC database that includes prospective data on treatment strategies and five-year outcomes. We aim to assess variability in treatment planning and improve disease management for GC patients.

**Methods:** This is a prospective cohort study. The Canadian Gastric Cancer Database was developed using REDCap software. Prospective data is collected using patient medical and pathology reports and recorded through the REDCap platform. Prospective data collection began on January 1, 2020. All adult ( $\geq 18$  years) patients that have been diagnosed with gastric cancer and received treatment by surgical bypass or resection are eligible for study participation.

**Results:** 104 variables have been developed for the Canadian National Gastric Cancer Database. Three main forms are used to categorize GC patient data by Demographics, Treatment and Pathology and Follow-up. The Demographics form captures 34 variables, Treatment and Pathology captures 60 variables and Follow-Up captures 9 variables. The patient treatment factors recorded in REDCap include pre-operative intervention, surgical intervention, and post-surgical intervention. To date, 7 surgical oncologists from 6 different academic institutions across Canada are actively recruiting patients for the database. Abstracted data is transferred to the hosting server at the University of Alberta for future data analysis.

**Image:**



**UNIVERSITY OF ALBERTA**  
University of Alberta  
Women & Childrens Health Research Institute

Save & Exit Form

Save & Go To Next Form

-- Cancel --

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**Canadian National Gastric Cancer Database** PID-4698

Actions: [Download PDF of Instrument\(s\)](#)    [VIDEO: Basic data entry](#)

**CGCDB Treatment and Pathology**

Editing existing Record ID **6174-1**

<b>Record ID</b>	6174-1	
<b>Pre-op Chemo?</b>	<input type="radio"/> No <input checked="" type="radio"/> Yes <input type="radio"/> Not documented	reset
<b>Pre-op Radiation?</b>	<input type="radio"/> No <input checked="" type="radio"/> Yes <input type="radio"/> Not Documented	reset
<b>Staging Laparoscopy done?</b>	<input type="radio"/> Yes - separate procedure BEFORE chemotherapy given <input type="radio"/> Yes - separate procedure AFTER chemotherapy given <input checked="" type="radio"/> Yes - at time of planned laparotomy NO CHEMOTHERAPY given <input type="radio"/> Yes - at time of planned laparotomy AFTER CHEMOTHERAPY given <input type="radio"/> No	reset
<b>Surgical Procedure Performed other than Laparoscopy?</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No	reset
<b>Surgical Approach</b>	<input type="radio"/> Open <input checked="" type="radio"/> Laparoscopic <input type="radio"/> Laparoscopic converted to open <input type="radio"/> Robotic	reset
	<input type="checkbox"/> 1 Right Paracardial <input type="checkbox"/> 2 Left Paracardial	

Figure 1. Screen capture of the 'Treatment and Pathology' form in the Canadian National Gastric Cancer Database.

**Conclusions:** A comprehensive REDCap database was built to reflect patient outcomes of GC procedures. Clinical application of the Canadian National Gastric Cancer Database includes identifying elements of care that lead to improved long-term outcomes.

## *Diagnosis and staging*

IGCC22-ABS-1435

### **5-AMINOLEVULINIC ACID FOR PHOTODYNAMIC DIAGNOSIS OF PERITONEAL METASTASES DUE TO GASTRIC CANCER**

Tsuyoshi Takahashi<sup>1</sup>, Takeshi Omori<sup>2</sup>, Tatsuya Tanaka<sup>3</sup>, Tsutomu Namikawa<sup>4</sup>, Kazumasa Fujitani<sup>5</sup>, Kazuhiro Nishikawa<sup>6</sup>, Yoshiyuki Fujiwaka<sup>7</sup>, Hiroaki Nagano<sup>8</sup>, Eigo Otsuji<sup>9</sup>, Yoshihiro Kakeji<sup>10</sup>, Yukinori Kurokawa<sup>1</sup>, Yuichiro Doki<sup>1</sup>

<sup>1</sup>Department of gastroenterological surgery, Osaka university, Suita, <sup>2</sup>Department of gastroenterological surgery, Osaka International Cancer Institute, Osaka, <sup>3</sup>Department of gastroenterological surgery, Nagoya city university, Nagoya, <sup>4</sup>Department of surgery, Kochi university, Nankoku, <sup>5</sup>Department of surgery, Osaka general medical center, <sup>6</sup>Department of surgery, National Hospital Organization Osaka National Hospital, Osaka, <sup>7</sup>Department of gastroenterological surgery, Tottori university, Yonago, <sup>8</sup>Department of gastroenterological surgery, Yamaguchi university, Ube, <sup>9</sup>Department of gastroenterological surgery, Kyoto prefectural university of medicine, Kyoto, <sup>10</sup>Department of Surgery, Kobe university, Kobe, Japan

**Objectives:** For advanced gastric cancer, diagnosis of peritoneal dissemination is mandatory prior to the decision of therapy; therefore, staging laparoscopy (SL) has gained wider clinical acceptance. We previously reported the efficacy and safety of SL with photodynamic diagnosis (PDD) using 5-aminolevulinic acid (5-ALA). And, we have performed an investigator-initiated clinical phase III trial for the efficacy of oral administration of 5-ALA PDD compared with that of conventional white-light laparoscopic diagnosis.

**Methods:** A total of 20mg/kg 5-ALA was administered orally 180–300 minutes before SL. The primary endpoint was the proportion of patients who were diagnosed with peritoneal dissemination using only by 5-ALA PDD. And the secondary endpoints were sensitivity, specificity, positive predictive value, negative predictive value, and safety.

**Results:** One hundred three patients were enrolled. Only one more patient was found positive for dissemination via PDD. The proportion of patients who were diagnosed with peritoneal dissemination using only by 5-ALA PDD was 1.0 (95%CI: 0.0-5.3). The proportions of adverse events and side effects were 83.8% and 21.0%, respectively. There was no significance between the sensitivity of PDD (100% ( 86.3-100.0 ) ) that of conventional diagnosis (96.0% ( 79.7-99.9 ) ) . The specificities of PDD and conventional diagnosis were 52.6% (40.9-64.0) and 84.6% (74.7-91.8), respectively.

**Conclusions:** This investigator-initiated clinical trial confirmed the safety of 5-ALA administration in PDD for peritoneal metastases in gastric cancer. However, we could not show the efficacy of it in this investigator-initiated clinical trial.

***Diagnosis and staging***

IGCC22-ABS-1049

**EXTRA-GASTRIC LYMPH NODE IN THE PROGNOSIS WITH LYMPH NODE METASTASIS OF GASTRIC CANCER**

Yi Zeng<sup>1</sup>, Fenglin Cai<sup>1</sup>, Jingyu Deng<sup>1</sup>

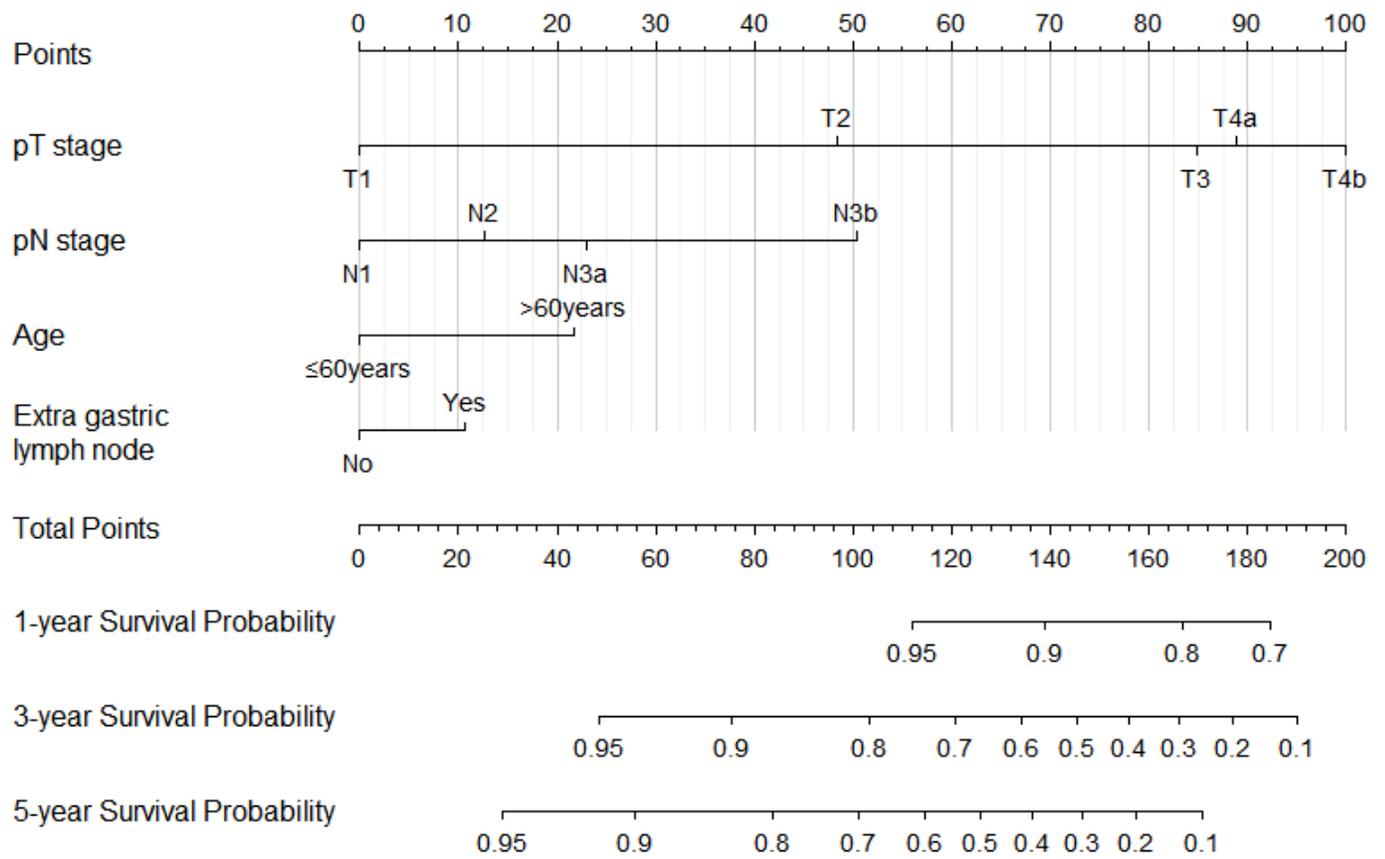
<sup>1</sup>Department of Gastric Cancer, Tianjin Medical University Cancer Institute and Hospital, Tianjin, China

**Objectives:** This study is based on the databases of two large medical centers in North and South China, aiming to clarify the clinical prognostic significance of Extra-gastric lymph node metastasis (ELNM, No. 7-12 lymph nodes).

**Methods:** The clinical data of 891 patients with pathologically confirmed lymph node metastasis in Fujian Cancer Hospital, a large medical center in southern China, were included as the training cohort. The clinical data of 749 patients with pathologically confirmed lymph node metastasis from Tianjin Medical University Cancer Hospital, a large medical center in northern China, were used as the external validation cohort.

**Results:** In the training cohort (Fujian Cancer Hospital), Cox multivariate regression analysis showed that age, pT stage, pN stage and ELMN were independent factors. Then the nomogram model was established. The external validation results show that the C-index value of the model is 0.687. The ROC curve is drawn. The internal validation shows that the AUC value of the nomogram prediction model is 0.77 in 1 year, 0.68 in 3 years and 0.7 in 5 years. The external validation shows that the AUC value of the nomogram prediction model is 0.74 in 1 year, 0.67 in 3 years and 0.69 in 5 years. The correction curve shows that the predicted results of the nomogram model are in good agreement with the actual results.

**Image:**



**Conclusions:** ELNM is an independent risk factor affecting the prognosis. The nomogram model has good prognostic prediction and grading ability for gastric cancer patients with definite lymph node metastasis.

## ***Diagnosis and staging***

IGCC22-ABS-1117

### **WHICH GASTRIC CANCER PATIENTS COULD BENEFIT FROM STAGING LAPAROSCOPY? A GIRCG COHORT STUDY.**

Leonardo Solaini<sup>1</sup>, Maria Bencivenga<sup>2</sup>, Alessia D'ignazio<sup>3</sup>, Marco Milone<sup>4</sup>, Elisabetta Marino<sup>5</sup>, Stefano De Pascale<sup>6</sup>, Fausto Rosa<sup>7</sup>, Michele Sacco<sup>2</sup>, Uberto Fumagalli Romario<sup>8</sup>, Luigina Graziosi<sup>5</sup>, Giovanni De Palma<sup>9</sup>, Daniele Marrelli<sup>3</sup>, Morgagni Paolo<sup>10</sup>, Giorgio Ercolani<sup>1</sup>

<sup>1</sup>Department of Medical and Surgical Sciences, University of Bologna, Forlì, <sup>2</sup>General and Upper GI Surgery Division, University of Verona, Verona, <sup>3</sup>Department of Surgery, University of Siena, Siena, <sup>4</sup>Department of Clinical Medicine and Surgery, University of Naples "Federico II", Napoli, <sup>5</sup>Department of Surgery, University of Perugia, Perugia, <sup>6</sup>Digestive Surgery, European Institute of Oncology, Milan, <sup>7</sup>Digestive Surgery, Università Cattolica del Sacro Cuore, Rome, <sup>8</sup> Digestive Surgery, European Institute of Oncology, Milan, <sup>9</sup>Department of Clinical Medicine and Surgery, University of Naples "Federico II", Napoli, <sup>10</sup>Department of Surgery, Morgagni-Pierantoni Hospital, Forlì, Italy

**Objectives:** This study aimed to investigate which gastric cancer patients could benefit the most from staging laparoscopy.

**Methods:** A retrospective cohort study was carried out, including 316 (216 cM- and 100 cM+) gastric cancer patients who had undergone staging laparoscopy between 2010-2020 in seven GIRCG centers. A model including easily-accessible clinical, biochemical and pathological markers was constructed to predict the risk of carcinomatosis. ROC curve and decision curve analyses were used to verify its accuracy and net benefit.

**Results:** In the cM- population staging laparoscopy could detect 67 cases who had peritoneal carcinomatosis or positive cytology, for a yield of 30.5%. In cM- patients, intestinal type tumors (0.25, 0.12-0.51; p=0.002), cT4 tumors (2.18, 1.11-4.28; p=0.023) and cancers of the lower third (0.31, 0.14-0.70; p=0.004) were associated with the presence of peritoneal carcinomatosis and/or positive cytology. The ROC curve analysis of the model including the three variables showed an AUC of 0.75 (0.68-0.81, p<0.001). The decision curve analyses showed that the model had a higher net benefit than the treating all strategy between threshold probabilities of 15 and 50%.

**Conclusions:** Staging laparoscopy is a useful tool to address the patient with gastric cancer to the most adequate treatment. In cM- patients the assessment of the location of the tumor, the Lauren's histotype and the cT status may help in providing additional elements in indicating or not the use of staging laparoscopy.

## ***Diagnosis and staging***

IGCC22-ABS-1065

### **EFFICACY OF 3D MICROFILTER WITH DNA APTAMER FOR DETECTING CIRCULATING TUMOR CELL FOR GASTRIC CANCER**

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**Objectives:** The analysis of blood for circulating tumor cells (CTCs) has opened new avenues for cancer diagnostics, including early detection, risk assessment and staging. However, research about CTCs has been challenging due to the rarity of CTCs in bloodstream, which makes detection and isolation difficult. We conduct a pilot study to evaluate the efficacy of our novel three-dimensional deformable microfilter with a DNA aptamer for detecting CTCs for gastric cancer.

**Methods:** We developed a three-dimensional deformable microfilter with a gold substrate modified with a DNA aptamer for EpCAM. The peripheral blood sample from 7 far advanced gastroesophageal junction and gastric adenocarcinoma patients are passed through the microfilter and counted by fluorescence microscope.

**Results:** A total of 7 patients and 10 samples with metastasis (2 patients) and recurrence (5 patients) were enrolled. The patterns of metastasis or recurrence included hematogenous (5 patients) and peritoneal dissemination (2 patients). At least one CTC was detected in 9 samples (90%). The average number of CTCs was 3.1 cells/ml (0-6.3 cells). CTC were successfully detected even in the patients with peritoneal dissemination without definitive mass by imaging. Also, for the patients who were measured multiple times with clinical time course, we found a close correlation between CTC number and CEA level or image assessment.

**Conclusions:** We successfully detected CTCs in the patients with far advanced gastric cancer patients, even in the those with peritoneal dissemination without definitive mass by imaging. Although our pilot study indicates the potential of a novel devise to capture CTC effectively, a large scale of validation is needed to confirm the clinical utility.

## ***Diagnosis and staging***

IGCC22-ABS-1192

### **A NOVEL YPTLM STAGING SYSTEM BASED ON LODDS FOR GASTRIC CANCER AFTER NEOADJUVANT THERAPY**

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**Objectives:** Accuracy of the AJCC 8th ypTNM staging system on the prognosis of gastric cancer (GC) patients after neoadjuvant therapy is controversial. This study aimed to develop and validate a novel neoadjuvant staging system for GC using the log odds of positive lymph nodes scheme (LODDS).

**Methods:** A retrospective analysis of 660 patients who underwent radical gastrectomy after neoadjuvant therapy was conducted. Clinical data from the First Hospital of Lanzhou University (n=35) was included as development cohort. Validation cohort came from the SEER database (n=1701). A novel ypTLoddsS (ypTLM) staging was established using the 3-year overall survival rate. Prognostic performance of the AJCC 8th ypTNM and ypTLM staging was compared.

**Results:** Two-step multivariate Cox regression analysis in both cohorts showed that ypTLM was an independent predictor of overall survival of GC patients after neoadjuvant therapy (HR:1.57, 95% CI:1.30-1.88, p<0.001). In the development cohort, ypTLM had better discrimination ability than ypTNM (C-index:0.663 vs 0.633, p<0.001), better prediction homogeneity (LR:97.7 vs. 70.9), and better prediction accuracy (BIC:3067.01 vs 3093.82; NRI:0.36). In the validation cohort, ypTLM had a better prognostic predictive ability (C-index:0.614 vs 0.588, p<0.001; LR:11909.05 vs. 11975.75; BIC:13263.71 vs 13328.24; NRI:0.22). The time-dependent ROC curve shows that predictive performance of ypTLM is better than ypTNM, and the analysis of the decision curve shows that ypTLM achieved better net benefits. **Conclusions:** A LODDS-based ypTLM staging based on international multicenter data was developed and validated. The prognostic prediction performance after neoadjuvant therapy of this staging is better than the AJCC 8th ypTNM staging.

***Diagnosis and staging***

IGCC22-ABS-1206

**THE COMBINATION OF EUS AND CT IS BENEFICIAL FOR INDICATION OF NEOADJUVANT CTX IN GASTRIC CANCER.**

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**Objectives:** With the introduction of new therapeutic options for gastric cancer treatment, more precise preoperative staging of gastric cancer is needed. The purpose of this study is to evaluate the accuracy of clinical staging in gastric cancer in terms of neoadjuvant chemotherapy using CT and EUS.

**Methods:** A total of 2,502 patients underwent stomach protocol CT (S-CT) and EUS, followed by gastrectomy for primary gastric adenocarcinoma between September 2012 and February 2018 at Seoul National University Hospital. The results of preoperative S-CT and EUS were compared to the postoperative pathologic staging.

**Results:** When T staging was divided into T1-2 and T3-4, the positive predictive value for T3-4 using S-CT, EUS, and a combination of both modalities were 74.2%, 79.2%, and 85.5%, respectively. And the proportion of Stage I were 17.8%, 13.1%, and 8.5%, respectively. Along with T3-4 staging in S-CT (OR 3.094, 95% CI 2.143-4.467,  $p < 0.001$ ) and EUS (OR 3.168, 95% CI 2.258-4.445,  $p < 0.001$ ), Borrmann type 4 (OR 4.096, 95% CI 1.839-9.124,  $p < 0.001$ ), and undifferentiated histology (OR 2.180, 95% CI 1.590-2.987,  $p < 0.001$ ) by endoscopy, and suspected lymph node (LN) metastasis in S-CT (OR 2.164, 95% CI 1.566-2.989,  $p < 0.001$ ) were associated with pathologic stage III/IV in clinically locally advanced gastric cancer (n=945).

**Conclusions:** The combination of EUS and CT is beneficial for indication of neoadjuvant CTx in gastric cancer in terms of preventing enrollment of patients with stage I. Gross type and histology by endoscopy, and LN metastasis by CT can be also considered as factors for indication of neoadjuvant CTx.

## Diagnosis and staging

IGCC22-ABS-1045

### ANALYSIS OF PREDICTIVE RISK FACTORS FOR LYMPH NODE METASTASIS IN EARLY GASTRIC CANCER

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<sup>1</sup>

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**Objectives:** Identify the predictive risk factors for lymph node metastasis(LNM) in patients with early gastric cancer(EGC).

**Methods:** Retrospective study, patients who underwent radical gastrectomy for gastric cancer during 1990-2020 were identified. Patients with pathological diagnoses of EGC were included. Univariate and multivariate analyses were conducted.

**Results:** During 1990-2020, 4394 patients were treated with radical gastrectomy for gastric cancer. Of these, 501 (11%) patients were diagnosed with EGC. The mean age was 62.4 years. Two-hundred-seventy-seven (55%) patients were female. Distal tumors were the most frequent (n=302; 60%). Tubular adenocarcinoma was the most frequent histological subtype (n=309; 62%). One-hundred-ninety-nine (40%) patients presented poorly differentiated tumors. The most frequent macroscopic classification was Type IIc (n=247; 49%). Ulceration was presented in 105 (21%) patients. Two-hundred-seventy-nine (56%) patients presented tumors that infiltrated the submucosa (T1b) and 222 (44%) patients presented infiltration of the mucosa (T1a). The mean tumor size was 3.4 cm. Lymphovascular invasion was presented in 76 (15%) patients and, perineural invasion in 24 (5%) patients. The mean of harvested LN was 42. LNM was detected in 96 (19.2%) patients. In the multivariate analysis, a tumor size >3cm (OR: 1.97, 95% CI: 1.1–3.8), submucosal invasion (OR: 2.71, 95% CI: 1.25–5.85), lymphovascular invasion (OR: 36.4, 95% CI: 16.8–78.8) and perineural invasion (OR: 21.2, 95% CI: 4.5–97.8) were independent predictors of LMN in EGC. One-hundred-eleven patients fulfilled the criteria for endoscopic treatment as an absolute indication and only one (0.9%) patient presented LMN. Also, 23 patients fulfilled the criteria for endoscopic treatment (expanded indication), and no patient presented LMN.

**Image:**

**Table 2. Multivariate analysis of predictive risk factors associated with the presence of lymph node metastasis in early gastric cancer patients**

	OR *	CI † 95%	p- Value
<b>Tumor size (&gt;3cm)</b>	1.97	1.1-3.8	<b>0.49</b>
<b>Submucosal Invasion</b>	2.71	1.25-5.85	<b>0.01</b>
<b>Lymphovascular Invasion</b>	36.4	16.8-78.8	<b>≤0.001</b>
<b>Perineural Invasion</b>	21.2	4.5-97.8	<b>≤0.001</b>

\* OR: Odds Ratio

† CI: Confidence Interval

**Conclusions:** A tumor size >3cm, submucosal invasion, lymphovascular invasion, and perineural invasion were independent predictors of LMN in EGC. According to our results, the indications for endoscopic treatment are safe, with a low incidence of LMN.

## ***Diagnosis and staging***

IGCC22-ABS-1211

### **TUMOR SIZE DISCREPANCY BETWEEN ENDOSCOPIC AND PATHOLOGIC ESTIMATION IN GASTRIC CANCER**

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**Objectives:** Preoperative measurement of tumor size is important in terms of the choice of resection type and the determination of resection margin for gastrectomy. The purpose of this study is to evaluate tumor size discrepancy between endoscopic and pathologic estimation in gastric cancer.

**Methods:** Between September 2013 and February 2018 at Seoul National University Hospital, endoscopic measurements of tumor size were performed in 2,163 patients who underwent gastrectomy for primary gastric adenocarcinoma. The results of endoscopic measurements were compared to those of pathologic measurements. **Results:** The mean pathologic size 3.3cm, and the mean size difference (pathologic size minus endoscopic size)  $\pm$  95%confidence interval was  $0.3 \pm 3.0$ cm. The value of Pearson correlation was 0.76. In terms of macroscopic type by endoscopy, the mean size difference  $\pm$  95% confidence interval was  $0.4 \pm 2.6$ cm in type 0 (n=1,600),  $-0.1 \pm 2.5$ cm in type 1 and 2 (n=56),  $0 \pm 3.7$ cm in type 3 (n=493), and  $2.6 \pm 6.5$ cm in type 4 (n=14), respectively. Upper (OR 1.594, 95% CI 1.083-2.347, p=0.018) and encircling location (OR 2.472, 95% CI 1.205-5.072, p=0.014), undifferentiated histology (OR 1.481, 95% CI 1.069-2.051, p=0.018), Borrmann type 4 (OR 6.247, 95% CI 1.626-24.006, p=0.008), and T3 or over by CT (OR 1.836, 95% CI 1.078-3.129, p=0.026) were significant preoperative risk factors for endoscopic underestimation of tumor size with a difference of more than 2 cm.

**Conclusions:** Endoscopic estimation of tumor size showed good correlation with pathologic size, with an error of less than 4cm except Borrmann type 4. Upper and encircling location, undifferentiated histology, Borrmann type 4, and T3 or over by CT were significant preoperative risk factors for endoscopic underestimation of tumor size.

## ***Diagnosis and staging***

IGCC22-ABS-1456

### **STAGING AND TREATMENT OF TYPE 1-3 GASTRIC NEUROENDOCRINE TUMORS: A 20 YEAR SINGLE CENTER EXPERIENCE**

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**Objectives:** Gastric neuroendocrine tumors (g-NETs) are rare, differentiated and usually indolent lesions; they include 3 types defined on the basis of pathogenesis; type 1 and 3 are treated by endoscopic or surgical removal according to their size, depth of invasion and presence of lymph-node (LN) metastases. There is no clear evidence of the most accurate staging strategy for LN metastases of g-NETs.

**Methods:** We conducted a retrospective analysis of patients (pts) with type 1 and 3 g-NETs treated from 2000 to oct 2021. After endoscopic diagnosis, pts underwent a staging CT scan. Somatostatin-receptor (SSR) imaging with Octreoscan or with 68-Ga DOTA PET was performed in case of NETs larger than 2 cm, or in case of suspicious locoregional LN at CT scan. Endoscopic ultrasound with fine needle biopsy was used selectively. Surgery was indicated for tumors with clinically positive LN or invasion beyond the submucosa.

**Results:** 71 pts with type 1 (87,3%) or type 3 (12,6%) g-NETs were treated at our Institute. 6 showed LN positivity at SRR imaging (1 at Octreoscan and 5 at PET): all of them had a tumor > 2 cm and were G2; 5 of them showed suspicious LN at CT scan. 63 pts (88,7%) were treated endoscopically, either with cold biopsy resection (41%), mucosal resection (35%), or submucosal dissection (24%). 8 pts (11%) underwent surgery either because of nodal disease at SSR imaging (n 6, 75%) or because they were g-NETs type 3 not suitable for endoscopic removal (n 2 25%). In 5 cases a total gastrectomy was performed (4 type 1 and 1 type 3); in 3 most recent cases a limited resection was preferred (2 type 1 and 1 type 3). Surgery confirmed the presence of LN metastases in all the 6 pts showing SSR imaging positivity. At a mean follow up of 48 months (1-60) all pts are alive with no local or distant recurrence.

**Conclusions:** SSR imaging showed high accuracy in staging of LN metastases in g-NETs and represents the gold standard for nodal staging. A tailored and conservative surgery may be warranted, when feasible, given the good prognosis for these pts.

## *Diagnosis and staging*

IGCC22-ABS-1160

### **SHORR VERSUS MODIFIED ULTRAFAST PAPANICOLAOU FOR INTRAOPERATIVE CYTOLOGY IN ADVANCED GASTRIC CANCER**

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**Objectives:** According to the AJCC TNM classification, the presence of metastatic gastric cancer cells in peritoneal washing cytology (PWC) is regarded as stage IV gastric cancer. There is still no established reliable method for rapid intraoperative diagnosis of PWC. This study evaluates the Shorr method and the Modified Ultrafast Papanicolaou (MUFP) method, and compares their diagnostic accuracy.

**Methods:** This study included gastric cancer patients with T3 or higher. The Shorr method and the MUFP method were performed on all specimens, and they were compared to the conventional Papanicolaou (PAP) with immunohistochemistry. The sensitivity, specificity, and the partial likelihood test was used to compare the two methods.

**Results:** A total of 40 patients underwent intraoperative PWC between November 2019 to August 2021. The average time for development of the Shorr and MUFP smears was 45.3 minutes, and the average time to pathologic diagnosis was 53.9 minutes. Finally, eight patients (20.0%) had positive cytology in conventional staining. The Shorr method had a sensitivity of 75.0% and specificity of 93.8%, while the MUFP method had 62.5% sensitivity and 100.0% specificity. The area under the curve values were 0.844 for the Shorr, and 0.813 for the MUFP method. When compared with patient overall survival, there was no difference in partial likelihood ratio between Shorr, MUFP, and the conventional PAP staining method.

**Conclusions:** Both the Shorr and the MUFP methods are acceptable for intraoperative diagnosis of PWC in advanced gastric cancer.

## ***Diagnosis and staging***

IGCC22-ABS-1256

### **PROGNOSTIC FACTORS IN GASTRIC STUMP CARCINOMA**

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**Objectives:** In an earlier report from 1999 we could show that prognosis of patients with gastric stump cancer (GSC) did not differ from patients with primary cancer of the proximal third (PGC) after resection and adequate lymphadenectomy. The present work is an update on the previous analysis additionally including the patients from the previous 20 years.

**Methods:** Surgical treatment of 94 patients with gastric stump cancer (GSC) was compared to 1144 patients with primary gastric cancer (PGC) of the proximal third of the stomach. OS between the two groups was compared using the Kaplan-Meier method and log-rank test. Differences in the baseline characteristics were analyzed using the Mann Whitney U-test, Student's t-test or  $\chi^2$ -statistics where appropriate. Prognosticators were identified using uni- and multivariate Cox regression analysis. Confounders were balanced using Propensity Score (PS) matching.

**Results:** Resection was curative in 64.9% of GSC patients and 68.4% of PGC patients ( $p=0.489$ ), without significant differences concerning 30d mortality rate (6.7% vs. 4.2%,  $p=0.327$ ) and median survival time (21 vs. 25 months,  $p=0.670$ ). Patients with GSC were more often of male sex ( $p=0.006$ ), significantly older ( $p<0.001$ ), had received neoadjuvant therapy less often ( $p<0.001$ ), underwent extended resections less frequently ( $p<0.001$ ), showed a higher rate of postoperative complications ( $p=0.026$ ), presented with more advanced (T4) tumors ( $p<0.001$ ) and were better differentiated ( $p<0.001$ ) when compared to patients with PGC. Multivariate analysis showed an independent prognostic effect of age ( $p<0.001$ ), postoperative complications ( $p<0.001$ ), number of nodes removed ( $p=0.014$ ), T-stage ( $p<0.001$ ), N-stage ( $p<0.001$ ) and R-status ( $p<0.001$ ). After PS matching for relevant confounders no survival difference could be detected between patients with GSC and PGC ( $p=0.529$ ).

**Conclusions:** Analyses showed that curability and prognosis after resection and adequate lymphadenectomy in GSC and PGC patients is not different.

## ***Diagnosis and staging***

IGCC22-ABS-1104

### **HISTOLOGIC CATEGORIZATION BY LAUREN HISTOTYPE CONVEYS PROGNOSTIC INFORMATION FOR GE-JUNCTION CANCER**

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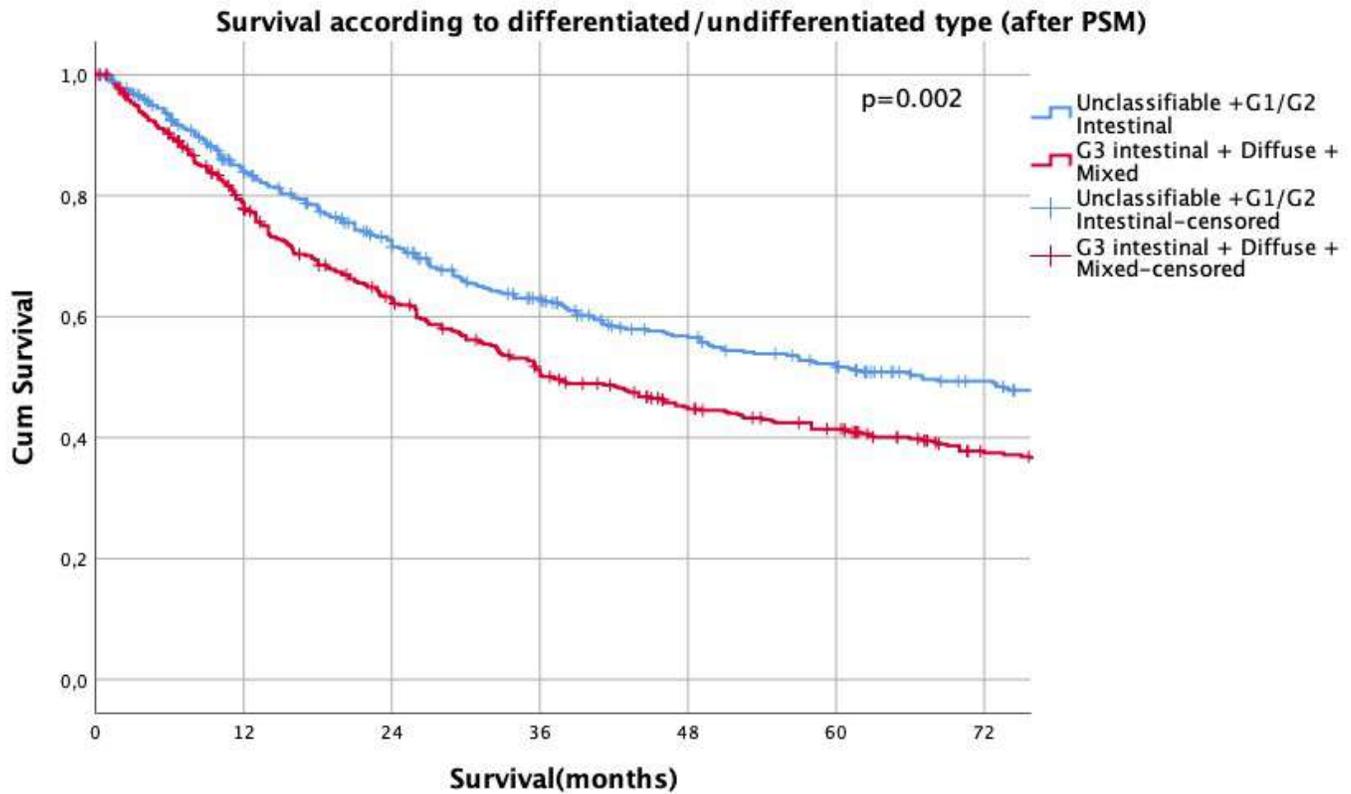
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**Objectives:** Adenocarcinoma of the GE-junction(AEG) ranks among the most common cancers in the Western world with increasing incidence. Prognostic influence and applicability of the Lauren classification was not examined in detail before. The purpose of this analysis was to analyze oncologic outcomes of AEG related to the Lauren histotype in a large single center cohort.

**Methods:** Data from the prospectively documented database of TUM School of Medicine for patients undergoing curatively intended oncologic resection for GE-junction cancer between 1984 and 2018 were extracted. Univariate and multivariate regression analyses were performed to identify predictors for overall survival (OS). Kaplan-Meier analyses were done to investigate OS-rates according to the Lauren histotype. After identification of two distinct histologic categories with prognostic implications, propensity score matching (PSM) was performed to balance for confounders and evaluate its oncologic outcomes retrospectively.

**Results:** 1153 patients were analyzed. In multiple variable analysis, age, UICC-stage, Lauren histotypes, R-stage, and postOP complications were significant OS-predictors. Kaplan Meier analysis demonstrated significant OS differences between intestinal, diffuse and mixed Lauren-histotypes ( $p=0.001$  and  $p=0.029$ ). OS-rates were comparable for non-classifiable and intestinal Lauren-types ( $p=0.16$ ) and for diffuse and mixed types ( $p=0.56$ ). When combining non-classifiable, well and moderately differentiated Lauren-types and combining poorly differentiated intestinal, diffuse and mixed types, two highly prognostic groups were identified ( $p<0.0001$ ). This was confirmed after PSM for possible confounders.

**Image:**



**Conclusions:** Lauren histotypes demonstrate highly prognostic value after oncologic resection of AEG (Siewert types II/III) in a single center Western patient cohort. A simplified histotype classification based on Lauren subtypes revealed a clear distinction of prognostic groups and should be considered for further evaluation.

## ***Diagnosis and staging***

IGCC22-ABS-1247

### **ANALYSIS OF PROGNOSTIC SURVIVAL FACTORS OF SIGNET RING CELL GASTRIC CANCER, IN A WESTERN POPULATION**

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**Objectives:** In gastric cancer (GC) patients, adenocarcinoma is the most common pathological type, which accounts for about 90% of all. The Signet ring cell (SRC) carcinoma only accounts for 5–10% of all GC cases. This study aims to investigate the clinicopathological characteristics and survival prognostic significance of SRC components in our patients affected by GC.

**Methods:** From January 2004 to December 2020, 404 patients were curatively treated in our department. The median age was 75 years old and males represented 63.2%. Patients were dichotomized into two groups based on the SRC presence; according to preoperative, operative, and postoperative characteristics, a univariate analysis for overall survival was performed as well as an X<sup>2</sup> analysis when possible. Recurrence pattern was analyzed in the two different groups.

**Results:** SRC carcinoma showed an increasing incidence trend over the time analyzed when compared to the general population ( $p=0.05$ ). Overall median survival of SRC and N-SRC was respectively 16 vs. 35. In early gastric cancer prognosis of SRC is better than in N-SRC as opposed in advanced cancer ( $p<0.05$ ). At the multivariate analysis in the prognosis of SRC gastric cancer, independent factors were: preoperative serum albumin level, complete surgical resection, level of lymphadenectomy, and pathological stage. Recurrence occurred more frequently in patients affected by SRC ( $p<0.05$ ).

**Conclusions:** Signet ring cell carcinoma is not always associated with poor prognosis; in early gastric cancer, it is a good prognostic factor. In SRC preoperative nutritional status should be accurately evaluated and balanced; moreover, a radical surgical procedure associated with an adequate lymphadenectomy should be advocated to improve patients' survival. Therefore gastric cancer patients with SRC components should draw clinicians' attention.

*Diagnosis and staging*

IGCC22-ABS-1328

**EPIDEMIOLOGICAL EVOLUTION OF GASTRIC CANCER AT A THIRD LEVEL REFERENCE HOSPITAL IN MEXICO**

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**Objectives:** Describe epidemiology changes during a 30 year period at a third level reference hospital for Gastric Cancer in Mexico.

**Methods:** A total of 609 patients with histological diagnosis of gastric cancer treated during the period 1987-2020 were included. Electronic and physical records were reviewed to obtain clinical and epidemiological characteristics, and a retrospective cross-sectional study was performed with these data.

**Results:** Out of the 609 patients studied, 53.9% were women and 46.1% men. Most cases occurred in patients over 50 years of age (46%). Of the registered cases 53% were clinical stage IV, while 17.2%, 9.5% and 3.8% were clinical stages III, II, and I respectively. A total of 301 (49.4%) patients underwent surgical treatment, of which 23.6% were palliative. Distal gastrectomy was the most frequently documented procedure, in up to 46.5% (140) of cases.

**Conclusions:** The incidence of gastric cancer has decreased in the last decade; however, due to the fact that patients are diagnosed in late stages of the disease, this neoplasm still has high mortality rates, which maintains it as a serious public health problem in Mexico.

## ***Diagnosis and staging***

IGCC22-ABS-1473

### **RESPONSE EVALUATION AFTER NEOADJUVANT CHEMOTHERAPY FOR GASTRIC CANCER; DOWNSIZING VS DOWNSTAGING.**

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**Objectives:** Response evaluation following neoadjuvant chemotherapy (NAC) in resectable gastric cancer is debated. The aims of the present study were to disclose how RECIST performed when applied to a large Western cohort, and further, to evaluate downstaging as an alternative method of response evaluation by comparing radiologic stage at diagnosis (rTNM) to pathologic stage following chemotherapy (ypTNM).

**Methods:** Retrospective, population-based study on 171 consecutive patients diagnosed with gastric adenocarcinoma receiving NAC in the period 2007-2016. Two methods of response evaluation are compared, a radiologic using RECIST (downsizing) and a pathologic using TNM staging (downstaging).

**Results:** RECIST failed to identify half of the patients progressing to metastatic disease, and were not able to assign patients to subsets with different long-term survival rates. TNM response mode, however, did achieve this objective. At TNM restaging, 78/164 (48%) were downstaged, 25/164 (15%) had stable disease and 61/164 (37%) were upstaged. Histopathologic complete response was found in 15/164 (9%). The 5-year overall survival was 65.3% (95% CI 54.7% -75.9%) for responders, 40.0% (95 CI 20.8% - 59.2%) for stable disease and 14.8% (95% CI 6.0% - 23.6%) for patients with progression,  $p < 0.001$ . In a multivariable ordinal regression Lauren category and preoperative tumour location were significant determinants of response mode.

**Image:**

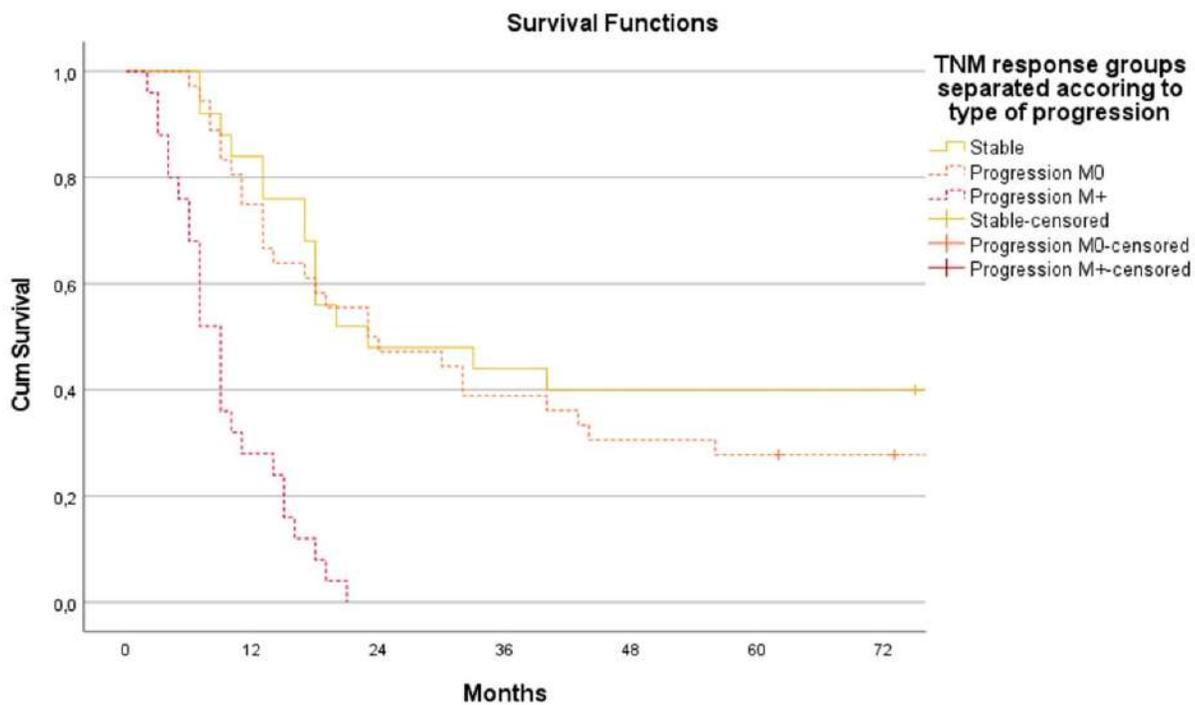
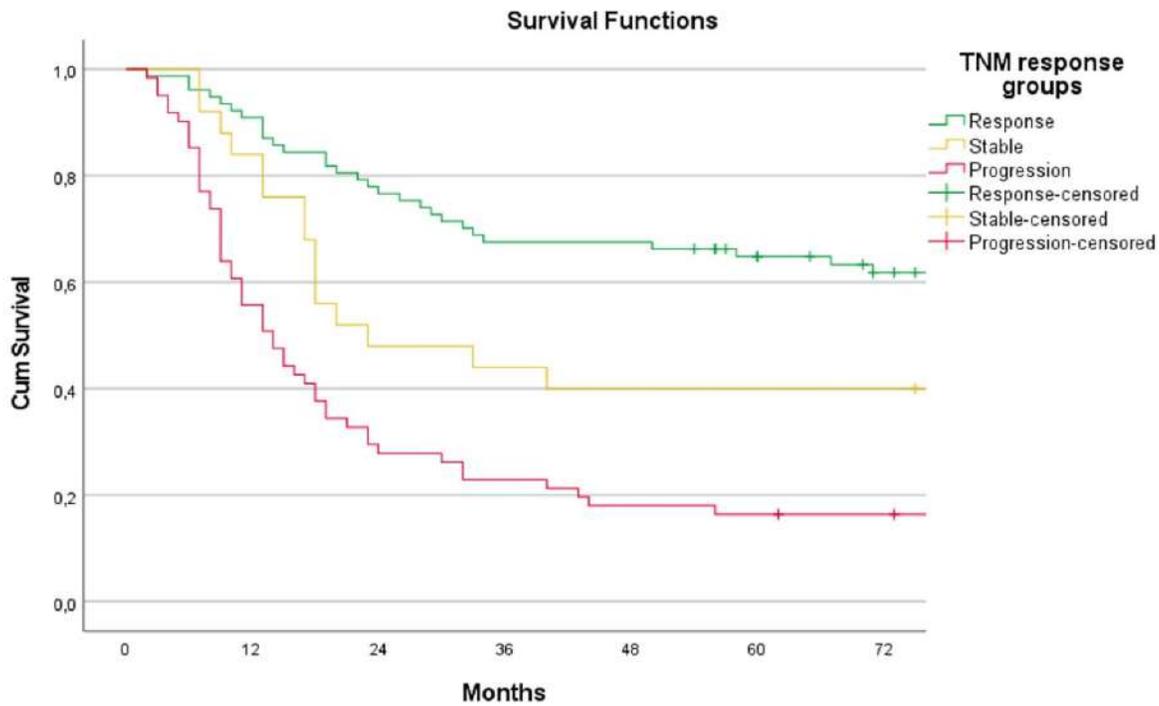


Figure 1a: Estimated 5-year survival based on the ypTNM response mode: response, stable and progression, global log rank  $p < 0.001$ . Response vs stable  $p = 0.012$ . Stable vs progression  $p = 0.020$

Figure 1b: Estimated 5-year survival based on the ypTNM response mode stable and progression, with progression further subdivided into maintaining M0 and developing M+. Stable vs M0  $p = 0.512$ .

**Conclusions:** RECIST as method of response evaluation following NAC in resectable gastric cancer should be abandoned. Comparing CT-stage at diagnosis to pathologic stage following NAC appears as a useful method of response evaluation that may serve the real-life situation well.

## ***Diagnosis and staging***

IGCC22-ABS-1224

### **ADVANCE GASTRIC CANCER FOR YOUNG MALE MISDIAGNOSED AS A ACHALASIA**

You Jin Jang<sup>1</sup>, Won Jun Seo<sup>1</sup>, Jong Han Kim<sup>1</sup>

<sup>1</sup>Surgery, Korea university medical college, Seoul, Korea, Republic Of

**Objectives:** Achalasia is a rare disease characterized by failure of distal esophageal peristalsis and loss of lower esophageal sphincter relaxation. Pseudoachalasia is a symptom caused by nearby malignancies which is similar to that of achalasia. We report a rare case which a young male person was diagnosed with advanced gastric cancer from achalasia treatment

**Methods:** A 25 year old male without any prior history of disease was admitted due to a severe epigastric pain. He had been suffering from difficulty of swallowing for ten days. A gastrofiberscopic result from previous clinic showed signs suspicious of achalasia. Additional gastrofiberscopy in our hospital, however, was not successful because the esophagogastric junction was too narrow for the scope to pass. Nevertheless, the esophageal manometry, as well as barium esophagography, diagnosed him as having type II achalasia.

**Results:** The patient preferred balloon dilatation for the treatment, and it was performed five days after the admission. The first trial was successful, but esophageal perforation occurred during the second attempt. The patient underwent an emergency operation (video-assisted esophageal repair and Ivor-Lewis esophagectomy) and soon returned to a normal condition.

The histological test was done on the specimen from the esophagus, and the result came up with advanced gastric carcinoma, Borrmann type 3 and 4 with positive distal resection margin. It was a poorly cohesive carcinoma, with Lauren type diffuse. The cancer had a size of 11.5x 10 cm and invaded visceral peritoneum.

**Conclusions:** Patients who have been diagnosed with achalasia should undergo additional tests in order to differentiate from pseudoachalasia. If these tests could be included as a routine achalasia workup, it is expected to eventually lower the incidence of gastric cancer, especially among young populations.

## ***Diagnosis and staging***

IGCC22-ABS-1303

### **A PROSPECTIVE CANADIAN GASTROESOPHAGEAL CANCER DATABASE: WHAT HAVE WE LEARNED?**

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<sup>1</sup>Department of Surgery, <sup>2</sup>Department of Medical Oncology, University of Alberta, Edmonton, Canada

**Objectives:** Minimal literature exists on the outcomes for Canadian patients with gastroesophageal adenocarcinoma (GC). The objective of our study was to establish a prospective clinical database to evaluate demographics, presentation and outcomes associated with GC.

**Methods:** Patients diagnosed with GC from January 30, 2017 to August 30, 2020 were asked to participate in the study. All patients had adenocarcinoma of the stomach, GE junction or distal esophagus. Data collected included demographics, presentation, treatment and survival. A multivariable model for overall survival (OS) in patients treated with curative intent was created using gender, lymph node status, resection margin status, age and tumor location (GE junction vs. not).

**Results:** A total of 122 patients were included (Figure 1). Median age was 65 years (59-74), 70% of patients were male and 27% were born outside of Canada. Patients had a median of 127.5 (65-247) days of symptoms prior to diagnosis. Mean follow up time was 14.5 months.

Following staging CT, 88% of patients were deemed potentially resectable. Eighty-one (76%) received staging laparoscopy. Ultimately only 61% were treated with curative intent surgery. Of those undergoing surgery 47% had a subtotal distal gastrectomy, 38% received total gastrectomy, and 15% had distal esophagectomy. Forty-six (62.2%) patients had nodal metastases and the median number of nodes harvested was 22 (17-30). Sixty-one patients (82.4%) had R0 resection margins.

Three year OS for patients who received curative intent treatment was 63%. On multivariable analysis female sex ( $p=0.01$ ), positive nodal stage ( $p=0.03$ ), positive margin status ( $p=0.03$ ) and GE tumor location ( $p=0.03$ ) were significantly associated with OS.

**Image:**

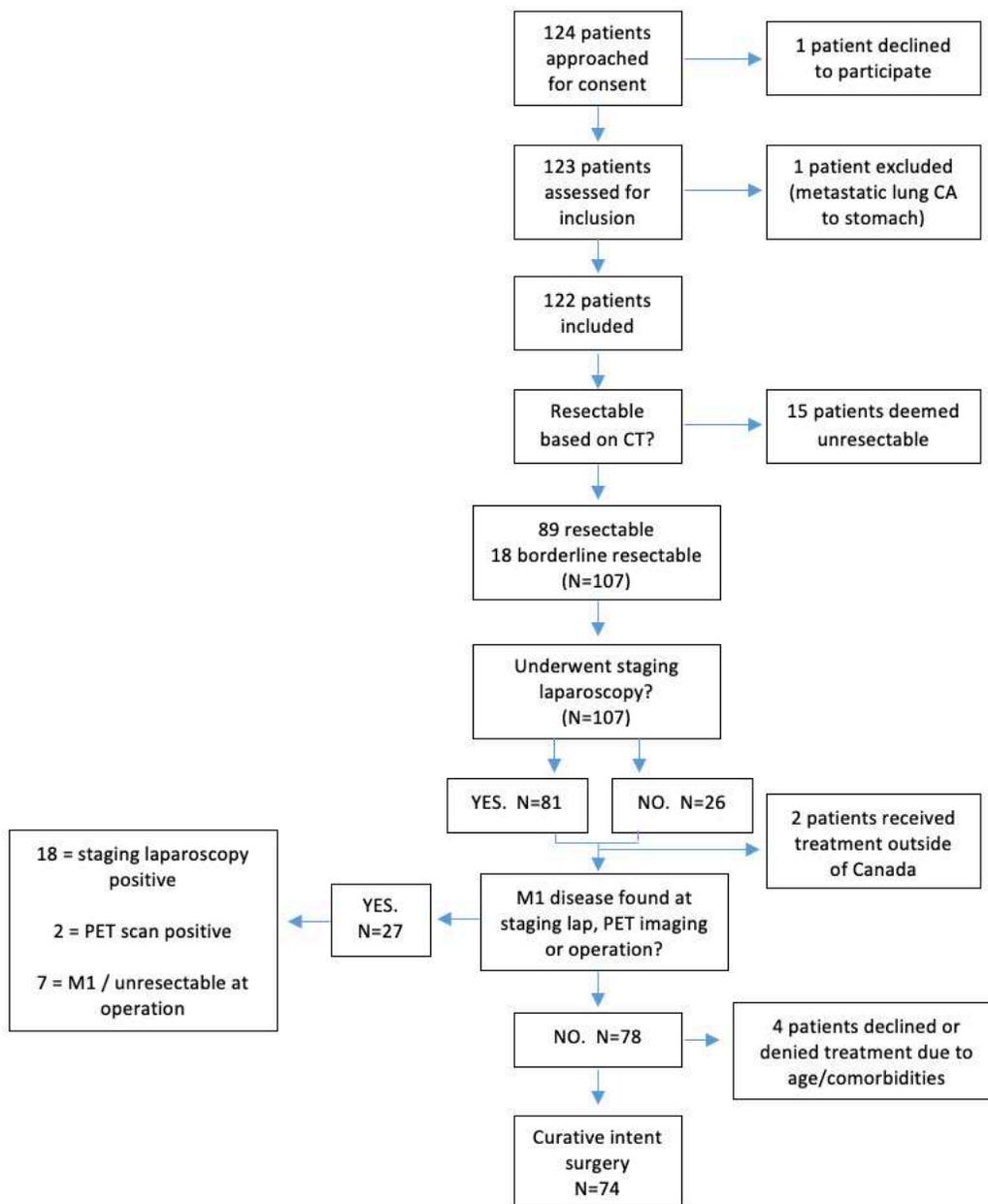


Figure 1. Inclusion and exclusion profile for all patients approached between January 30<sup>th</sup> 2017 to August 30<sup>th</sup> 2020.

**Conclusions:** This is the first prospective Canadian database for patients with GC. We demonstrate that many of our patients present with advanced disease and only 61% are able to receive curative intent surgery. A prospective national GC database involving multiple centers is now being established.

## ***Diagnosis and staging***

IGCC22-ABS-1425

### **NEO ADJUVANT CHEMOTHERAPY AND ITS EFFECTS ON TNM STAGING IN DIFFUSE GASTRIC CANCER.**

Ahmed Almonib<sup>1</sup>, Benjamin Tan<sup>1</sup>, Yi-tzu (Linda) Lin<sup>1</sup>, Manjunath Siddaiah-Subramanya<sup>1</sup>

<sup>1</sup>General surgery, University Hospital Birmingham, Birmingham, United Kingdom

**Objectives:** Neoadjuvant chemotherapy (NAC) has been widely used in the treatment of gastric cancer. The aim of this study is to evaluate the impact of NAC on the post-operative TNM staging and survival of intestinal type vs diffuse type gastric cancer patients.

**Methods:** A retrospective study was conducted at Queen Elizabeth Hospital Birmingham from January 2004 to December 2020. All patients with AJCC stage II and III gastric cancers (intestinal vs diffuse) were included in this study. Patient demographics, Mandard regression grade, TNM staging at diagnosis (utilising primarily CT scans) and post-surgery were collected. Survival data was also collected.

**Results:** Over the study period, 44 patients with intestinal type gastric cancer underwent NAC followed by surgery and 27 patients with diffuse type gastric cancer were treated with NAC and surgery.

In the intestinal type group, there were no significant differences between the diagnosis and post-operative T or N stages. In the diffuse type group, there was no significant in the T stage. However, there was an increase in N stage post-surgery (mean pre-NAC N stage 0.78 vs. ypN stage 1.33,  $p = 0.027$ )

There were no significant differences in the Mandard regression grade in patients with intestinal type and diffuse type cancers who undergo neo-adjuvant chemotherapy ( $p = 0.300$ ). There were also no significant differences in the overall survival of both groups of patients ( $p = 0.562$ ).

**Conclusions:** It is more likely that N staging is under-staged by radiological measures in diffuse gastric cancer rather than a progression of lymph node disease despite neo-adjuvant chemotherapy.

## ***Diagnosis and staging***

IGCC22-ABS-1438

### **PROGNOSTIC VALUE OF MOLECULAR CYTOLOGY BY ONE-STEP NUCLEIC ACID AMPLIFICATION IN PERITONEAL WASHINGS**

Katarzyna Gęca<sup>1</sup>, Karol Rawicz-Pruszyński<sup>1</sup>, Magdalena Skórzewska<sup>1</sup>, Radosław Mlak<sup>2</sup>, Katarzyna Sędlak<sup>1</sup>, Zuzanna Pelc<sup>1</sup>, Wojciech Polkowski<sup>1</sup>

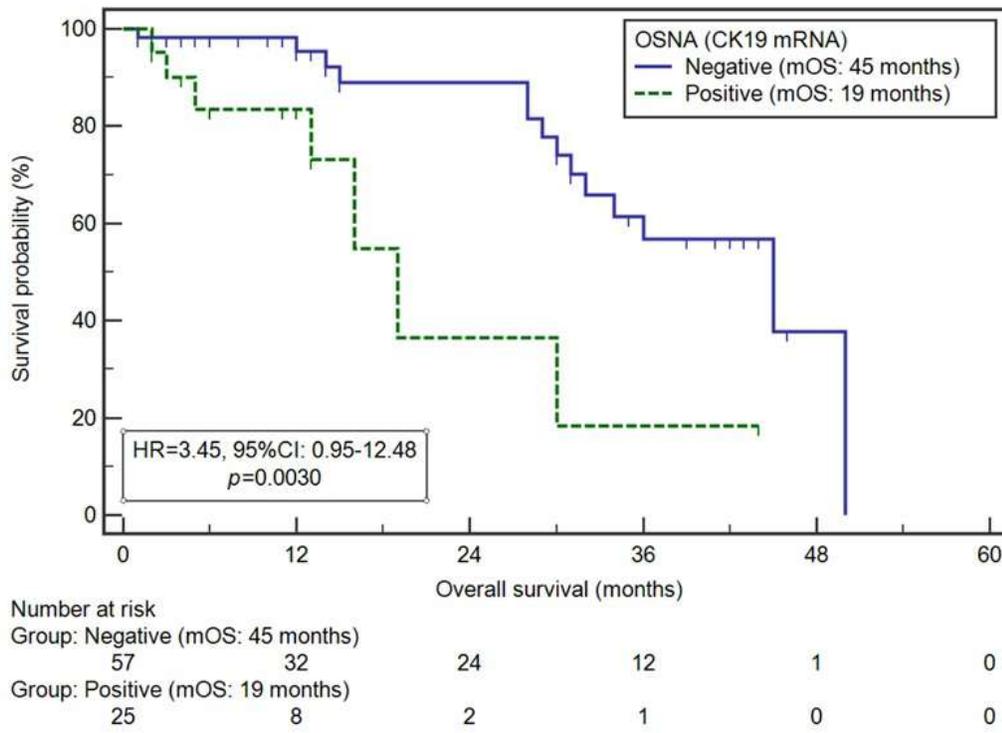
<sup>1</sup>Department of Surgical Oncology, <sup>2</sup>Department of Human Physiology, Medical University of Lublin, Lublin, Poland

**Objectives:** Peritoneal dissemination is a common form of recurrence of gastric cancer (GC). The presence of free cancer cells (FCC) is associated with advanced GC stage and poor prognosis. One-Step Nucleic acid Amplification (OSNA) allows fast detection of FCC in intraoperative peritoneal washings in GC patients. This study aimed to evaluate the prognostic value of OSNA assay in peritoneal washings from patients with advanced GC.

**Methods:** Data was collected from a prospectively maintained database of patients operated on for GC between July 2017 and Jun 2021. Inclusion criteria were: histologically confirmed GC scheduled for gastrectomy either following neoadjuvant chemotherapy, or upfront surgery. Exclusion criteria were any palliative non-resection procedures. The study included 82 consecutive patients in whom peritoneal washings were collected after surgical exploration. The equally divided washings samples were assessed using conventional cytology and OSNA assay to evaluate Cytokeratin-19 (CK-19) mRNA level. Overall survival (OS) was defined as the time from the date of surgery to the patient's death or last follow-up. In univariate OS analysis, the log-rank test was used, whereas Cox logistic regression models were applied in multivariate analysis.

**Results:** 25 (30.5%) patients obtained positive results by OSNA assay, whereas 6 (7.3%) patients were positive by conventional cytology (CY1). Median OS (mOS) of OSNA positive and negative patients were 19 and 45 months, respectively (HR=3.45, 95%CI: 0.95-12.45,  $p=0.0030$ ; Figure 1). Whereas mOS of CY1 and CY0 patients was not significantly different (HR=0.84, 95%CI: 0.22-3.29,  $p=0.7595$ ). In the multivariate analysis independent, unfavourable prognostic factors turned out to be: Laurén mixed type GC (HR=3.04, 95%CI: 1.07-8.59;  $p=0.0373$ ), lymph node involvement (HR=5.33, 95%CI: 1.66-17.10;  $p=0.0051$ ), and peritoneal washings positive by OSNA (HR=2.98, 95%CI: 1.05-8.43;  $p=0.0409$ ).

**Image:**



**Figure 1.**

Kaplan-Meier curves representing survival probability depending on OSNA assay status in patients with advanced GC.

**Conclusions:** Positive OSNA assay in peritoneal washings is a valuable indicator of poor survival in GC patients who underwent gastrectomy.

## ***Diagnosis and staging***

IGCC22-ABS-1458

### **IS CT USEFUL TO ASSESS THE STAGE AFTER NEOADJUVANT CHEMOTHERAPY?**

Ricardo G. Alvarado-Hurtado<sup>1</sup>, Adela P. López-García<sup>1</sup>, Javier Mínguez-García<sup>1</sup>, Belh Matías-García<sup>1</sup>, Sonia Soto-Schütte<sup>1</sup>, Diego M. Córdova-García<sup>1</sup>, Lucas Casalduero-García<sup>1</sup>, Yousef Allaoua-Moussaoui<sup>1</sup>, Eduardo Serrano-Yébenes<sup>1</sup>, Ana Quiroga-Valcárcel<sup>1</sup>, Marta Bru-Aparicio<sup>1</sup>, Pilar Laguna-Hernández<sup>1</sup>, Rubn Jiménez-Martín<sup>1</sup>, Flix Mañes-Jiménez<sup>1</sup>, Ruth Marcos-Hernández<sup>1</sup>, Mara de los Remedios Gómez-Sanz<sup>1</sup>, Francisca García Moreno-Nisa<sup>1</sup>, Inmaculada Lasa-Unzúe<sup>1</sup>, Alberto J. Gutiérrez-Calvo<sup>1</sup>

<sup>1</sup>General Surgery, Príncipe de Asturias Teaching Hospital, Alcalá de Henares, Spain

**Objectives:** We present a review of our cases to assess the precision of CT in evaluating the response of nQT, comparing the radiological stage (nrTNM) and the pathological stage (npTNM) of the surgical specimen.

**Methods:** The study is observational and retrospective presenting patients diagnosed with advanced gastric cancer who received nQT from our hospital and subsequently operated, from January 2011 to September 2021.

**Results:** Seventy-five gastric cancer operated patients who previously received nQT were included. The mean age was 65.4 years, 40% were women and 60% men. When comparing the nrTNM stage with the npTNM stage, in 22.7% there was a concordant stage, in 40% there was an overstaging and in 37.3% there was an understaging. The concordance between T and N were similar, 34.7% and 36% respectively. In the M it coincided in 77.3%, in 4 of these patients the CT valued as metastatic disease, not found later in the definitive diagnosis.

**Conclusions:** The findings found suggest that CT is not an adequate tool to assess the response of nQT. In the review of the literature published in recent years, we found that the concordance between the radiological diagnosis and the pathological diagnosis is between 69-88%. The results to assess the nQT are even lower. Regarding T, the agreement is between 33-57%, inflammation and fibrosis induced by nQT prevent a correct assessment and tend to overestimate it. For N, the concordance is between 37 - 51%, keeping below half one of the most determining factors to assess the prognosis of these patients.

It is important to mention that, in more than a third of our patients, nrTNM overstaged patients, this could deviate decision-making, abandon the surgical indication in certain patients and contribute to suboptimal treatment.

We conclude that radiological staging to assess nQT is deficient when compared with the definitive stage. We still do not have an exact tool for assessing the response to chemotherapy, with the limitations for decision-making and estimation of survival that this entails.

## ***Diagnosis and staging***

IGCC22-ABS-1215

### **A DECADE OF GASTRIC CANCER EPIDEMIOLOGY IN THE NATIONAL CANCER INSTITUTE IN MEXICO.**

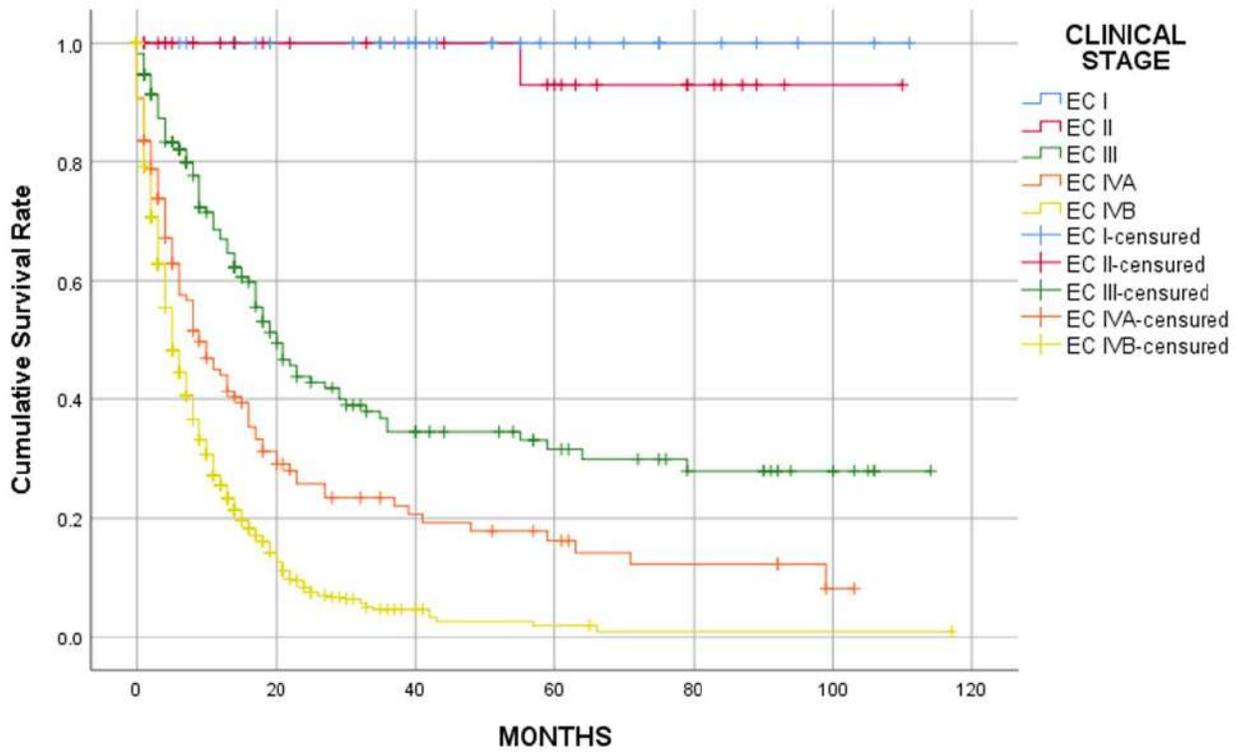
Alberto M. Leon-Takahashi<sup>1</sup>, Leonardo S. Lino Silva<sup>2</sup>, Horacio N. Lopez Basave<sup>1</sup>, German Calderillo Ruiz<sup>1</sup>, Erika B. Ruiz Garcia<sup>1</sup>, Maria del Consuelo Diaz Romero<sup>1</sup>, Marytere Herrera Martinez<sup>1</sup>, Angel Herrera Gomez<sup>3</sup>, Carolina Castillo Morales<sup>1</sup>, Cesar A. Paleta Torres<sup>1</sup>

<sup>1</sup>Gastrointestinal Department, <sup>2</sup>Pathology Department, <sup>3</sup>Medical Director, National Cancer Institute, Mexico City, Mexico

**Objectives:** Gastric cancer has a high incidence and is a lethal disease. However, there is no gastric cancer pathology registration in Mexico. It is an important mission for the National Cancer Institute to assess the epidemiological overall picture and the survival rate in Mexico, where Latin American is the main race.

**Methods:** Retrospective study of patients diagnosed as gastric adenocarcinoma from November, 2010 to December, 2020. We used the 8th edition (AJCC) to determine the clinical stage. The Mean Overall Survival (MOS) and the Overall Survival (OS) were figured from the date of diagnosis to the date of death or the last follow-up. Kaplan-Meier was used to assess the patients' survival and the differences in subgroups were analyzed by the log-rank with SPSS ver.26. **Results:** 1274 patients admitted during the period. The ratio was men 673(52.8%) vs women 601(47.1%) and the media age was 55.5±13.9 y.o. (range18-94), the majority of patients were between 41 to 70 y.o. (860 (67.4%)). The main histology was diffuse adenocarcinoma 778(61.1%), the second was intestinal adenocarcinoma 403(31.6%), and 859(67.4%) had signet ring cells. Then, there were 909 (71.4%) IVB stage, 129(10.1%) stage IVA, 169(13.3%) stage III, 32(2.5%) stage IIA-B and 35(2.7%) stage I. The mean following was 11.8(0-117)months and MOS was 23.7 months (95%CI, 21.1-26.3) and the OS was 30.9%. The MOS (months) by clinical stage were : stage I, II, III, IVA and IVB are (107.4 (95%CI,100.7-114.2), (106.1(95%CI,98.6-113.5), (45.1(95%CI, 36.7-53.4), (24.5 (95%CI, 17.9-31.1) and (10.3months (95%CI, 8.7-11.9), respectively. p<0.0001. The 5 year SV rates were 100%, 93%, 31%, 13% and 2% in order.

**Image:**



**Conclusions:** In our population, although gastric cancer does not have gender differences, it is more common in less than 65 years old and there are more cases of diffuse histology with signet ring cells in advanced stage (IVB) which leads to the worst survival.

## ***Diagnosis and staging***

IGCC22-ABS-1329

### **TIME BETWEEN SYMPTOMS, DIAGNOSIS AND TREATMENT IN PATIENTS WITH GASTRIC CANCER IN MEXICO.**

Alejandro Alfaro-Goldaracena<sup>1</sup>, Gabriela Del Angel-Millan<sup>2</sup>, Pablo Leon-Gasca<sup>2</sup>, Xiomara Zapien-Lopez<sup>2</sup>

<sup>1</sup>Surgical Oncology, <sup>2</sup>Surgery, INNSZ, Mexico City, Mexico

**Objectives:** Evaluate referral time between symptoms, diagnosis and treatment among patients with gastric cancer in Mexico and its correlation with prognosis and clinical stage.

**Methods:** Retrospective study during the period from 2015 to 2021. records of these 193 patients with initial diagnosis of suspicion, initial treatment, first diagnostic study, histopathological study, stage, referral to a third level of health, initiation and type of treatment at the third level of health, patient evolution, death or follow-up.

**Results:** Out of the 193 patients, 52% history of cancer, most common initial symptomatology was abdominal pain (32%) and dysphagia (13%), gastric adenocarcinoma was initially suspected in 42% of the cases from first consultation and 20% for gastroesophageal reflux. Most common stage was 4 in 65% and 3 in 14%, which is consistent with the time of onset of symptoms and the first consultation. Time of consultation of 30% of patients is 0 days from onset of symptoms and 30 to 90 days in 22%. 46% of the patients were sent or were already in consultation of a third level of health care and 21% took more than a month to go to a center of this level, at this level 26% of the patients were assigned and began treatment in less than 7 days and 22% in 0 days, 24% of the patients died in less than 7 days and 22% in 0 days. The survival rate in 40% of the participants is less than one year and 27.6% between 1-2 years, so despite the fact that 42% of these patients were attended at a third level of health for some other disease, 65% were diagnosed late with stage 4, this could be due to the diffuse nature of the symptoms and the few protocols that exist at the national level for the timely diagnosis of gastric cancer.

**Conclusions:** Referral time does correlate with prognosis in Gastric Cancer, we urge implementation of measures to better referral and awareness of this disease.

## ***Diagnosis and staging***

IGCC22-ABS-1310

### **LARGE GASTRIC TUMOUR SIMULATING LIVER TUMOUR**

Fatima Mrue<sup>1</sup>, MATHEUS C. RASSI<sup>1, 1</sup>, THIAGO M. TREDICCI<sup>1</sup>, IZABELLA REZENDE\*<sup>1</sup>, ALLINE K. C. DA SILVA<sup>1</sup>, THIAGO O. F. BECKER<sup>1</sup>, LEONARDO MILHOMEM<sup>1</sup>, EDUARDO TOCAFONDO<sup>1</sup>, LARISSA MARINHO<sup>2</sup>

<sup>1</sup>Department of Surgery, <sup>2</sup>Pathology, Federal Univesity of Goias, Goiania, Brazil

**Objectives:** The aim of this paper is to present a case of a large gastric neopasm of unusual presentation mimicking liver neoplasm.

**Methods:** This is a case report of a 60-year-old male patient with a chief complaint of abdominal discomfort. The patient was referred to the liver cancer outpatient clinic due to a larg mass in the topography of the epigastrium. The investigation was carried out by means of abdominal computed tomography and magnetic resonance imaging. The operative planning was exploratory laparotomy and resection of the tumour mass.

**Results:** The imaging exams revealed that it was a lesion that presented heterogeneous contrast enhancement, with well-defined limits, with a thin capsule and without a cleavage plane with the left liver lobe and the duodenum. The lesion was hypovascular without washout phenomenon and exerted an expansive effect displacing the adjacent structures. The patient underwent exploratory laparotomy and it was found a large tumour mass originating in a narrow portion of approximately 2 am in lenght in the small gastric curvature with exophytic growth pattern occupying the topography of the left hepatic lobe and displacing and compressing the neighboring structures. The lesion was completely resected along with part of the gastric wall. The patient has good postoperative recovery and the anatomopathological study is ongoing.

**Conclusions:** Non-epithelial gastric tumours may present as bulky agdominal masses. The definitive preoperative diagnosis can be of great difficulty. Exploratory laparotomy is often indicated and the lesions are usually successfully resected.

## ***Diagnosis and staging***

IGCC22-ABS-1075

### **RELATION OF PRETREATMENT NEUTROPHIL - LYMPHOCYTE RATIO IN GASTRIC CANCER PROGNOSIS.**

Alberto M. Leon-Takahashi<sup>1</sup>, Saul Lino Silva<sup>2</sup>, Horacio N. Lopez Basave<sup>1</sup>, German Calderillo Ruiz<sup>1</sup>, Erika B. Ruiz Garcia<sup>1</sup>, Maria del Consuelo Diaz Romero<sup>1</sup>, Rosa A. Salcedo Hernandez<sup>1</sup>, Marytere Herrera Martinez<sup>1</sup>, Angel Herrera Gomez<sup>3</sup>, Cesar A. Paleta Torres<sup>1</sup>

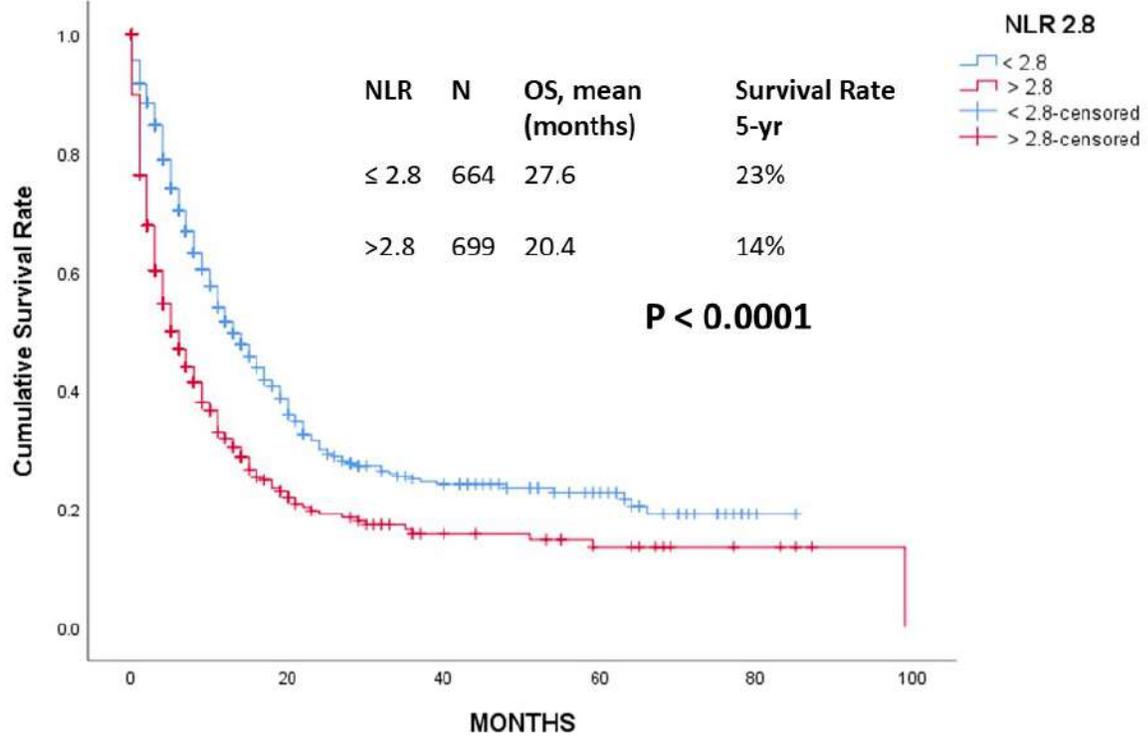
<sup>1</sup>Gastrointestinal Department, <sup>2</sup>Pathological Department, <sup>3</sup>Medical Director, National Cancer Institute, Mexico City, Mexico

**Objectives:** Systemic inflammation is not yet understood if carcinogenesis involved. The Neutrophil-Lymphocyte Ratio (NLR) is a balance between pro-tumor inflammatory and anti-tumor immune status and could lead to the prognosis.

**Methods:** Retrospective study which included patients with gastric adenocarcinoma, admitted from November, 2010 to July, 2021. All patients were staged by using the 8th edition TNM (AJCC). The NLR was calculated during a diagnosis protocol pretreatment. The Overall Survival (OS) was calculated from the diagnosed date to the dead date or the last follow up until July, 2021. ROC was constructed by using the OS as status variable, and the cut-off value was calculated for NLR with SPSS ver. 26. To demonstrate the relation between the NLR and the clinical parameters, Student-t or Pearson's chi-square test was used. Also we used Kaplan-Meier for the patients' survival and log-rank test for the subgroups.

**Results:** The mean follow-up time of 1378 gastric adenocarcinoma cases was 8.9 (0-99) months and the OS was 25.4 months (22.6 – 28.2). The ROC analysis, we used the OS as the status variable (AUC=0.55) and determined the optimal cut-off value for NLR as 2.8. We divided it into two groups according to the cut-off value ( $\leq 2.8$  vs  $> 2.8$ ). The association of the NLR in clinical parameters with age or gender was not notable. However, stage IV had a crucial result, mean overall survival (MOS) to the group  $< 2.8$  was 27.6 months (24.3 – 31) and the group  $> 2.8$  was 20.4 months (22.6-28.2)  $p < 0.0001$ , the 5 year-survival was 23% vs 14%. The MOS of stage I-III and IV were worse in the group  $> 2.8$  (41.2 and 15.2 months) than the group  $< 2.8$  (47.3 and 18.4 months)  $p < 0.0001$ .

**Image:**



**Conclusions:** Pretreatment gastric cancer patients with an NLR  $> 2.8$ , could have in an advanced stage and a poor MS.

## ***Diagnosis and staging***

IGCC22-ABS-1271

### **MRI IN THE EVALUATION OF EARLY THERAPY RESPONSE IN GC PATIENTS TREATED WITH ICI**

Li Jiazheng<sup>\*</sup> 1, tang lei<sup>1</sup>

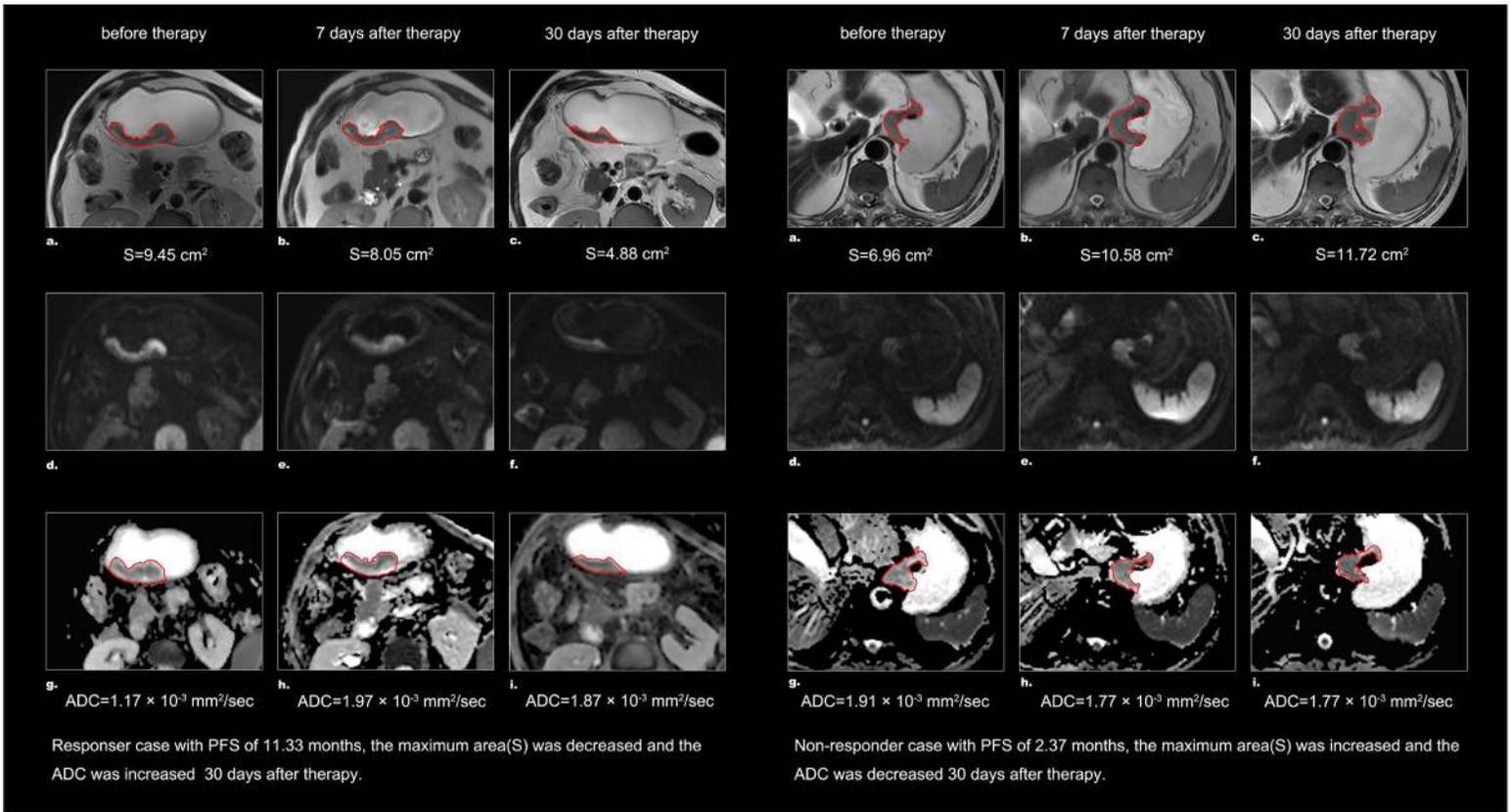
<sup>1</sup>Department of Radiology, Peking University Cancer Hospital and Institute, Key Laboratory of Carcinogenesis and Translational Research (Ministry of Education), Beijing, China

**Objectives:** To investigate the use of MRI as an early response indicator in gastric cancer (GC) patients treated with immune checkpoint inhibitors (ICI).

**Methods:** MRI including diffusion-weighted imaging was performed in 12 patients with GC before and 7 and 30 days after treatment with ICI monotherapy. Maximum area (S) and ADC of primary tumour were measured on all three time points on T2WI and ADC maps, respectively. The percentage change of S and ADC was calculated between two time points (% $\Delta$ X0-7; % $\Delta$ X0-30; % $\Delta$ X7-30). Clinical response was defined when patients showed partial or complete response or stable disease > 6 months. Progression free survival (PFS) was defined as the time from the start of ICI treatment to disease progression, or the latest follow-up. Fisher's exact test and independent t test were used to compare between responders and non-responders. Cox proportional hazards model was used for the multivariate analysis.

**Results:** There were 8 patients of responders and 4 patients of non-responders. The median time for PFS was 4.5 months (range, 0.5–11.3 months). No difference in % $\Delta$ S0-7 between responders and non-responders. % $\Delta$ S0-30 and % $\Delta$ S7-30 were statistically significant between responders and non-responders (p=0.001; p=0.008), and the area of responders exhibited a significant decrease. There was no significant difference of the ADC and its percentage change on all three time points between responders and non-responders. However, all of the responders (8/8) showed an increase in ADC, and half of the non-responders (2/4) showed a decrease in ADC on day 30 (p=0.091). In multivariate analysis, % $\Delta$ S0-30 was found to be independently significant for PFS (P =0.046).

**Image:**



**Conclusions:** A noticeable and statistically significant decrease in the maximum area of primary tumour was observed in responders but not in non-responders 30 days after ICI treatment.

## ***Diagnosis and staging***

IGCC22-ABS-1259

### **EPIDEMIOLOGICAL PROFILE IN A BRAZILIAN TERTIARY CARE HOSPITAL: UFPE-INCA**

Suzana T. De Almeida<sup>1</sup>, Ana Paula T. de Almeida<sup>2</sup>, Luiz A. Mattos<sup>1</sup>, Mariana M. Lira<sup>3</sup>, Georges B. Almeida Neto<sup>2</sup>, Maria T. Lencastre<sup>4</sup>, Edmundo M. Ferraz<sup>5</sup>

<sup>1</sup>MEDICINA CLINICA, Universidade Federal de Pernambuco (UFPE), <sup>2</sup>Medicina de Família, Prefeitura do Recife, <sup>3</sup>Patologia, <sup>4</sup>Curso Médico, <sup>5</sup>Cirurgia (in memorian), Universidade Federal de Pernambuco (UFPE), Recife, Brazil

**Objectives:** Gastric cancer is a frequent cancer that has a high mortality rate due to the diagnosis in advanced stages. To determine the incidence of gastric cancer in a referral center in the city of Recife, as well as to evaluate the histological types diagnosed and the risk factors involved.

**Methods:** This is a descriptive and retrospective study with a sample of 214 patients, from 2009 to 2014, analyzing medical records and histopathological files of patients, in order to meet the following variables: gender, age, race, education, occupation, history family, habits and histological type; stored in a statistical program.

**Results:** Most of the sample studied came from Pernambuco, regarding gender: 120 male and 94 female, with a predominance of the age group between 50 and 75 years, with 4 cases under 25 years. Of the 214 patients, 99 browns, 47 whites, 26 blacks, too many without information. Regarding educational level, 125 cases classified as semi-literate or with incomplete elementary school ; As for professional occupation: 55 worked in agriculture. Regarding the genetic factor, 53 stated family history and 43 denied, 108 without information. Regarding habits: 55 cases consumed alcohol, 30 were former consumers and 69 denied, regarding smoking: 43 smokers, 58 former smokers and 64 denied.

Histopathologically, 85 cases of unspecified adenocarcinoma, 52 signet ring carcinoma and 08 stromal tumor (GIST) prevailed.

**Conclusions:** By comparing the results presented with the case series of other centers, it is concluded that gastric cancer should be analyzed as a socioeconomic and public health problem. In this regard, the importance of more efficient care for early detection of gastric cancer and, as prevention, diagnosis and treatment of *Helicobacter pylori*, a well-established carcinogenic agent, is highlighted. In addition, from public policies, the population should be warned about the risks of alcohol consumption, smoking, processed foods and the application of pesticides.

## Endoscopic treatment

IGCC22-ABS-1063

### RISK FACTORS FOR OVERALL SURVIVAL IN EARLY GASTRIC CANCER PATIENTS WHO RECEIVED SURGERY AFTER ESD

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**Objectives:** To examine risk factors for overall survival (OS) after additional surgery in patients with EGC who initially underwent ESD.

**Methods:** This was a retrospective analysis of patients with EGC who underwent additional surgery after ESD between August 2012 and August 2019. Logistic regression models and Kaplan-Meier curves were used for further analysis.

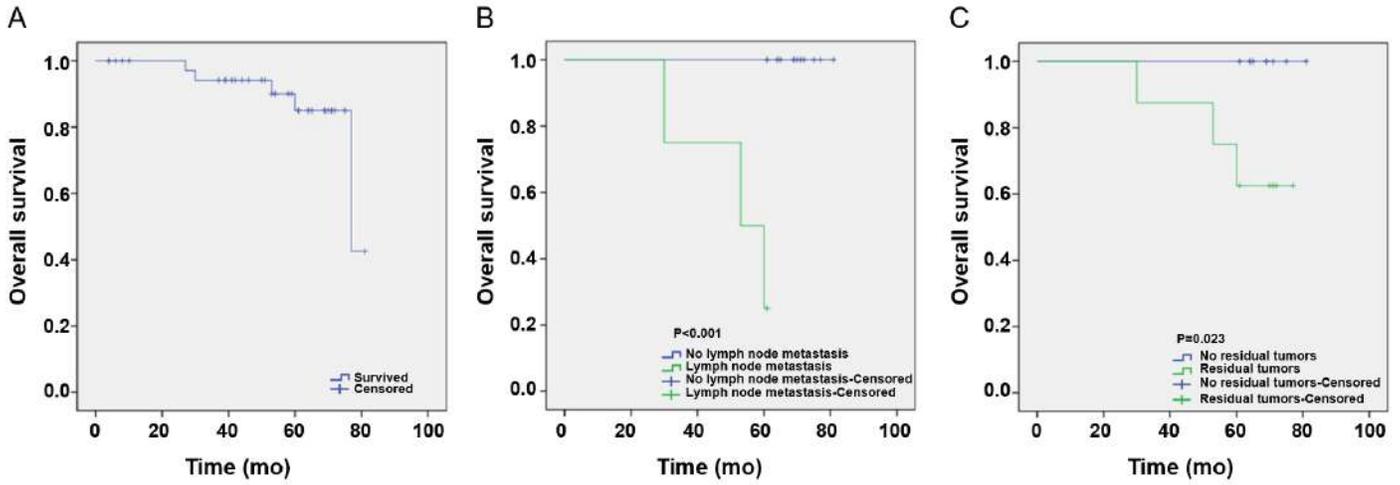
**Results:** Forty-two patients were evaluated, including 35 (83.3%) males and 7(16.7%) females. The mean age was 62 (range, 32-82) years. Male sex [hazard ratio (HR) = 21.906, 95% confidence interval (CI): 3.762-229.250;  $P = 0.039$ ], T1b invasion (HR = 3.965, 95%CI: 1.109-17.432;  $P = 0.047$ ), undifferentiated tumor (HR = 9.455, 95%CI: 0.946-29.482;  $P = 0.049$ ), lymph node metastasis (HR = 2.126, 95%CI: 0.002-13.266;  $P = 0.031$ ), and residual tumor (HR = 4.275, 95%CI: 1.049-27.420;  $P = 0.043$ ) were independently associated with OS (Table 1). The follow-up duration was 4-81 mo (median: 50.7 mo). OS was  $77.0 \pm 12.1$  mo (95%CI: 53.3-100.7 mo). The 3-year and 5-year OS rates were 94.1% and 85%, respectively (Figure 1).

**Table 1 Characteristics of the patients and independent risk factors for overall survival**

Characteristic	Univariable analysis			Multivariable analysis		
	HR	95%CI	P value	HR	95%CI	P value
Sex (male)	13.550	1.407-130.515	0.024	21.906	3.762-229.250	0.039
Invasion depth						
T1a	Reference	-	-	Reference	-	-
T1b	2.011	0.621-6.213	0.018	3.965	1.109-17.432	0.047
Histological type						
Differentiated	Reference	-	-	Reference	-	-
Undifferentiated	13.155	0.991-25.014	0.028	9.455	0.946-29.482	0.049
Lymph node metastasis	1.813	0.390-3.871	0.003	2.126	0.002-13.266	0.031
Residual tumor	5.160	2.391-9.107	0.021	4.275	1.049-27.420	0.043

HR: Hazard ratio; CI: Confidence interval.

**Image:**



**Conclusions:** Male sex, T1b invasion, undifferentiated tumor, lymph node metastasis, and residual tumor are independently associated with OS in patients with EGC who underwent additional surgery after ESD.

## ***Endoscopic treatment***

IGCC22-ABS-1098

### **ENDOSCOPIC SUBMUCOSAL DISSECTION FOR EARLY GASTRIC CANCER: A LARGE EXPERIENCE IN LATIN-AMERICA.**

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**Objectives:** Endoscopic submucosal dissection (ESD) is a surgical procedure that allows “en bloc” resection of early gastric cancer (EGC). In selected patients it provides cure with less morbidity and mortality than radical surgery. Several studies report similar oncologic outcomes for ESD and gastrectomy.

The objective is to report our experience in ESD for EGC.

**Methods:** Retrospective evaluation of prospectively collected data in patients diagnosed with EGC who underwent ESD between January 2008 and August 2021. We recorded demographic, clinical and histological data. En-bloc resection, R0-rate, complications, recurrence and oncologic outcomes are reported.

**Results:** We have performed 116 procedures in 114 patients, 52.7% were female, mean age was 67 years (45-88). 65% were ASA II and 16% ASA III. 32% of lesions were located in the upper third, 27% corporal and 41% in the lower third. Histology included 68 adenocarcinomas, 37 adenomas with high-grade dysplasia and one with low-grade dysplasia. En-bloc resection was achieved in 98% of the cases. Complications Clavien III or higher were 7%; four haemorrhages treated endoscopically and four perforations managed laparoscopically. One patient presented with a late pyloric stenosis. R0-rate was 95% and 86% of the procedures were curative using the extended criteria. Eight patients underwent surgery; only one had residual neoplasia with positive lymph nodes. One patient had a curative re-esd and three patients were followed up with no recurrence.

Median follow up is 50 months (1-146), overall survival rate is 94%, specific survival rate by gastric cancer is 100% and disease-free survival reaches 97%.

**Conclusions:** To our knowledge this is the largest series of ESD for the treatment of EGC in Latin-America. Our results are comparable to data reported in literature showing similar oncologic outcomes and less morbidity and mortality than gastrectomy.

## ***Endoscopic treatment***

IGCC22-ABS-1125

### **EXTERNAL VALIDATION OF THE ECURA SYSTEM FOR UNDIFFERENTIATED-TYPE EARLY GASTRIC CANCER**

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**Objectives:** eCura system is the risk scoring model to stratify lymph node (LN) metastasis risk after noncurative endoscopic resection (ER) for early gastric cancer (EGC). The usefulness of this model was internally validated mainly in differentiated-type EGCs. We aimed to externally validate this model for undifferentiated-type (UD) EGC.

**Methods:** In this multicenter retrospective cohort study, we included 634 patients who underwent additional surgery (radical surgery group,  $n=270$ ) or were followed without additional treatment (no additional treatment group,  $n=364$ ) after noncurative ER for UD EGC between 2005 and 2015. Lymph node (LN) metastasis rates and survival rates were compared according to the risk categories.

**Results:** In the radical surgery group, LN metastasis rate was 2.6%, 10.9%, and 14.8% in the low-, intermediate-, and high-risk category of the eCura system ( $P=0.003$ ). In the no additional treatment group, overall survival (92.7%, 68.9%, and 80.0%, respectively, at 5 years,  $P<0.001$ ) and cancer-specific survival (99.7%, 94.7%, and 80.0%, respectively, at 5 years;  $P<0.001$ ) differed significantly across the risk categories. In the multivariate analysis, overall mortality was significantly higher (hazard ratio [HR], 3.14;  $P=0.007$ ) and cancer-specific mortality (HR, 2.93;  $P=0.212$ ) tended to be higher in the no additional treatment group than in the radical surgery group in the intermediate to high-risk category. However, no such differences were noted in the low-risk category.

**Conclusions:** The eCura system could be applied to UD EGC. Close follow-up without additional treatment might be considered for the low-risk category while additional surgery should be recommended for the intermediate- or high-risk categories.

**Endoscopic treatment**

IGCC22-ABS-1313

**EVALUATION OF ENDOSCOPIC CURE CRITERIA(ECURA) IN PATIENTS UNDERWENT SURGERY FOR EARLY GASTRIC CANCER**

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**Objectives:** Evaluate the frequency of lymph node metastasis according to the eCURA classification.

**Methods:** Retrospective evaluation of all patients who underwent gastrectomy from 2009 to 2020 at the ICESP Institute -BRAZIL. **Inclusion criteria:** Diagnosis of adenocarcinoma; Gastrectomy with curative intent; Early tumors: pT1a and pT1b. **Exclusion criteria:** Remnant gastric cancer; Preoperative chemotherapy; Synchronous lesion.

**Results:**

ECURA - A vs B vs C

	eCURA system	n	%	n pts with pN+	%		
	eCuraA	42	26.3	2	4.8		
	eCuraB	22	13.8	4	18.2		
	eCuraC	96	60	19	19.8		
	Total	160	100	26	16.3		
<b>LNM ESD Criteria - % of LNM</b>							
			<b>Diferentiated type</b>		<b>Undifferentiated type</b>		
	<b>T1a</b>	<b>UI (-)</b>	<b>&lt;=2 cm</b>	<b>&gt; 2cm</b>	<b>&lt;=2 cm</b>	<b>&gt; 2cm</b>	<b>Total</b>
			5.9% (1/17)	6.7% (1/15)	28.6% (2/7)	16.7% (1/6)	11.1% (5/45)
		<b>UI(+)</b>	<b>&lt;=3 cm</b>	<b>&gt; 3cm</b>	<b>&lt;=2 cm</b>	<b>&gt; 2cm</b>	
			0% (0/8)	0% (0/1)	0% (0/7)	0% (0/8)	0% (0/24)
	<b>T1b (sm1)</b>	<b>UI(-/+)</b>	<b>&lt;=3 cm</b>	<b>&gt; 3cm</b>	<b>Any size</b>		
			17.6% (3/17)	66.7% (2/3)	7.7% (1/13)		18.2% (6/33)
	<b>Total</b>		9.5% (4/42)	5.3% (1/19)	9.7% (4/41)		
<b>LNM - ECURA CRITERIA</b>							
			<b>Tumor size ≤ 3 cm</b>		<b>Tumor size &gt; 3cm</b>		
			<b>Venous invasion (-)</b>	<b>Venous invasion (+)</b>	<b>Venous invasion (-)</b>	<b>Venous invasion (+)</b>	<b>Total</b>
	<b>T1a</b>	<b>Lymphatic invasion (-)</b>	7.7% (4/52)	0	5.3% (1/19)	0	7% (5/71)
		<b>Lymphatic invasion (+)</b>	0	0	0	0	0
	<b>T1b (sm1)</b>	<b>Lymphatic invasion (-)</b>	8.3% (2/24)	0	25% (1/4)	0	10.7%(3/28)
		<b>Lymphatic invasion (+)</b>	50% (1/2)	100% (1/1)	50% (1/2)	0	60% (3/5)
	Total		9% (7/78)	100% (1/1)	12% (3/25)	0	

**Conclusions:** This classification is adequate and its applicability in our service is feasible, although studies in the West are still limited and little available; In addition, surgeons can assess the benefit-risk of indicating a less invasive procedure based on the estimated frequency of LNM in EGC.

***Surgery and quality assurance***

IGCC22-ABS-1334

**BETTER SURVIVAL AFTER FLUORESCENT LYMPHOGRAPHY GUIDED LYMPHADENECTOMY FOR GASTRIC CANCER**

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**Objectives:** Near-infrared fluorescent lymphography-guided lymphadenectomy using indocyanine green(NIR lymphadenectomy) is gaining popularity with its potential of thorough lymphadenectomy, more lymph node(LN) harvests, and high sensitivity in detecting metastatic LNs with. However, it is not known whether NIR lymphadenectomy affects the prognosis. This study aims to assess the prognostic impact of NIR lymphadenectomy on patients with gastric cancer.

**Methods:** From 2013 to 2017, 3348 patients who underwent minimally invasive gastrectomy were retrospectively analyzed. NIR lymphadenectomy and conventional lymphadenectomy groups were analyzed after a 1:1 propensity score matching. The long-term prognostic impact of NIR lymphadenectomy was assessed by comparing overall survival between the two groups.

**Results:** After propensity score matching, 1066 patients in each group were compared. In the NIR group, significantly more LNs were retrieved (56.0 vs. 43.3,  $p<0.001$ ) although the two groups were similar in the patient demographics and clinical staging. The NIR group revealed significantly higher proportion of LN positive patients ( $p=0.038$ ) and resulted in significantly less proportion of stage I patients( $p=0.023$ ) than in conventional group by upstaging nodal classification. The NIR group showed better survival than the conventional group, although it was not statistically significant( $p=0.09$ ). However, the NIR group showed a significantly better survival( $p=0.04$ ) than the conventional lymphadenectomy group in stage I while there was no difference between the two groups in stage II( $p=0.67$ ) and III( $p=0.26$ ).

**Conclusions:** NIR lymphadenectomy demonstrated stage migration effect through more thorough LNs evaluation by retrieving more LNs and resulted in reduction of stage I patients' proportion through decreasing LN negative patients. The stage migration effect of NIR lymphadenectomy may lead to better survival in stage I patients by classifying stage II patients who were staged as stage I with conventional lymphadenectomy.

## ***Surgery and quality assurance***

IGCC22-ABS-1354

### **AUDIT OF KLASS-02-RCT RESULTS BASED ON THE PROFICIENCY CRITERIA USED IN KLASS-02-QC STUDY**

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**Objectives:** KLASS-02-RCT revealed that laparoscopic distal gastrectomy was not inferior to open distal gastrectomy regarding long-term oncologic outcomes in patients with advanced gastric cancer. Before starting KLASS-02 study, KLASS-02 researchers made the items necessary for standardization of D2 lymphadenectomy for quality control of participating surgeons (KLASS-02-QC). We aimed to audit the quality of lymphadenectomy performed during the KLASS-02 study and to assess the predictive value of proficiency criteria used for KLASS02-QC study.

**Methods:** We reviewed the KLASS-02-QC database, which included proficiency scores of 20 surgeons, and the KLASS-02-RCT database, which included 492 patients who underwent laparoscopic gastrectomy for advanced gastric cancer. We classified surgeons into two groups according to their proficiency scores, and then compared surgical, pathological, perioperative outcomes of patients operated by surgeons.

**Results:** Of the total 492 patients, 251 (51.0%) were operated by surgeons with higher proficiency scores and 241 (49.0%) were operated by surgeons with lower proficiency score. Compared to the lower-score group, the higher-score group had larger number of harvested lymph nodes, comparable intraoperative blood loss, and longer operation time. The rate of early major complication was significantly lower in the higher-score group. The day of first flatus, day of first soft diet initiated, and hospital stays of the higher-score group were significantly shorter than the lower-score group. Survival outcomes were comparable between the groups.

**Conclusions:** KLASS-02-QC was a useful tool for evaluating surgical proficiency required to perform D2 lymph node dissection in patients with advanced gastric cancer.

## *Surgery and quality assurance*

IGCC22-ABS-1089

### **AN INTERNATIONAL CONSENSUS ON CORE OUTCOMES TO REPORT IN SURGICAL TRIALS FOR GASTRIC CANCER**

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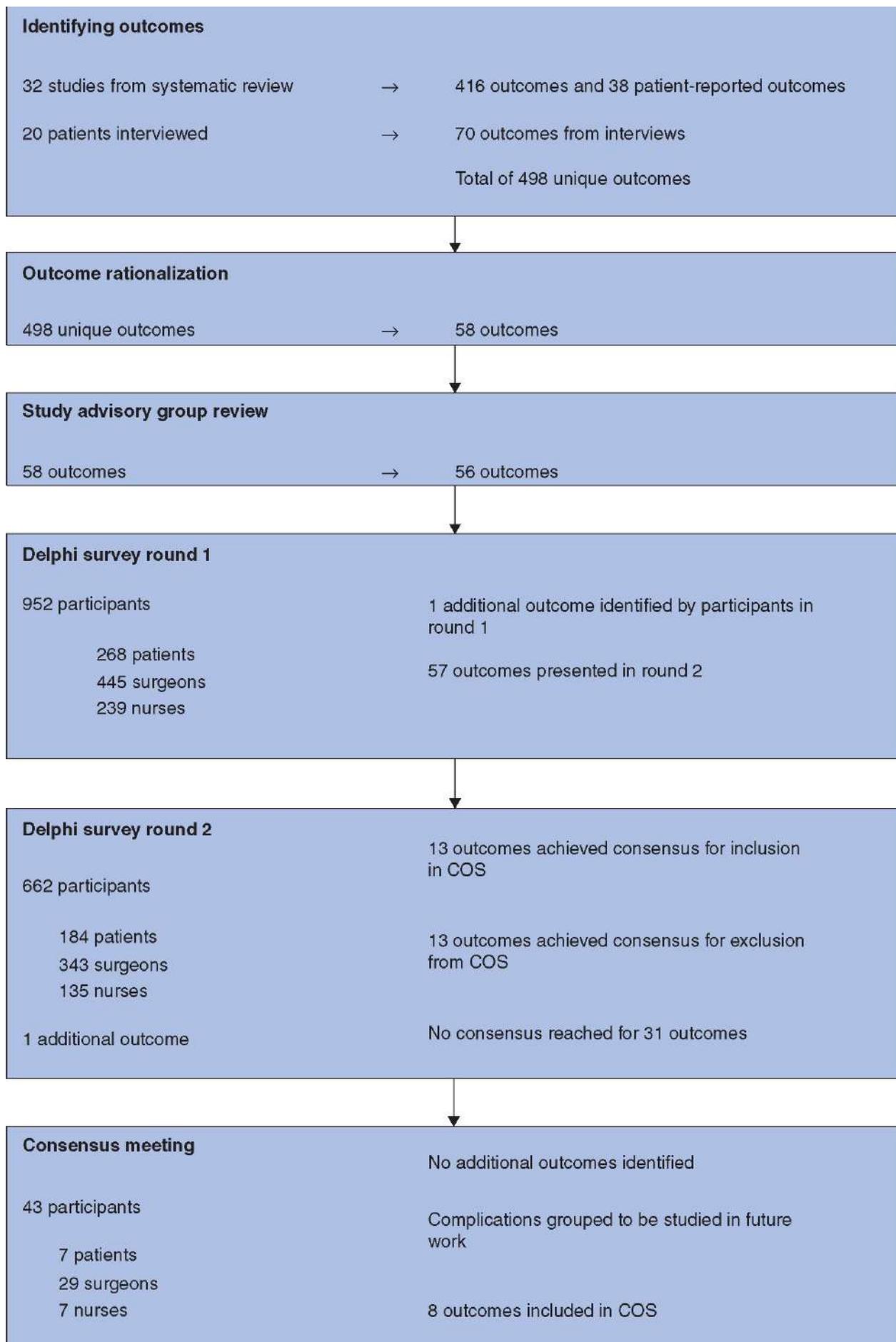
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**Objectives:** Surgery is the primary treatment that can offer potential cure for gastric cancer, but is associated with significant risks. Identifying optimal surgical approaches should be based on comparing outcomes from well designed trials. Currently, trials report different outcomes, making synthesis of evidence difficult. To address this, the aim of this study was to develop a core outcome set (COS)—a standardized group of outcomes important to key international stakeholders—that should be reported by future trials in this field.

**Methods:** Stage 1 of the study involved identifying potentially important outcomes from previous trials, trial protocols and a series of patient interviews. Stage 2 involved patients and healthcare professionals prioritizing outcomes using a multilanguage international Delphi survey that informed an international consensus meeting at which the COS was finalized.

**Results:** Some 498 outcomes were identified from previously reported trials and patient interviews, and rationalized into 56 items presented in the Delphi survey. A total of 952 patients, surgeons, and nurses enrolled in round 1 of the survey, and 662 (70 per cent) completed round 2. Following the consensus meeting, eight outcomes were included in the COS: disease-free survival, disease-specific survival, surgery-related death, recurrence, completeness of tumour removal, overall quality of life, nutritional effects, and 'serious' adverse events.

**Image:**



**Conclusions:** A COS for surgical trials in gastric cancer has been developed with international patients and healthcare professionals. This is a minimum set of outcomes that is recommended to be used in all future trials in this field to improve trial design and synthesis of evidence.

***Surgery and quality assurance***

IGCC22-ABS-1126

**COMPARISON OF STANDARD AND LIMITED LYMPHADENECTOMY IN ELDERLY PATIENTS WITH ADVANCED GASTRIC CANCER**

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**Objectives:** Knowledge on the optimal extent of lymphadenectomy among elderly patients with advanced gastric cancer is limited. This study was designed to compare standard D2 and limited lymphadenectomy for evaluating the appropriate extent of lymphadenectomy.

**Methods:** We retrospectively reviewed patient's data based on a prospectively collected gastric cancer registry. The inclusion criteria were age above 75 years and histologically confirmed stage II or more advanced gastric cancer. In this study, 103 patients who underwent limited lymph node dissection and 134 patients who underwent standard D2 lymph node dissection were included to evaluate surgical and oncological outcomes using propensity score matching analysis (PSM).

**Results:** The mean age after PSM was approximately 78 years in both groups. The Charlson Comorbidity Index was  $5.81 \pm 0.87$  and  $5.75 \pm 0.76$ , respectively, and 12.5% of the patients in both groups had American Society of Anesthesiologists scores of more than 3. The limited lymphadenectomy group showed a shorter operation time and fewer retrieved lymph. However, other surgical outcomes and pathological data were not significantly different between the groups. No postoperative mortality within 30 days was observed. No significant differences in overall complications between the groups. The 3-year overall-survival rates of the limited and standard lymphadenectomy groups were 58.3% and 73.6%, respectively. The 3-year recurrence-free survival rate of the limited lymphadenectomy group was lower than that of the standard lymphadenectomy group; however, the difference was not statistically significant.

**Conclusions:** Standard D2 lymphadenectomy has better oncological outcomes regarding surgical safety in elderly patients with advanced gastric cancer.

*Surgery and quality assurance*

IGCC22-ABS-1131

**SPLEEN PRESERVATION WITH DISSECTION OF LYMPH NODES AT THE SPLENIC HILUM FOR ADVANCED GASTRIC CANCER**

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**Objectives:** For proximal gastric cancer (GC) that does not invade the greater curvature, splenectomy should be avoided as it increases operative morbidity without improving survival. However, the survival impact of prophylactic splenectomy for tumors localized to the greater curvature of the proximal stomach remains unknown.

**Methods:** We retrospectively analyzed data of 38 patients with advanced upper GC localized to the greater curvature between February 2006 to September 2020. We divided the patients into underwent splenectomy and splenic hilar lymph node dissection without splenectomy. We compared the clinicopathological characteristics and surgical and survival outcomes between the two groups.

**Results:** Of the 38 patients, 26 (68%) preserve the spleen and 12 underwent splenectomy. Age, gender, clinical stage, operative time and blood loss were statistically equivalent between the groups. The number of lymph nodes dissected in the splenic hilum was also equivalent (median 2 in both groups,  $P=0.56$ ). Nonetheless, metastatic lymph nodes were frequently observed in the splenectomy group (spleen preserving group: 3.8% vs. splenectomy group: 42%,  $P=0.004$ ). Postoperative complications of Clavien-Dindo classification Grade IIIa or higher were significantly higher in the splenectomy group than that in the spleen preserving group (spleen preserving group: 12% vs. splenectomy group: 42%,  $P=0.04$ ). Survival analysis showed that the spleen preserving group tended to have better survival outcome (5-year overall survival rate: 55% in the spleen preserving group vs. 33% in the splenectomy group,  $P=0.24$ , 5-year recurrence-free survival rate: 51% in the spleen preserving group vs. 13% in the splenectomy group,  $P=0.06$ ).

**Conclusions:** Our results suggested that spleen preservation along with dissection of splenic hilar lymph nodes for advanced proximal GC localized to the greater curvature could reduce postoperative complications without compromising the curability.

***Surgery and quality assurance***

IGCC22-ABS-1168

**SPECIALIZATION SIGNIFICANTLY IMPROVES LONG-TERM SURVIVAL IN PATIENTS WITH GASTRIC CANCER**

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**Objectives:** We aimed to investigate the influence of specialization on the treatment of gastric cancer patients. **Methods:** The clinicopathological data of 4005 patients who underwent radical gastrectomy at Fujian Union Hospital from January 2006 to December 2015 were retrospectively analyzed. The patients were divided into three groups: a nonspecialized group (NS group, 2006-2009), a transitional group (T group, 2010-2011) and a specialized group (S group, 2012-2015).

**Results:** There were 4005 patients in the whole group. The rate of achieving a textbook outcome in the S group was significantly higher than that in the NS group and T group ( $P < 0.05$ ), while the rate of major lymph node noncompliance in the S group was significantly lower than that in the NS group and T group ( $P < 0.05$ ). Multivariate analysis showed that specialization was an independent factor affecting textbook outcomes and lymph node compliance. For stage I, the 5-year overall survival rates of the three groups were similar. For stages II and III, the 5-year overall survival rate of the S group was significantly higher than that of the NS group and the T group, while the 5-year overall survival rates of the NS and T groups were similar. Further multivariate analysis showed that specialization was an independent protective factor for long-term survival in patients with stage II-III disease.

**Conclusions:** Specialization of gastric cancer surgery can significantly improve surgical quality and the long-term survival rate of patients with stage II-III gastric cancer.

***Surgery and quality assurance***

IGCC22-ABS-1187

**SURGICAL SKILLS AFFECT THE CLINICAL OUTCOMES IN PATIENTS WITH LOCALLY ADVANCED DISTAL GASTRIC CANCER**

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**Objectives:** Quality control of D2 lymph node dissection (LND) for gastric cancer is usually based only on the number of LNDs, while the process and dynamic quality of the operation are rarely reported.

**Methods:** A total of 189 gastric cancer patients unedited surgical videos from two prospective randomized controlled trials (RCTs) of laparoscopic surgery for locally advanced distal gastric cancer were collected. Two peers independently used the Klass-02-QC LND Score scale and generic error rating tool (GERT) to quantitatively evaluate the quality of D2 LND in the videos. The short-term clinical outcomes of patients in different groups were compared.

**Results:** The overall incidence of complications was 20.6%; the incidence of systemic complications was 13.7%, and the incidence of surgical complications was 6.9%. According to whether the LND score reached the median (44 score), patients were divided into a standardized group (73%) and non-standardized group (27%). ES by quartile was divided into grade 1 (21.7%), grade 2 (26%), grade 3 (28%), and grade 4 (24.3%) from low to high. Univariate logistic regression analysis showed that ES >3 (OR=8.65, 95%CI: 2.50-49.83, score 0.016), ASA score >II (OR=8.16, 95%CI: 2.27-29.35, score 0.001), and pTNM >II (OR=4.54, 95%CI: 1.37-18.8, grade 0.038) were independent risk factors for non-standardized LND. Male sex (OR=4.31, 95%CI: 1.60-11.66, p=0.004) and pTNM >II (OR=6.85, 95%CI: 2.67-40.75, p=0.002) were independent risk factors for grade 4 ES. Non-standardized LND (OR=1.62, 95%CI: 1.16-3.89, p=0.021), grade 4 events (OR=3.21, 95%CI: 1.52-3.90, p=0.035), and pTNM >II (OR=1.74, 95%CI: 1.39-7.33, p=0.041) were independent risk factor for postoperative surgical complications.

**Conclusions:** Standardized laparoscopic D2 LND and fewer "events" can significantly reduce postoperative surgical complications. To achieve homogenization of surgical skills, attention should be paid to the monitoring of complete surgical videos in the design and implementation of future surgical RCTs.

***Surgery and quality assurance***

IGCC22-ABS-1190

**IMPLICATIONS OF INDOCYANINE GREEN FLUORESCENCE IMAGING-GUIDED LYMPHADENECTOMY FOR GASTRIC CANCER**

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**Objectives:** The value of indocyanine green (ICG) fluorescence imaging in tracing metastatic lymph nodes (LNs) has rarely been reported. We aimed to evaluate the clinical implications of fluorescence imaging-guided lymphadenectomy and the sensitivity of fluorescent lymphography to detect metastatic LN stations in gastric cancer (GC).

**Methods:** This analysis pooled data from two randomized controlled trials (FUGES-012 and FUGES-019 studies) on laparoscopic ICG tracer-guided lymphadenectomy for GC between November 2018 and October 2020. The ICG group received ICG injection using either the intraoperative subserosal or submucosal approaches 1 day before surgery and underwent fluorescence imaging-guided lymphadenectomy. The non-ICG group underwent conventional lymphadenectomy without intraoperative imaging.

**Results:** Among 514 enrolled patients, the ICG and non-ICG groups included 385 and 129, respectively. A significantly higher mean number of LNs was retrieved in the ICG group than in the non-ICG group (49.9 vs. 42.0,  $P < 0.001$ ). The ICG group showed a lower LN noncompliance rate than that in the non-ICG group (31.9% vs. 57.4%,  $P < 0.001$ ). The sensitivity of fluorescence imaging for detecting all metastatic LN stations was 86.8%. The negative predictive value was 92.2% for nonfluorescent stations. For detecting all metastatic stations, subgroup analysis revealed 97.7%, 91.7%, 86.2%, and 84.3% sensitivities for pT1, pT2, pT3, and pT4a tumors, respectively. Regardless of gastrectomy type, the diagnostic accuracy for detecting all metastatic stations in the D1+ and D2 stations for cT1–cT2 disease reached 100%.

**Conclusions:** ICG fluorescence imaging assisted in the thorough dissection of potentially metastatic LNs, as recommended for individualized laparoscopic lymphadenectomy for GC.

## ***Surgery and quality assurance***

IGCC22-ABS-1207

### **ROLE OF SURGERY FOR LOCALLY ADVANCED GASTRIC CANCER IN THE ERA OF NEO-ADJUVANT THERAPIES.**

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**Objectives:** Locally advanced gastric cancer (LAGC) represents a therapeutic challenge, particularly as it often involves adjacent organs.

In the last decade, a multimodal approach has been suggested for the treatment of LAGC with the adoption of neoadjuvant (preoperative or perioperative) therapies (NAC) based on the reason that, at least theoretically, it may reduce tumor volume, improve the R0 resection rate and eliminate micro metastases.

The aim of this study was to analyze the factors affecting prognosis and survival in patients with LAGC with particular regard to the effect of neoadjuvant therapies.

**Methods:** Between January 2005 and December 2018, the medical records of 113 patients with LAGC who underwent curative resection were retrospectively reviewed. Patient characteristics, related complications, long-term survival, and prognostic factors were analyzed with regard.

**Results:** Postoperative mortality and morbidity rates of patients undergoing neo-adjuvant therapies and upfront surgery were 2.3% vs 4.3% ( $p= ns$ ) and 43.2% vs 39.1% ( $p= ns$ ), respectively.

R0 resection was achieved 79.5% and in 73.9% of patients undergoing neoadjuvant therapy and upfront surgery, respectively ( $p < 0.001$ ).

Neoadjuvant therapy, TNM stage, R status, Lauren type, number of lymph nodes retrieved and N status, multivisceral resection and HIPEC were all prognostic factors that significantly affected both overall (OS) and disease-free survival (DFS).

Multivariate analysis revealed that neoadjuvant therapy, completeness of resection (R0), number of lymph nodes retrieved, N status and the adoption of HIPEC were independent prognostic factors associated with longer survival.

**Conclusions:** Patients with LAGC undergoing surgery after neoadjuvant therapy had a better OS and DFS with respect to patients treated with upfront surgery. No significant difference was observed in terms of morbidity and mortality.

***Surgery and quality assurance***

IGCC22-ABS-1235

**PREHABILITATION IN UPPER GASTROINTESTINAL CANCER SURGERY: A SCOPING REVIEW PROTOCOL**

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**Objectives:** Prehabilitation aims to enhance patients' overall physical fitness prior to surgery to improve outcomes and recovery. This practice is becoming widely adopted in surgical cancer care. Patients diagnosed with an upper gastrointestinal (GI) cancer are vulnerable to frailty, malnutrition, and adverse outcomes following surgery and may benefit from prehabilitation interventions. Currently, the effects of prehabilitation on patient outcomes and the optimal means of implementation remain unclear. This scoping review aims to synthesize and describe current prehabilitation interventions and their effects on postoperative outcomes for individuals receiving upper GI cancer surgery.

**Methods:** PUBMED, EMBASE, and the Cochrane Centre Register of Controlled Trials were searched to identify all published randomized controlled trials (RCTs) from 2010 to 2021 that compared prehabilitation interventions with standard care. Studies of prehabilitation that examined postoperative outcomes in adults undergoing any surgery for upper GI cancer were eligible for inclusion. Study screening and data charting were completed by two independent reviewers.

**Results:** A data extraction tool was used to identify details of patient demographics, prehabilitation interventions, duration, mode of delivery, and postoperative outcomes. Early results demonstrate a dearth of RCT evidence for prehabilitation in GI cancer patients and notable heterogeneity. A quantitative, narrative analysis will be conducted to summarize the findings obtained from eligible studies into tables.

**Conclusions:** This scoping review will provide a comprehensive synthesis and appraisal of existing prehabilitation regimens and their effects on postoperative outcomes. This will assist in suggesting future directions of optimal design and delivery of prehabilitation for upper GI cancer in clinical practice.

## ***Surgery and quality assurance***

IGCC22-ABS-1245

### **LONG-TERM SURVIVAL OF PATIENTS WITH STAGE II-III AFTER GASTRECTOMY WITH INADEQUATE NODAL ASSESSMENT**

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**Objectives:** This study evaluates the long-term survival of advanced gastric cancer patients who deviated from expected survival curves because of inadequate nodal evaluation.

**Methods:** Patients were identified from the SEER database. Those with stage II–III gastric cancer were considered for inclusion. Three groups were compared based on the number of analyzed LNs. They were inadequate LN assessment (ILA, < 16 LNs), adequate LN assessment (ALA, 16-29 LNs), and optimal LN assessment (OLA, ≥ 30 LNs). The main outcomes were overall survival (OS) and cancer-specific survival. Data were analyzed by the Kaplan-Meier product-limit method, log-rank test, hazard risk, and Cox proportional univariate and multivariate models. PSM was used to compare the ALA and OLA groups.

**Results:** The analysis included 11,607 patients. Most had advanced T stages (T3=48%; T4=42%). The pathological AJCC stage distribution was IIA = 22%, IIB = 18%, IIIA = 26%, IIIB = 22%, and IIIC = 12%. The overall sample divided by the study objective included ILA (50%), ALA (35%), and OLA (15%). Median OS was 24 mo for the ILA group, 29 mo for the ALA group, and 34 mo for the OLA group ( $P<0.001$ ). Univariate analysis showed that the ALA and OLA groups had better OS than the ILA group [ALA hazard ratio (HR)=0.84, 95% confidence interval (CI): 0.79–0.88,  $P<0.001$  and OLA HR=0.73, 95%CI:0.68–0.79,  $P<0.001$ ]. The OS outcome was confirmed by multivariate analysis (ALA HR=0.68, 95%CI:0.64–0.71,  $P<0.001$  and OLA: HR=0.48, 95%CI:0.44–0.52,  $P<0.001$ ). A 1:1 PSM analysis in 3428 patients found that the OLA group had better survival than the ALA group (OS: OLA median = 34 mo vs ALA median = 26 mo,  $P<0.001$ , which was confirmed by univariate analysis (HR=0.81, 95%CI:0.75–0.89,  $P<0.001$ ) and multivariate analysis: (HR=0.71, 95%CI:0.65–0.78,  $P<0.001$ ).

**Conclusions:** Proper nodal staging is a critical issue in gastric cancer. Assessment of an inadequate number of LNs places patients at high risk of adverse long-term survival outcomes.

## ***Surgery and quality assurance***

IGCC22-ABS-1292

### **COMPARISON OF GASTRIC CANCER TREATMENT RESULTS BETWEEN REFERENCE CENTERS AND OTHER HOSPITALS**

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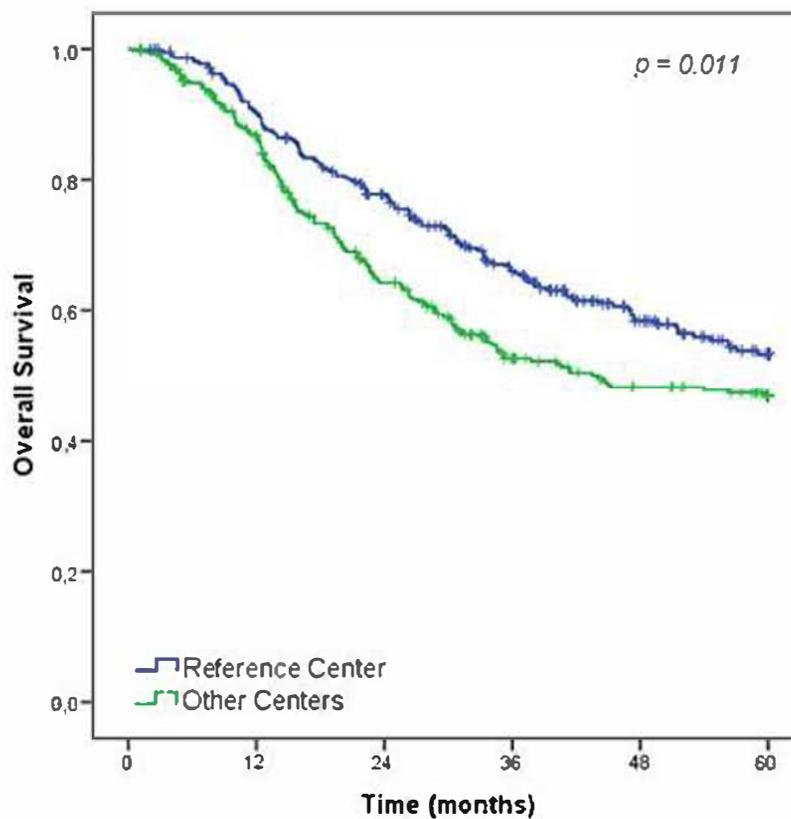
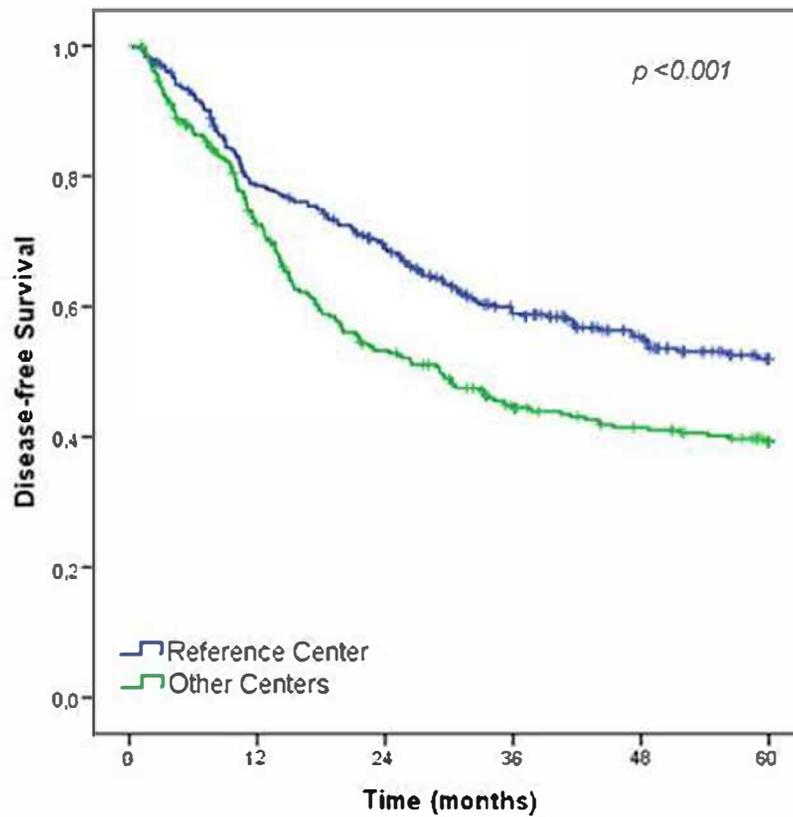
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**Objectives:** The treatment of Gastric Cancer (GC) must be performed by a multidisciplinary team, aiming to offer full treatment according to the clinical stage. However, there is still a lack of evidence in the literature regarding the benefit of centralized treatment. Therefore, this study aimed to compare oncological treatment and survival of GC patients between who underwent surgery in a reference center and other hospitals, where a multidisciplinary team is not available.

**Methods:** Patients with GC, stage II and III, who underwent gastrectomy with curative intent between 2009 and 2018 were included. Patients operated at our Institution (reference center) were compared with who underwent surgery at other hospitals and referred for adjuvant therapy. We analyzed pathological report, performance of adjuvant therapy, overall survival and disease-free survival.

**Results:** Between 2009 and 2018, 336 patients surgically treated at the reference center and 307 at other hospitals. Those from other hospitals took 3.7 months to start adjuvant chemotherapy. In the reference center, pathological reports demonstrated that more lymph nodes were resected (41.4 vs 23.5,  $p < 0.001$ ), was a higher R0 resection rate (98.5% vs 95.1%,  $p = 0.013$ ), lower rate of adjuvant radiotherapy (66.1% vs 50.5%  $p < 0.001$ ) and lower recurrence rate (68.5% vs 56.7%,  $p < 0.001$ ). There was no difference regarding locoregional recurrence. However, peritoneal recurrence (38.7 vs 63.2,  $p < 0.001$ ) and distant (37.7% vs 49, 6%,  $p = 0.066$ ) were lower in the reference center. Patients from reference center have significantly better disease-free survival ( $p < 0.001$ ) and overall survival rates ( $p = 0.011$ ). Multivariate analysis demonstrated worse disease-free survival and overall survival for total gastrectomy, pT3/T4 status, lymph node status (pN+) and surgical procedure performed out of the reference center.

**Image:**



**Figure.** Overall Survival and Disease-Free Survival of Gastric Cancer Patients according to Center of Origin.

**Conclusions:** Treatment of GC in a reference center is related to higher number of lymph nodes resection, R0 resections, and higher overall and disease-free survival.

## ***Surgery and quality assurance***

IGCC22-ABS-1300

### **THE EFFECT OF SURGICAL SPECIMEN DISSECTION ON THE NUMBER OF HARVESTED LYMPH NODES IN GASTRIC CANCER**

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**Objectives:** The N-stage is an important prognostic factor in gastric cancer. Our aim was to evaluate how the preparation of the surgical specimen affected the number of lymphnodes harvested.

**Methods:** We conducted a retrospective study of 144 consecutive gastric carcinoma patients who underwent gastric surgery with a curative intent. The number of harvested lymphnodes was assessed from the pathologist's report and clinical data was reviewed from the electronic health records. The association of the number of the lymphnodes with categorical variables was assessed with Mann-Whitney U-test or Kruskal-Wallis test.

**Results:** Of the 144 patients with gastric adenocarcinoma, in 80 cases the lymphnode areas were dissected into separate specimens and in 64 cases the surgical specimen was sent to pathology as an en bloc preparation. The lymphnode yield was significantly greater in the dissected specimens (median lymphnode harvest 21.0 vs 35.0,  $p < 0.001$ ).

Of the 37 D1 specimens 17, and of the 107 D2 specimens 63 were dissected. The dissection of lymphnode stations was significantly associated with the number of harvested lymphnodes in the D1 (median 41.0 vs 16.5,  $p < 0.001$ ), as well as in the D2 lymphadenectomy (median 34.0 vs 23.5,  $p < 0.001$ ).

The dissection of lymphnode stations yielded significantly greater lymphnode harvests in total and subtotal gastrectomy, and in laparoscopic and open surgery subgroups ( $p < 0.001$ ). In total gastrectomies, the median lymphnode harvests of dissected and en bloc preparations were 43.0 and 21.5, in subtotal gastrectomies 32.0 and 19.5, in laparoscopic surgeries 35.0 and 18.5, and in open surgeries 34.0 and 22.0 lymphnodes.

**Gastric surgery** Total 65 (35+30)

	Subtotal 79 (45+34)
<b>Technique of surgery</b>	Open 85 (43+42)
	Laparoscopic 59 (37+22)
<b>Lymphnode dissection</b>	D1 37 (17+20)
	D2 107 (63+44)
<b>pT-stage</b>	T0 11, T1 31, T2 14, T3 51, T4 37
<b>pN-stage</b>	N0 78, N1 19, N2 19, N3 28

**Conclusions:** The dissection of lymphnode stations improves the recovery of lymphnodes resulting in a more accurate N-stage.

*Surgery and quality assurance*

IGCC22-ABS-1377

**ACTUAL RISK OF LYMPH NODE METASTASIS OF NON-CURATIVE ENDOSCOPIC TREATMENT IN PROXIMAL GASTRIC CANCER**

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**Objectives:** The aim of this study is to evaluate the actual risk and benefit of additional gastrectomy after non-curative endoscopic treatment for early gastric cancer in the upper third of the stomach. We investigated the lymph node metastasis of tumor meeting non-curative resection criteria for endoscopic submucosal dissection, and postoperative complications of patients who underwent total or proximal gastrectomies.

**Methods:** We retrospectively reviewed the clinicopathological data of patients who underwent total or proximal gastrectomy for early gastric cancer in the upper third of the stomach between March 2002 and January 2021. Lymph node metastasis rate at each station, postoperative complications, and survival rate were analyzed.

**Results:** A total of 523 patients who underwent total or proximal gastrectomy for early gastric cancer, 379 had tumors meeting non-curative resection criteria for endoscopic submucosal dissection. Overall lymph node metastasis rate was 9.5%, and the presence of lymphovascular invasion is a significant risk factor for lymph node metastasis ( $p < 0.001$ ). Lymph node metastasis rate at station number 1, 3, and 7 were 3.2%, 3.7%, and 3.2%, respectively. Postoperative complication rates were 22.9%, 44.4%, 18.4%, and 20.6% in the open total, open proximal, laparoscopic total, and laparoscopic proximal gastrectomy, respectively. The 5-year overall survival rates were 96.1% and 81.1% in the patients with and without lymph node metastasis, respectively ( $p = 0.076$ ).

**Conclusions:** Before planning additional gastrectomy for early gastric cancer in the upper third of the stomach after non-curative endoscopic treatment, we can discuss with patients about 9.5% of lymph node metastasis rate and approximately 20% of postoperative complication rate.

## ***Surgery and quality assurance***

IGCC22-ABS-1391

### **DIFFERENT RECURRENCE PATTERNS BY TUMOR LOCATION IN REMNANT GASTRIC CANCER**

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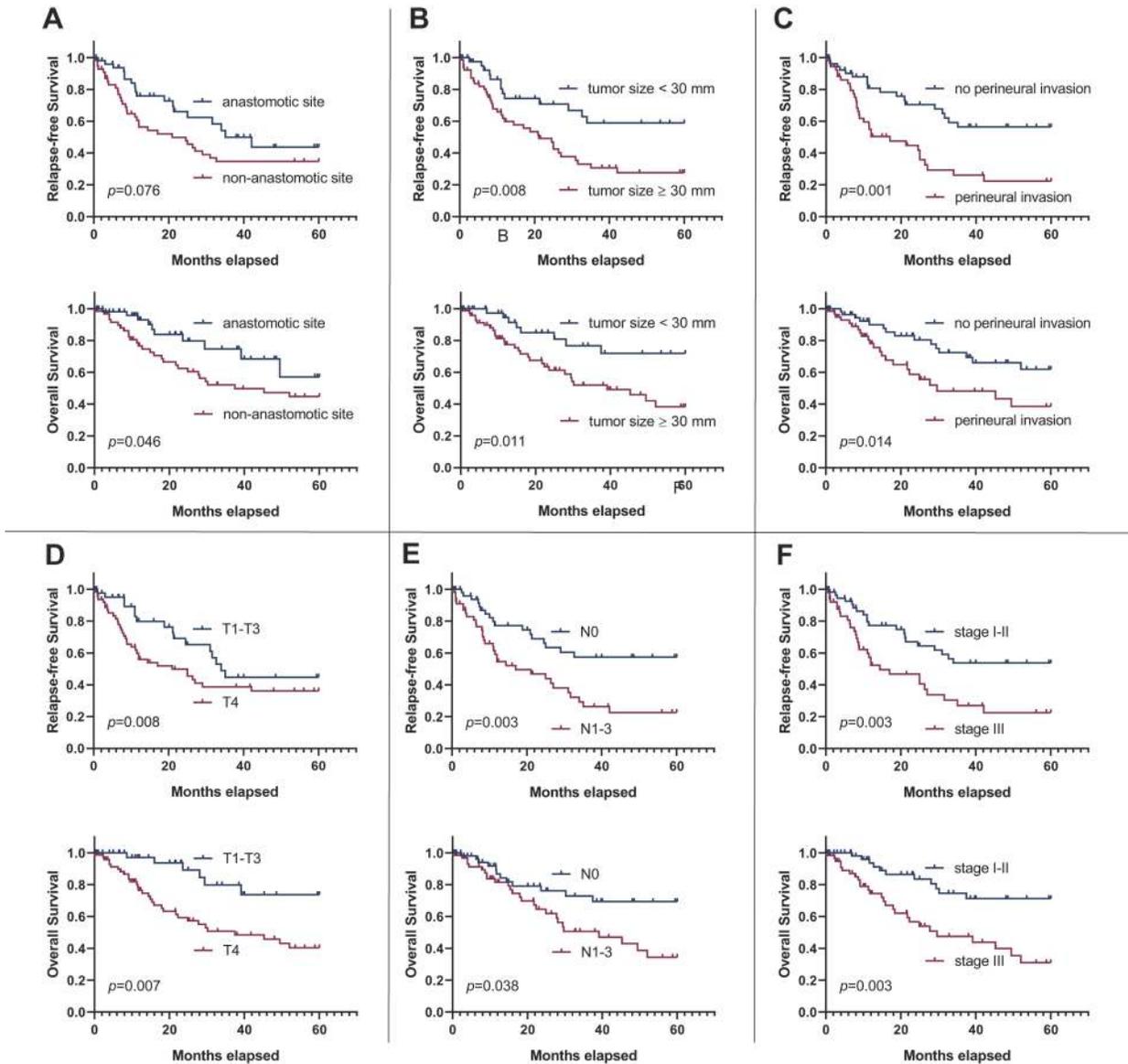
<sup>1</sup>Department of Gastric Surgery, Fudan University Shanghai Cancer Center, <sup>2</sup>Department of Oncology, Fudan University Shanghai Medical College, <sup>3</sup>Department of ultrasound, Fudan University Shanghai Cancer Center, Shanghai, China

**Objectives:** Carcinoma of the remnant stomach after partial gastrectomy is a typical carcinogenesis model, especially for the anastomotic site. This study aimed to examine the clinical significance of tumor location in remnant gastric cancer (RGC).

**Methods:** A total of 135 RGC patients between January 2000 and December 2020 were enrolled in this study. Sixty-three patients with tumors at the anastomotic site were classified as group A, and 72 patients with tumors at the non-anastomotic site were classified as group N. The clinicopathological features, periprocedural complications, recurrence pattern, and overall survival were evaluated between groups.

**Results:** The time interval from the previous gastrectomy to the current diagnosis is  $32.0 \pm 13.2$  years in group A, which was markedly longer than  $20.0 \pm 13.1$  in group N. The previous disease in 51/63 cases (81.0%) was benign in group A and 40/72 cases (55.6%) in group N ( $p=0.002$ ). No significant difference was found in intraoperative and recovery outcomes between groups. The morbidity in group A was 24.2% and 14.9% in group N, which showed no statistical significance ( $p=0.183$ ). The patterns of tumor recurrence were different between groups. Higher incidences of peritoneal metastasis were observed in group A (7/62, 11.3%) than in group N (1/67, 1.5%,  $p=0.021$ ), while higher incidences of liver metastasis were observed in group N (9/67, 13.4%) than group A (2/62, 3.2%). Tumor location was a significant prognostic factor for OS but not for RFS.

**Image:**



**Conclusions:** RGC at the anastomotic site and the non-anastomotic site have different clinicopathological features and recurrence patterns, and thus should receive individualized perioperative management and postoperative follow-up.

***Surgery and quality assurance***

IGCC22-ABS-1385

**PREDICTION MODEL FOR SCREENING PATIENTS AT RISK OF MALNUTRITION AFTER GASTRIC CANCER SURGERY**

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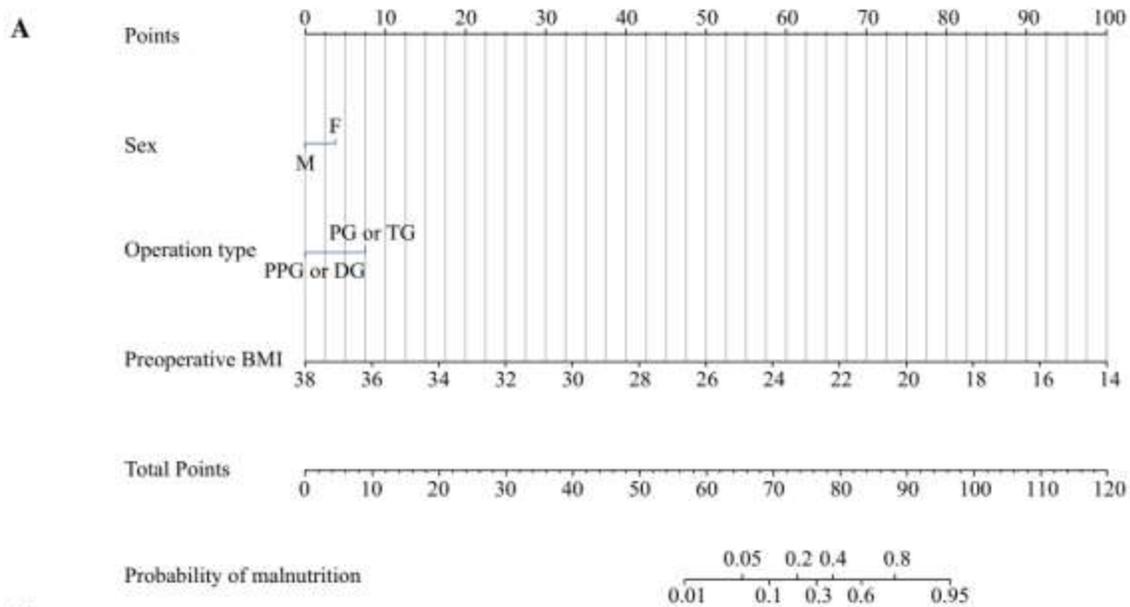
<sup>1</sup>Department of Surgery, <sup>2</sup>Nutritional Support Team, <sup>3</sup>Department of Nursing, <sup>4</sup>Department of Food Service and Nutrition Care, <sup>5</sup>Department of Medical Research Collaborating Center, Seoul National University Hospital, Seoul, Korea, Republic Of

**Objectives:** Malnutrition after gastrectomy is associated with a poor prognosis; however, no accurate model for predicting post-gastrectomy malnutrition exists. Hence, we conducted a retrospective study to develop a prediction model identifying gastric cancer patients at a high risk of malnutrition after gastrectomy.

**Methods:** Gastric cancer patients who underwent curative gastrectomy with more than one weight measurement during a 3-year follow-up period were included. Malnutrition was defined as body mass index (BMI) < 18.5 kg/m<sup>2</sup> according to the European Society of Clinical Nutrition and Metabolism diagnostic criteria. BMI-loss pattern was analyzed using a group-based trajectory model. A prediction model for malnutrition 6 months after gastrectomy was developed based on significant risk factors and validated.

**Results:** Overall, 1,421 patients were examined. The BMI-loss trajectory model showed significant BMI loss at 6 months after gastrectomy. Severe BMI loss (mean 21.5%; n = 109) was significantly associated with the elderly, female sex, higher preoperative BMI, advanced cancer stage, open surgery, total gastrectomy, Roux-en-Y reconstruction, chemotherapy, and postoperative complications (all,  $P < 0.05$ ). Malnutrition 6 months after gastrectomy was observed in 152 (11.9%) of 1,281 patients. Preoperative BMI, sex, and type of operation were included in the final prediction model as predictive factors ( $P < 0.05$ ). The C-index (95% confidence interval) of the developmental set and bootstrap validation of the prediction model was 0.91 (0.89-0.94) and 0.91, respectively.

**Image:**



**B**

Preoperative BMI	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30≤
Score	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Sex	Male				Female												
Score	0				-1												
Operation type	PPG or DG				PG or TG												
Score	0				-2												
Malnutrition prediction score	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Probability of malnutrition (%)	97	94	88	77	61	41	24	13	6.2	2.9	1.4	0.6	0.28	0.13	0.06	0.03	<0.01

**Conclusions:** The prediction model for the risk of malnutrition 6 months after gastrectomy was accurately developed with three independent risk factors: low preoperative BMI, female sex, and total or proximal gastrectomy.

***Surgery and quality assurance***

IGCC22-ABS-1055

**COMPLETE MESOGASTRIC EXCISION FOR GASTRIC CANCER: SHORT-TERM OUTCOMES OF A RANDOMIZED CLINICAL TRIAL**

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<sup>1</sup>Department of GI surgery, Tongji Hospital, Huazhong University of Science and Technology, Wuhan, China, <sup>2</sup>

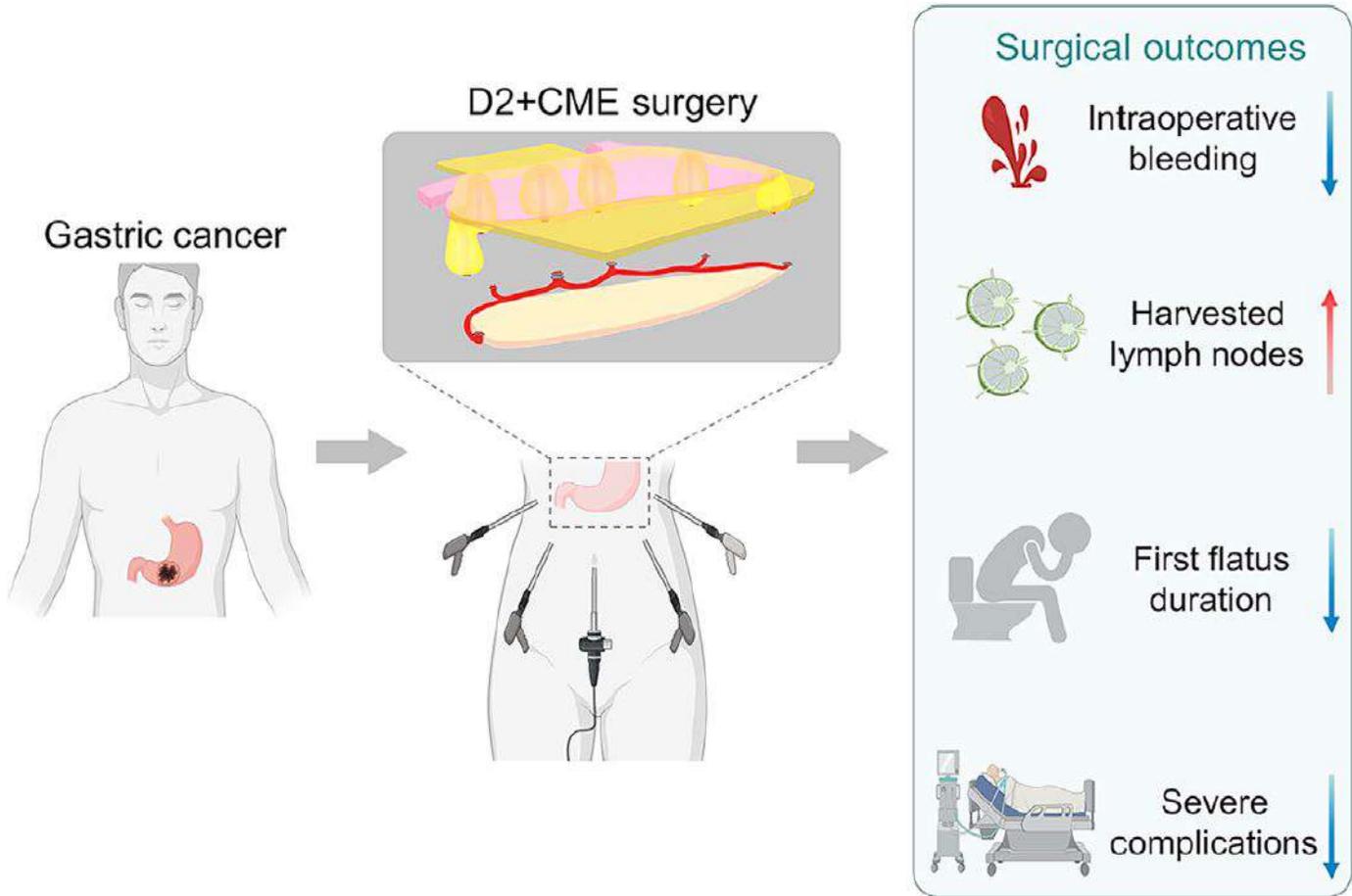
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**Objectives:** Implementation of complete mesogastric excision in gastric cancer surgery, named D2 lymphadenectomy plus complete mesogastric excision (D2+CME), has recently been proposed as an optimal procedure. However, the safety and efficacy of D2+CME remain uncertain. To obtain a high level of evidence for D2+CME surgery, we conducted a prospective, randomized controlled trial (DCGC01,NCT01978444) to compare D2+CME with conventional D2 dissection for gastric cancer treatment.

**Methods:** This single-center, prospective, paralleled, randomized controlled trial (allocation ratio: 1:1), between September 2014 and June 2018, was conducted at the Department of Gastrointestinal Surgery, Tongji Hospital, Huazhong University of Science and Technology (HUST), Wuhan, China. The study was approved by the Tongji Hospital Ethics Committee (TJ-C20130811). All patients signed an informed consent document to participate. The protocol of study was published in *Trials*. The primary end point, 3-year disease-free survival, is being assessed in the follow-up phase. The current study presents short-term outcomes, including surgical results, morbidity, and mortality within 30 days after surgery.

**Results:** In this randomized controlled trial, patients receiving D2+CME procedure exhibit less intraoperative blood loss, more lymph node harvesting and earlier postoperative flatus than those in D2 group. Univariate Cox regression analysis reveals that the risk ratio for postoperative flatus in D2+CME group is 1.247 ( $p=0.044$ ). The overall postoperative complications are comparable between the two groups. However, the severity of complications in D2+CME group are significantly less than those in D2 group (Clavien-Dindo Classification grade  $\geq$ IIIa: 4 [11.8%] in D2+CME vs. 9 in [33.3%] D2,  $p=0.041$ ).

**Image:**



**Conclusions:** In conclusion, our work shows that D2+CME is associated with better short-term outcomes and surgical safety than conventional D2 dissection for patients with advanced gastric cancer.

***Surgery and quality assurance***

IGCC22-ABS-1127

**SAFETY EVALUATION OF CURATIVE GASTRECTOMY FOR GASTRIC CANCER PATIENTS WHO UNDERWENT LIVER TRANSPLANT**

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**Objectives:** We aimed to examine the technical and oncological safety of curative gastrectomy for gastric cancer patients who underwent liver transplantation.

**Methods:** In this study, we compared the surgical and oncological outcomes of two groups. The first group consisted of 32 consecutive patients who underwent curative gastrectomy for gastric cancer after liver transplantation (LT), while the other group consisted of 127 patients who underwent conventional gastrectomy (CG). In addition, a subgroup analysis was performed to evaluate the impact of the involvement of a specialized liver transplant surgery team on the surgical outcomes of gastrectomy.

**Results:** The mean operative time was significantly longer in the LT group ( $p < 0.05$ ). Furthermore, there were more frequent cases of post-operative transfusion in the LT group compared to the CG group ( $p < 0.05$ ). However, there were no significant differences in the overall complications between the groups (25.00% vs 23.62%,  $p = 0.874$ ). The 5 year overall survival rates of the LT and CG groups were 76.7% and 90.1%, respectively ( $p < 0.05$ ). The results of the subgroup analysis demonstrated no statistically significant difference in various early surgical outcomes, such as time to transfusion during surgery, first flatus, time to first soft diet, post-operative complications, hospital stay after surgery, and the number of harvested lymph nodes except for operation time.

**Conclusions:** Despite one's medical history of undergoing LT, our study demonstrated that curative gastrectomy could be a surgically safe treatment for gastric cancer. However, close cooperation with the liver transplant team is required in order to enhance the safety of the gastrectomy.

*Surgery and quality assurance*

IGCC22-ABS-1162

**IMPACT OF TYPE OF GASTRECTOMY ON DEATH FROM PNEUMONIA IN ELDERLY PATIENTS WITH GASTRIC CANCER**

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**Objectives:** Gastrectomy may induce significant postoperative disabilities and worsen the quality of life in elderly patients. Without a functioning esophagogastric junction (EGJ), swallowing is impaired because of the anatomical and physiological changes after surgery, which increases the risk of postoperative pneumonia. The aim of this study was to identify the impact of the type of surgical procedure on death from pneumonia in elderly patients with gastric cancer (GC) over the long term.

**Methods:** We analyzed the data of 343 patients with GC who underwent curative gastrectomy in our hospital. We divided the patients into elderly and non-elderly groups. Among them, 109 patients aged  $\geq 75$  years who underwent curative resection were analyzed, their clinicopathological factors and clinical outcomes were compared, and the impact of the type of surgical procedure on death from pneumonia over the long term was evaluated.

**Results:** There were significantly higher levels of American Society of Anesthesiologists (ASA) and poor nutrition in the elderly group; however, gender, BMI and factors related to pneumonia did not differ significantly between groups. The median duration of follow-up time 1588 days. On the multivariate analysis, age and surgical procedure (total and proximal gastrectomy) were selected as independent predictive factors for pneumonia-related survival.

**Conclusions:** Preservation of the EGJ as much as possible while maintaining curability is useful for reducing postoperative death from pneumonia over the long term in elderly patients with gastric cancer.

***Surgery and quality assurance***

IGCC22-ABS-1197

**TEXTBOOK OUTCOME, CHEMOTHERAPY COMPLIANCE AND PROGNOSIS AFTER RADICAL GASTRECTOMY FOR GASTRIC CANCER**

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**Objectives:** This study aimed to analyze the impact of textbook outcome (TO) on the surgical quality evaluation of radical gastrectomy, relationship between TO and chemotherapy compliance, and prognostic value of TO in patients with gastric cancer (GC).

**Methods:** Consecutive patients who underwent radical gastrectomy with pathological stage I-III at Union Hospital of Fujian Medical University from January 2010 to June 2017 were included. TO was defined as receiving a complete-potentially curative status,  $\geq 15$  lymph nodes examined, hospital stay  $\leq 21$  days, and freedom from intraoperative and postoperative complications, re-intervention in 30 days, 30-day readmission to the hospital or intensive care unit, and 30-day postoperative mortality.

**Results:** A total of 3993 patients were included, of which 3361 (84.2%) patients achieved TO. The overall, recurrence-free, and disease-free survival rates of patients achieving TO were significantly better than those of patients who did not achieve TO (all  $P < 0.05$ ). Laparoscopic surgery and adjuvant chemotherapy (AC) were identified as related factors. TO was an independent prognostic factor for improved overall survival ( $P = 0.008$ ). The total number of AC cycles was greater and the interval from surgery to first AC was shorter in the TO group compared with the Non-TO group.

**Conclusions:** TO is a reliable and effective indicator to evaluate the surgical quality of radical gastrectomy and contributes to chemotherapy compliance and improved long-term prognosis of patients with GC. Age  $< 65$  years, non-total radical gastrectomy, pT1-2 stage, and laparoscopic surgery may promote the achievement of TO, especially laparoscopic surgery, which can be adopted to achieve TO in high-risk populations.

***Surgery and quality assurance***

IGCC22-ABS-1200

**TECHNICAL PERFORMANCE, AND SURGICAL OUTCOMES IN LAPAROSCOPY RADICAL SURGERY FOR GASTRIC CANCER**

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**Objectives:** Surgical quality control is the key to evaluate the surgical treatment of tumors. This study aims to prospectively verify the Classintra system in evaluating the quality control and predicting prognostic performance for gastric cancer.

**Methods:** This study included the data from the 2D-3D RCT (NCT02327481) and a subset of CLASS-01 RCT (NCT01609309). According to the Classintra system, patients were classified into the two groups (iAE and non-iAE group). Technical performance was evaluated using the Objective Structured Assessment of Technical Skills (OSATS) and the Generic Error Rating Tool.

**Results:** There were 105 patients (19.9%) in the iAE group and 423 patients (80.1%) in the non-iAE group. Relevance analysis revealed ClassIntra $\geq$ III grade, low OSATS, and total gastrectomy were the independent risk factors for increased postoperative complications. The performances of iAE showed regardless of total or distal gastrectomy, the number of iAEs was highest during suprapancreatic area lymph node dissection(LND). What's more, there was a significant increase in bleeding (grade IV) and injury during splenic hilar area LND. Multivariate logistic analysis showed age $\geq$ 65 years, BMI $\geq$ 25, total gastrectomy, and pTNM II-III staging were the independent risk factors for iAE.

**Conclusions:** ClassIntra classification can be used as effective surgical quality control and prognostic index of laparoscopic radical surgery for gastric cancer.

*Surgery and quality assurance*

IGCC22-ABS-1258

**QUALITY OF RECOVERY AFTER SUBTOTAL GASTRECTOMY USING QUALITY OF RECOVERY-40 QUESTIONNAIRE**

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**Objectives:** Gastric cancer surgery highly impacts postoperative quality of life. The Quality of Recovery-40 (QoR-40) is a validated 40-item patient questionnaire, designed to evaluate the quality of recovery after anesthesia. QoR-40 is subcategorized in five dimensions; physical comfort, physical independence, psychological support, emotional state and pain. The aim of this study was to evaluate the quality of recovery after subtotal gastrectomy using the QoR-40 questionnaire and to establish a reference standard for the QoR-40 after subtotal gastrectomy to be used in future studies.

**Methods:** This prospective observational study included all patients undergoing subtotal gastrectomy between January 2020 and September 2021 in the Amsterdam UMC. Primary endpoint was the quality of recovery on day three after surgery, using the validated Dutch QoR-40. Secondary endpoint was the occurrence of poor quality of recovery (PQR), defined as impairment in 2 or more dimensions, or impairment in the global QoR-40.

**Results:** 43 Patients were included in this study, the median total score of the QoR-40 questionnaire was 180 [IQR 173-189]. Ten patients had a PQR, of whom five patients (50.0%) developed postoperative complications. Furthermore, five patients without PQR developed complications (15.2%). Two patients with postoperative complications were not able to complete the questionnaire. Impairment occurred mainly in dimensions physical comfort, physical independence and emotional state.

**Conclusions:** This study presents a reference standard for quality of recovery based on the QoR-40 questionnaire in patients undergoing subtotal gastrectomy. PQR may be related to postoperative complications. Future studies should focus on enhancing physical comfort, physical independence and emotional state to improve patient reported quality of recovery.

***Surgery and quality assurance***

IGCC22-ABS-1275

**RACIAL DISPARITIES IN GASTRIC CANCERS IN THE UNITED STATES: A PROPENSITY SCORE-MATCHED ANALYSIS**

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**Objectives:** The incidence of gastric cancer in the Hispanic population in the United States has rapidly grown. Using a large national database, we identified differences in patient demographics, socioeconomic factors, treatment, and outcomes of Hispanic patients compared to Asians, who consistently demonstrate superior outcomes in the US for gastric cancer.

**Methods:** A total of 18,218 patients with gastric adenocarcinoma between 2004 and 2015 were retrospectively identified in the National Cancer Database, of which 10,983 (60.2%) were Hispanic and 7235 (39.7%) were Asian. Baseline demographics, tumor characteristics, treatment patterns, and overall survival (OS) were compared between Hispanic and Asian patients. The surgical cohort was further analyzed, and 1:1 propensity score matching was used to balance covariates between Hispanic and Asian surgical patients. OS was compared using Kaplan-Meier estimate and multivariable Cox regression.

**Results:** Compared to Asian patients, Hispanic patients were more likely to be younger, male, socioeconomically disadvantaged and travel farther for care, and were more likely to present with aggressive and metastatic disease. Hispanic patients were less likely to undergo surgery and more likely to receive chemotherapy. Stage for stage, Hispanic patients had worse OS compared to Asians. In the surgical cohort, Hispanic patients were more likely to receive care at community centers and low case volume centers, and were less likely to have a lymphadenectomy with at least 16 lymph nodes retrieved, adjuvant chemotherapy, and negative margins. In Cox regression models of all patients, unmatched surgical patients, and matched surgical patients, Hispanic and Asian ethnicity was associated with similar hazard of mortality.

**Image:**

Table 1: Cox Proportional-Hazards Regression for Overall Survival of Surgical Cohort, Before and After Propensity Score Matching

Factors	Unmatched		Matched	
	Hazard Ratio (95% CI)	P value	Hazard Ratio (95% CI)	P value
<b>Age</b>				
41-70	Ref		Ref	
18-40	1.302 (0.882-1.922)	0.184	1.745 (1.045-2.916)	0.033
70+	1.924 (1.293-2.861)	0.001	2.605 (1.547-4.386)	<0.001
Female	1.013 (0.941-1.091)	0.725	1.050 (0.961-1.146)	0.282
<b>Race: Asian</b>	Ref			
Hispanic	1.068 (0.986-1.158)	0.107	1.045 (0.960-1.137)	0.306
<b>Charlson-Deyo Score</b>				
0	Ref		Ref	
1	1.094 (1.004-1.193)	0.040	1.107 (1.000-1.227)	0.050
2	1.125 (0.959-1.319)	0.148	0.994 (0.819-1.207)	0.955
3	1.427 (1.107-1.839)	0.006	1.366 (0.978-1.908)	0.068
<b>Median Income Quartile</b>				
1 <sup>st</sup> : <\$40,227	Ref		Ref	
2 <sup>nd</sup> : \$40,227-\$50,353	0.982 (0.873-1.106)	0.767	0.957 (0.816-1.122)	0.586
3 <sup>rd</sup> : \$50,354-\$63,332	1.062 (0.945-1.193)	0.313	1.079 (0.927-1.257)	0.325
4 <sup>th</sup> : \$63,333+	1.017 (0.886-1.168)	0.812	0.998 (0.814-1.185)	0.984
<b>Education Quartiles</b>				
1 <sup>st</sup> : 17.6% or more	Ref		Ref	
2 <sup>nd</sup> : 10.9%-17.5%	0.980 (0.885-1.086)	0.705	1.009 (0.896-1.137)	0.877
3 <sup>rd</sup> : 6.3%-10.8%	0.975 (0.870-1.094)	0.670	1.021 (0.896-1.163)	0.756
4 <sup>th</sup> : <6.3%	0.919 (0.797-1.061)	0.249	0.982 (0.828-1.164)	0.833
<b>Distance Traveled</b>				
<10 miles	Ref		Ref	
10-25 miles	0.949 (0.866-1.038)	0.252	0.932 (0.936-1.039)	0.204
>25 miles	1.120 (0.989-1.268)	0.074	1.036 (0.891-1.204)	0.648
<b>Insurance</b>				
Uninsured	Ref		Ref	
Private	1.016 (0.875-1.181)	0.831	1.014 (0.851-1.208)	0.876
Medicaid	1.051 (0.889-1.243)	0.559	1.060 (0.868-1.293)	0.569
Medicare	1.172 (1.005-1.368)	0.043	1.142 (0.954-1.367)	0.147
Other government	1.152 (0.763-1.739)	0.500	1.457 (0.907-2.342)	0.120
<b>Facility Type</b>				
CCP	Ref		Ref	
CCCP	1.003 (0.880-1.142)	0.969	0.989 (0.846-1.157)	0.894
Academic	0.800 (0.695-0.921)	0.002	0.759 (0.641-0.900)	0.001
INCP	0.864 (0.736-1.015)	0.075	0.894 (0.738-1.085)	0.256
<b>Case Volume</b>				
<50 <sup>th</sup>	Ref		Ref	
50-75 <sup>th</sup>	0.947 (0.942-1.125)	0.718	1.102 (0.927-1.309)	0.272
>75 <sup>th</sup>	0.951 (0.827-1.093)	0.478	1.009 (0.855-1.192)	0.914
<b>Analytic Stage</b>				
1	Ref		Ref	
2	2.498 (2.204-2.833)	<0.001	2.424 (2.090-2.812)	<0.001
3	4.761 (4.243-5.341)	<0.001	5.082 (4.433-5.826)	<0.001
4	8.471 (7.452-9.631)	<0.001	9.469 (8.136-11.021)	<0.001
Poorly cohesive/Signet	1.235 (1.140-1.337)	<0.001	1.172 (1.066-1.289)	<0.001
Lymphadenectomy =16 Lymph Nodes	0.810 (0.753-0.872)	<0.001	0.820 (0.751-0.895)	<0.001
Positive Margins	2.007 (1.840-2.189)	<0.001	1.862 (1.676-2.068)	<0.001
<b>Chemo</b>				
None	Ref		Ref	
Neoadjuvant	0.765 (0.670-0.873)	<0.001	0.777 (0.659-0.917)	0.003
Adjuvant	0.647 (0.584-0.716)	<0.001	0.626 (0.556-0.704)	<0.001
Perioperative	0.697 (0.583-0.833)	<0.001	0.743 (0.604-0.915)	0.005
<b>Radiation</b>				
None	Ref		Ref	
Neoadjuvant	1.243 (1.019-1.516)	0.032	1.373 (1.079-1.747)	0.010
Adjuvant	0.826 (0.745-0.915)	<0.001	0.834 (0.739-0.942)	0.004

**Conclusions:** Although Hispanic patients with gastric cancer are younger than their Asian counterparts, they paradoxically present with more advanced and aggressive disease, and are less likely to receive the standard of care.

***Surgery and quality assurance***

IGCC22-ABS-1311

**MULTIVISCERAL VS STANDARD GASTRECTOMY FOR GASTRIC CANCER: A PROPENSITY SCORE-MATCHING ANALYSIS**

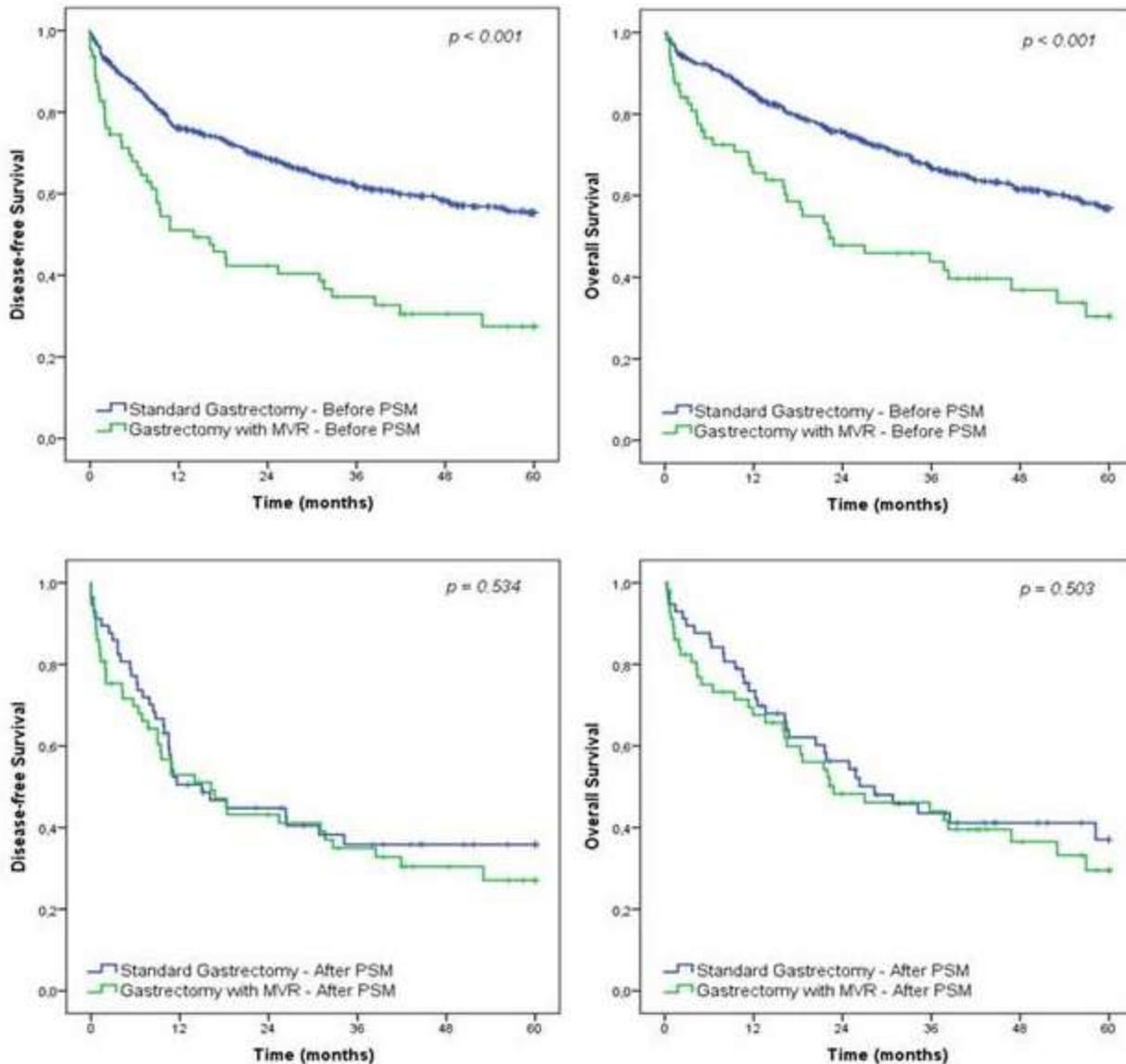
Andre R. Dias\*<sup>1</sup>, Marina A. Pereira<sup>1</sup>, Marcus F. K. P. Ramos<sup>1</sup>, Ulysses Ribeiro Jr<sup>1</sup>, Bruno Zilberstein<sup>1</sup>, Sergio C. Nahas<sup>1</sup>  
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**Objectives:** Gastric cancer (GC) with invasion of adjacent organs (T4b) should be managed with en bloc gastrectomy along with the invaded organs (multivisceral resection - MVR), when free margins can be obtained. MVR in GC brings high morbidity and mortality and, apparently, worse results compared to standard gastrectomy (SG). However, due to study bias, the real impact of MVR remains controversial. This study aimed to compare the outcomes of MVR and SG using PSM.

**Methods:** We reviewed all gastric adenocarcinoma patients who underwent curative gastrectomy. Propensity Score Matching (PSM) analysis including 9 variables (sex, age, comorbidities, ASA, hemoglobin, preoperative chemotherapy, type of gastrectomy, pT and pN) was conducted to reduce patient selection bias. Main outcome was 90-day mortality

**Results:** A total of 685 GC patients were eligible for inclusion (621 SG and 64 MVR). In MVR group, R0 rate was 95.3%, mean post-operative stay was 12.5 days, and 53.1% were pT4b. After PSM, 57 patients were matched in each group. All variables assigned in the score were well matched. Statistically different outcomes between groups became equivalent: major postoperative complications (pre-PSM: 14.5 vs 26.6%, p 0.011 / post-PSM: 21.1 vs 26.3%, p=0.509); 90-day mortality (pre-PSM: 6.6 vs 10.5%, p=0.020 / post-PSM: 10.5 vs 17.5%, p=0.281). Overall survival was also similar between both groups after PSM. Age $\geq$ 65 years old (OR:3.39) and resection of  $\geq$ 2 organs, beside the stomach (OR:4.62), were factors associated with 90-day mortality. R1 resection and surgery alone (no chemotherapy) were independent prognostic factors for poor OS (HR:3.61 and 2.81, respectively).

**Image:**



**Figure.** Survival curves of patients with gastric cancer undergoing standard gastrectomy (SG) or gastrectomy with multivisceral resection (MVR) before and after propensity score matching (PSM).

**Conclusions:** After PSM, the difference in morbidity, mortality and survival of MVR compared to SG was no longer statistically significant, revealing that MVR is performed in high risk patients, whom are expected to have worse results despite the procedure performed. Resection of 2 or more organs was the main factor associated with 90-day mortality in resectable GC.

## Surgery and quality assurance

IGCC22-ABS-1312

### PROPOSAL OF MODIFIED TEXTBOOK OUTCOME FOR IMPROVING THE QUALITY OF GASTRIC CANCER SURGERY

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**Objectives:** Gastric cancer has the highest cancer incidence rate in Korea and is one of the leading causes of cancer-related deaths worldwide. Since 2014, the national healthcare quality assessment has been implemented for gastric cancer in Korea. The proportion of early gastric cancer through early detection is high in Korea, and gastric cancer surgery has a great influence on outcome index. Based on the successful implementation of TO in Western countries, we propose a modified TO (mTO). The aim of this study was to identify indicators that can improve textbook outcome (TO) in patients undergoing gastric cancer surgery.

**Methods:** We included consecutive cases of gastrectomy for primary gastric cancer from a prospective clinical database of a high-volume university hospital in Korea between 2014 and 2016. Surgical approaches included both open surgery and minimal invasive surgery such as laparoscopic and robotic surgery. TO was calculated as the percentage of patients who met the 10 original indicators proposed by the Dutch Upper Gastrointestinal Cancer Audit group. For comparison with Western data, we calculated TO, mTO, and survival among stage II and III patients.

**Results:** Among the 2,153 included patients, TO was achieved in 80.1% with a 5-year survival of 90.0%. In the 608 stage II and III patients, the TO and mTO were 72.9% and 65.3%, and the 5-year survival was 74.8% and 74.0%, respectively; the latter was significantly lower in non-mTO patients (62.1%;  $P < 0.001$ ). The number of metastatic lymph nodes increased with increasing stages; in stage IIIC, their number exceeded 19. We performed frozen study examinations of the proximal and distal margins to prevent R1 resection.

**Image:**

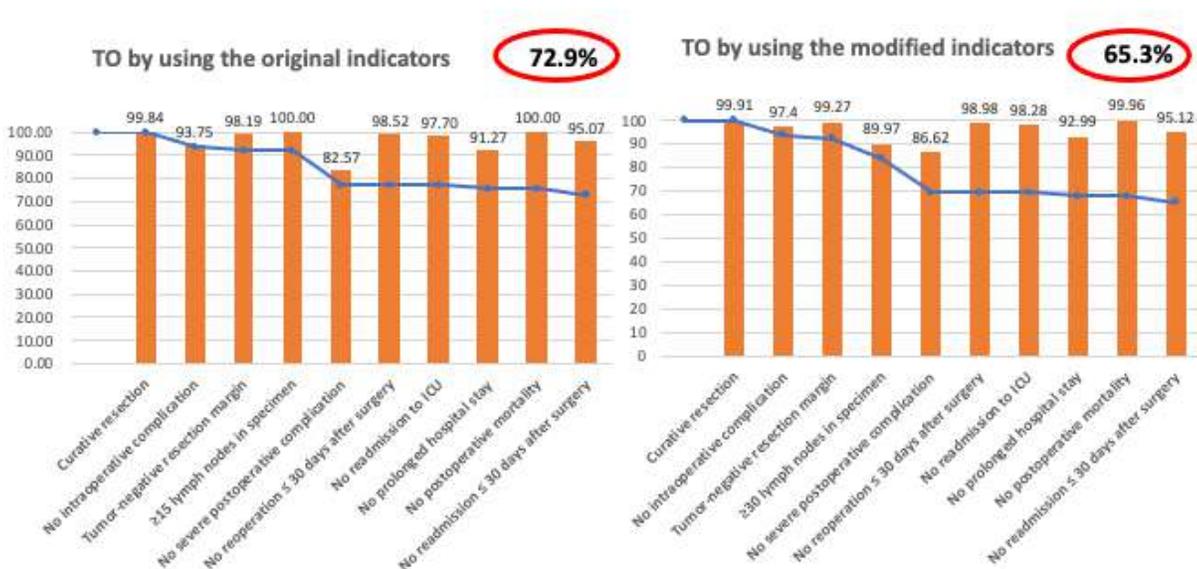


Fig.1 Overall Textbook outcome and modified Textbook outcome in stage II, III patients

**Conclusions:** Data from a high volume gastric cancer center showed the high textbook outcome rates. According to our proposed mTO, the minimum number of lymph nodes retrieved should be at least 30, even in advanced gastric cancer, and routine intraoperative frozen study examination is necessary to increase R0 resection.

## ***Surgery and quality assurance***

IGCC22-ABS-1392

### **IMPACT OF SPLENIC INFARCTION VOLUME MEASURED BY AI BASED SEGMENTATION SOFTWARE AFTER GASTRECTOMY**

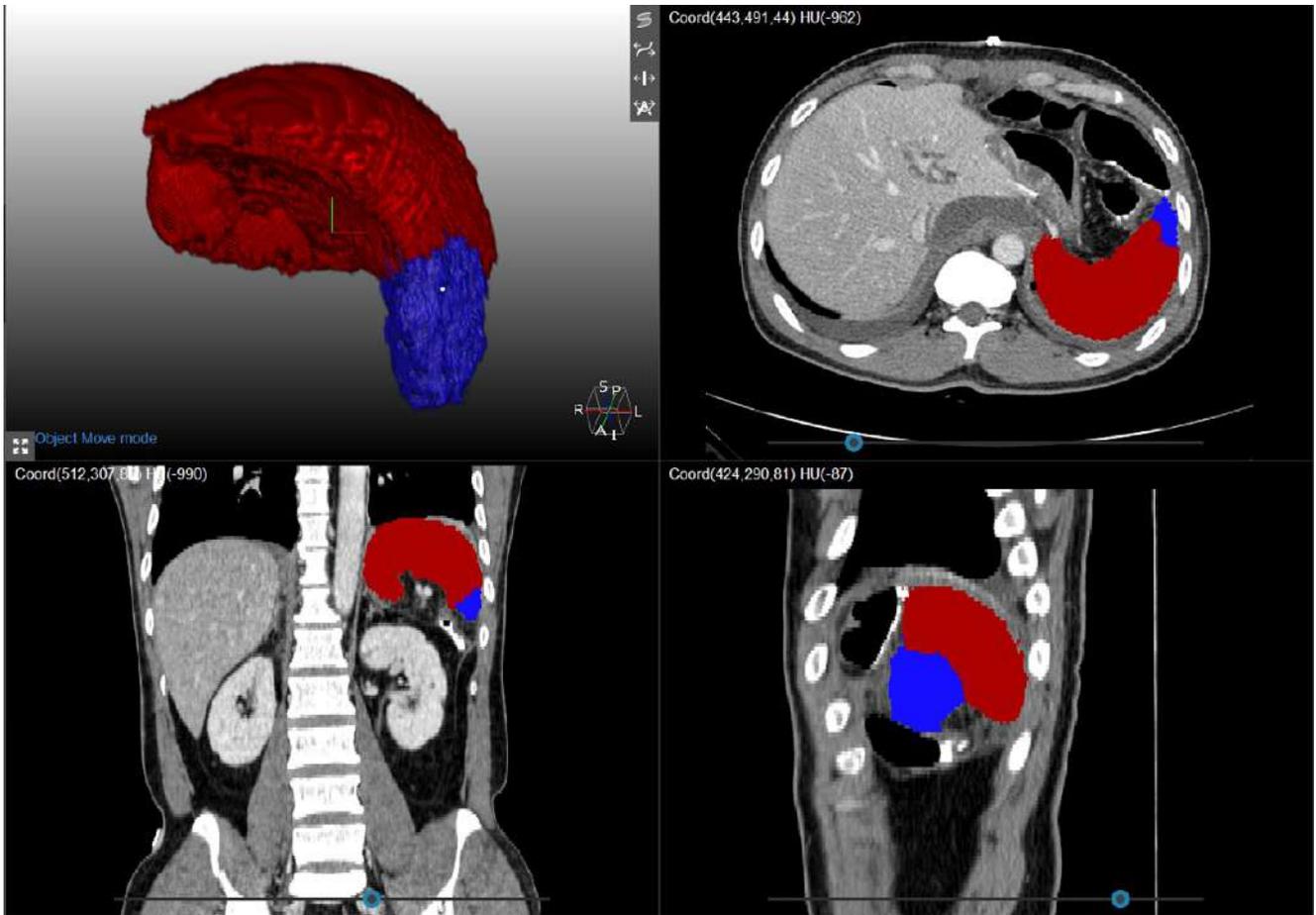
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**Objectives:** The aim of this study was to analyze the clinical manifestations of splenic infarction after radical gastrectomy and the difference according to the volume of splenic infarction measured by AI based segmentation software. **Methods:** Prospectively collected clinical data of the patients underwent radical gastrectomy for primary gastric cancer at the Department of Surgery at Seoul National University Hospital between January 2013 and December 2019 were analyzed retrospectively. For comparison, 1:1 propensity score matching analysis was conducted. CT of infarction group were reconstructed in 3D using a volume segmentation program (MEDIP®), and accurate infarcted volume were measured. The clinical data according to infarction volume were analyzed.

**Results:** 180 splenic infarctions were identified out of 1293 patients with contrast CT. After 1:1 propensity score matching, CRP and WBC count were significantly higher in infarction group during hospital stay. The length of hospital stay was longer in infarction group without significance ( $17.53 \pm 20.17$  vs.  $16.51 \pm 13.21$  days,  $p=0.570$ ). The Clavien-Dindo classification of surgical complication showed significant difference ( $1.41 \pm 1.41$  vs.  $1.18 \pm 1.36$ ,  $p<0.001$ ), but grade 3 or higher complications wasn't significantly different (31.1% vs. 25.0%,  $p=0.300$ ). Fluid collections requiring intervention were more frequent in infarction group without significance (11.7% vs. 6.1%,  $p=0.064$ ). After 3D reconstruction, mean infarction volume was  $20.73 \pm 26.02 \text{cm}^3$ , and the ratio was  $11.90 \pm 14.69\%$ . In correlation analysis, WBC count of 2~3 postoperative day was related to infarction volume ( $p=0.050$ ) and ratio ( $p=0.019$ ), and 4~5 day was related to ratio ( $p=0.030$ ). Otherwise, either volume or ratio of splenic infarction showed no linearity with CRP level, hospital stay, and complication grade.

**Image:**



**Conclusions:** Splenic infarction may increase inflammatory markers after gastrectomy which is related to its extent. However, the extent of splenic infarction was not associated with hospital stay and surgical complications.

*Surgery and quality assurance*

IGCC22-ABS-1401

**QUALITY CONTROL WITH COMPREHENSIVE COMPLICATION INDEX IN RADICAL GASTRIC CANCER SURGERY**

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**Objectives:** The comprehensive complication index (CCI) integrates all complications of the Clavien–Dindo classification (CDC) and offers a metric approach to measure morbidity. The aim of this study was to evaluate the CCI at a high-volume center for gastric cancer surgery and to compare the CCI to the conventional CDC.

**Methods:** Clinical factors were collected from the prospective complication data of gastric cancer patients who underwent radical gastrectomy at Seoul National University Hospital from 2013 to 2014. CDC and CCI were calculated, and risk factors were investigated. Correlations and generalized linear models of hospital stay were compared between the CCI and CDC. The complication monitoring model with cumulative sum control-CCI (CUSUM CCI) was displayed for individual surgeons, for comparisons between surgeons, and for the institution.

**Results:** From 1660 patients, 583 complications in 424 patients (25.5%) were identified. The rate of CDC grade IIIa or greater was 9.7%, and the overall CCI was  $5.8 \pm 11.7$ . Age, gender, Charlson score, combined resection, open method, and total gastrectomy were associated with increased CCI ( $p < 0.05$ ). The CCI demonstrated a stronger relationship with hospital stay ( $q = 0.721$ ,  $p < 0.001$ ) than did the CDC ( $q = 0.634$ ,  $p < 0.001$ ). For prolonged hospital stays ( $>30$  days), only the CCI showed a moderate correlation ( $q = 0.544$ ,  $p = 0.024$ ), although the CDC did not. The CUSUM-CCI model displayed dynamic time–event differences in individual and comparison monitoring models. In the institution monitoring model, a gradual decrease in the CCI was observed.

**Conclusions:** The CCI is more strongly correlated with postoperative hospital stay than is the conventional CDC. The CUSUM-CCI model can be used for the continuous monitoring of surgical quality

***Surgery and quality assurance***

IGCC22-ABS-1390

**LONG-TERM NATURAL COURSE OF LYMPH NODE STATION 6 METASTASIS AFTER PYLORUS-PRESERVING GASTRECTOMY**

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**Objectives:** Pylorus-preserving gastrectomy (PPG) accompanies the chance of incomplete lymph node station 6 (LN #6) dissection. Moreover, concerns of oncologic safety merge when LN #6 metastasis is confirmed in postoperative pathologic report. We aimed to describe the natural course of the LN #6 metastasis after PPG.

**Methods:** Electronic medical records of PPG patients from 2007 to 2017 were retrospectively reviewed. Cox and logistic regression analyses were conducted to evaluate the implication of location of lesion (longitudinal, circular), stage, the total number of metastatic LN, and the presence of metastatic LN for each station to survival and recurrence.

**Results:** The total number of PPG patients was 1,070. Location of lesion (longitudinal, circular) had insignificant effects on survival ( $p=0.547$ ,  $0.105$ ) and recurrence ( $p=0.554$ ,  $0.254$ ). Stage and the total number of metastatic LN had negative effects on survival and recurrence ( $p<0.001$ ). Lymph node station 3, 6, and 9 negatively affected survival, and lymph node 6 and 8 showed negative effects on recurrence after univariate and multivariate analyses. The number of patients with LN #6 metastasis was eleven (1.0%). 3 patients (0.28%) confirmed recurrence among those eleven patients, and they especially showed more extensive LN metastasis patterns beyond LN #6 (e.g. LN #7, 8a, 11p). The other 8 patients showed relatively more localized LN metastasis patterns, mainly within LN #6 and #4d.

**Conclusions:** Even LN #6 metastasis can be a prognostic factor for survival and recurrence, patients with LN #6 metastasis can be safely observed unless LN metastasis pattern is not extensive. A discrete surveillance strategy should be considered for patients with extensive LN metastasis patterns.

## ***Surgery and quality assurance***

IGCC22-ABS-1412

### **GASTRIC CANCER SURGERY AFTER LIVER TRANSPLANTATION**

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**Objectives:** De novo malignancy is not uncommon after liver transplantation (LT), however, there are limited reports of the clinical outcomes of gastric cancer surgery after LT. The purpose of this study is to investigate the feasibility and safety of gastric cancer surgery after LT.

**Methods:** We retrospectively reviewed 17 patients with gastric cancer after LT at a single institution from January 2013 to June 2021. We analyzed demographics, clinicopathological features, surgical technique, complications, and survival in the case series.

**Results:** The average number of years from transplantation to gastric cancer is  $8.7 \pm 5.0$  years. Among 15 gastrectomies, there were 5 cases of (33%) laparoscopic gastrectomy and 10 cases (67%) of open gastrectomy. According to Clavien-Dindo classification, the incidence of surgical complications and serious complications was 3/15 (20.0%) and 1/15 (6.7%). There was no significant difference in operative time and complication rates between laparoscopic and open surgery. The laparoscopic surgery group had a shorter hospital stay than the open surgery group. Regarding immunosuppression, 16 patients received tacrolimus-based immunosuppressive therapy with or without mycophenolate mofetil. The average number of days to stop taking immunosuppressants during hospitalization was 2.35 days. Only in 3 cases, a slight dose adjustment was necessary during hospitalization due to tacrolimus concentration. No suspicious acute rejection was identified during perioperative period.

**Conclusions:** Gastrectomy for gastric cancer in LT recipients had acceptable complications and no extension of hospitalization. This suggests that laparoscopic or open gastrectomy may be a feasible treatment option for gastric cancer, without adversely affecting transplant function or immunosuppression.

***Surgery and quality assurance***

IGCC22-ABS-1416

**PYLORUS-PRESERVING GASTRECTOMY FOR EARLY CANCER INVOLVING THE UPPER THIRD: CAN WE GO HIGHER?**

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**Objectives:** Pylorus-preserving gastrectomy (PPG) is commonly performed for early gastric cancer (EGC) located in middle third of the stomach. We investigated the surgical, oncological, and functional outcomes of PPG involving the upper third of stomach.

**Methods:** We included all patients of the period 2013-2016 who underwent PPG, distal subtotal gastrectomy (DSG), and total gastrectomy (TG) for EGC involving the upper third by carefully defining the localization. Surgical, oncological, and functional outcome analyses included postoperative morbidity, lymph-node metastasis, tumor recurrence, postoperative body weight, body mass index, hemoglobin, total protein, albumin, quantification of intraabdominal fat, and gallstone development.

**Results:** Overall, 288 cases were analyzed: 145 PPG, 61 DSG, and 82 TG. In the study period, patients potentially underwent PPG for EGC involving the upper third, if enough proximal remnant stomach was found whilst achieving a sufficient proximal margin. PPG resulted in less operation time ( $p < 0.001$ ), less blood loss ( $p = 0.002$ ) and lower postoperative morbidity compared to TG. For lymph-node (LN) stations being resected in all groups, no difference was found in number of resected LN. Recurrence-free survival was similar for all groups. PPG showed advantages regarding postoperative body weight, hemoglobin, total protein, albumin in postoperative 6 and 12 month follow-up. Lowest decrease of abdominal fat area after 12 months was seen for PPG. Gallstone incidence was significantly lower after PPG compared to TG ( $p < 0.001$ ).

**Conclusions:** For EGC involving the upper third, PPG can be another good option with lower postoperative morbidity, better functional outcomes, and same oncological safety.

*Surgery and quality assurance*

IGCC22-ABS-1471

**WORLDWIDE COMPARATIVE REVIEW OF GASTRIC CANCER TREATMENT GUIDELINES**

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**Objectives:** Gastric cancer is the fifth most commonly diagnosed cancer and the third leading cause of death in the world. It is geographically heterogenous because it is affected by environmental and genetic factors, and there is large gap between high risk and low risk countries including incidence, mortality. For these reasons, guidelines for the treatment of gastric cancer in each country have some similarities, but many others are controversial. We recognized the need to compare the guidelines of each country to find out what they had in common and what they differed from each other.

**Methods:** We reviewed and compared guidelines for gastric cancer treatment from five countries in aspects of endoscopic, surgical treatment and perioperative chemotherapy with palliative treatment and follow up surveillance based on the evidence level and recommendation grade.

**Results:** Relatively South Korea, China and Japan mentioned endoscopic treatment, surgery and lymphadenectomy in detail, while ESMO and NCCN dealt with perioperative chemotherapy. Korea, ESMO guidelines have level of evidence and grading of recommendation. NCCN guideline has their own categories of evidence and consensus. But there was no mention of evidence in recommendation of guidelines in Japan and China.

**Conclusions:** The guidelines of each country had some similarities, but there were also differences. We integrated these points and described the overall gastric cancer treatment. It will help medical personnels to understand the guidelines of each country at a glance so that they can refer the comparison of worldwide treatment of gastric cancer precisely.

***Surgery and quality assurance***

IGCC22-ABS-1220

**SURGICOPATHOLOGICAL QUALITY OF GASTRIC CANCER TREATMENT IN CENTRAL BRAZIL: REAL WORLD DATA.**

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**Objectives:** Adequate lymph node dissection and R0 resection are critical points of staging, management and treatment with curative intent of Gastric Cancer. The purpose of this study was to evaluate surgicopathological quality criteria of patients treated by Gastric Cancer surgeons and General surgeons in accordance with established requirements of good surgical quality.

**Methods:** We conducted a retrospective study of patients who underwent gastrectomy with curative intent, analyzed by the same pathology department and submitted to surgery by Gastric Cancer Surgeons (Group I) and General Surgeons (Group II). Surgicopathological quality indicators like margin status, ex-vivo dissection, number of removed lymph nodes, surgical contamination were included in the analysis.

**Results:** Between 2014 and 2020, 155 patients were included in the analysis. Among 106 patients (Group I) and 49 patients selected (Group II), no differences were observed in relation to contamination ( $p=0.49$ ). Differences were observed in relation to compromised margins ( $p=0.002$ ), collection of cytology ( $p < 0.001$ ), ex-vivo dissection ( $p < 0.001$ ), removal of  $\geq 15$  lymph nodes ( $p < 0.0001$ ), favoring Group I. The mean number of dissected lymph nodes was 39 vs 19 between the two groups.

**Conclusions:** Significant differences in surgicopathological quality indicators were noted between Gastric Cancer surgeons and General Surgeons. Treatment with specialized surgeons reached satisfactory quality parameters, demonstrating their compliance to criteria of good surgical quality. Programs to reduce this quality gap such as continuing medical education and centralization should be adopted.

## ***Surgery and quality assurance***

IGCC22-ABS-1218

### **SURGICAL QUALITY IN D2 LYMPHADENECTOMY OF RADICAL GASTRECTOMY AND ITS IMPACT OF THE SURVIVAL.**

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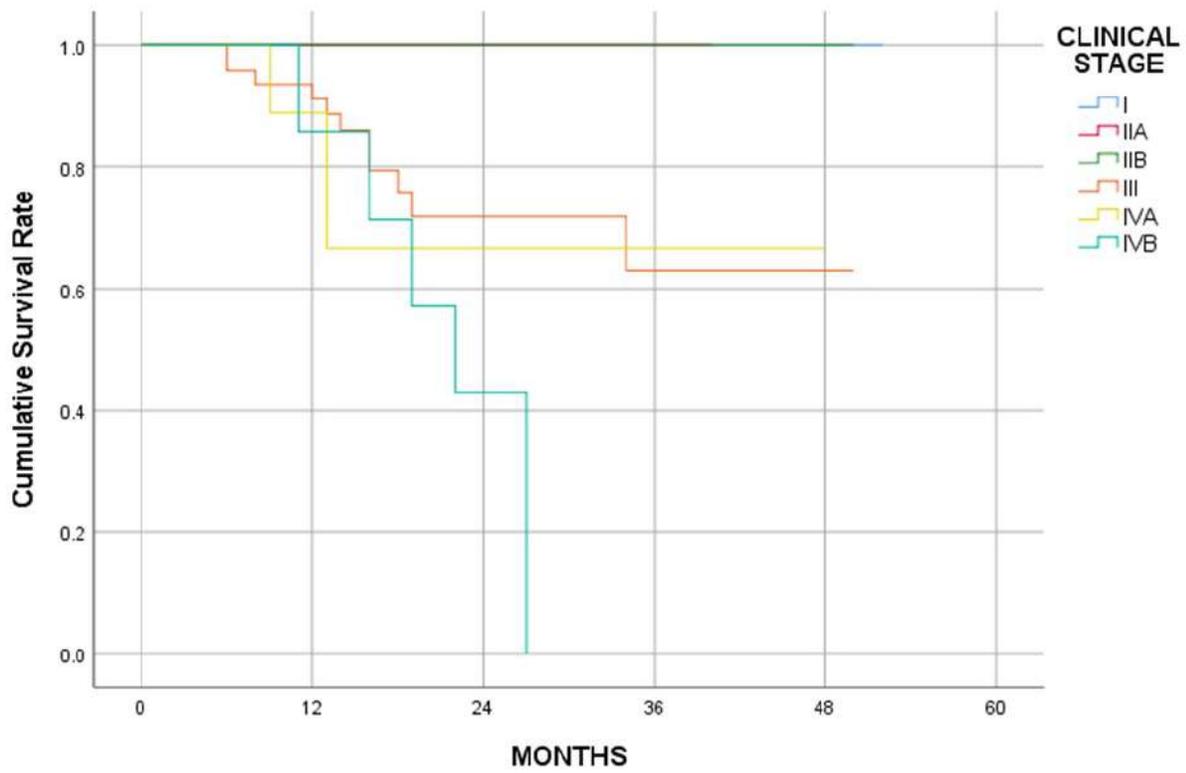
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**Objectives:** D2 lymphadenectomy is a standard treatment to locally advanced gastric cancer. However, high quality skills are required. The concepts "Surgicopathological compliance (SPC)-sampling of minimum 15 lymph nodes" and "Surgical compliance (SC)-removal minimum lymph node station 1-9 and 11, except 2 and 4sa in distal gastrectomy" are principal markers for the dissection quality.

**Methods:** Retrospective study of open radical gastrectomy and D2 lymphadenectomy from December, 2016 to April, 2021. Lymph nodes were separated by using the Japanese guidelines. The surgical outcomes of 30 POD, SPC and SC were reported. Mean Overall Survival (MOS) and Overall Survival (OS) were computed from surgery to death or last follow-up. Disease free survival (DFS) was calculated from surgery to progression, death or last follow-up. The Kaplan-Meier was used for estimated survival.

**Results:** 88 radical gastrectomies were done. 46 (52.3%) were male and mean age was 55.2±13.1y.o. The main Clinical Stage (CS) was III (59.1%). Diffuse histology and signet ring cells were 55.7% and 62.5%, respectively. 17 (19.3%) had neoadjuvant chemotherapy. We performed 63 (71.6%) total gastrectomies and 25 (28.4%) subtotal gastrectomies, 8 (9.1%) splenectomies and non-distal pancreatectomies. Overall, bleeding was 300ml (262-339), surgical time 404min (387-422), and hospitalization 10.5 days (8.9-12). There were major complications 9 (10.2%) and mortality 3 (3.4%). Pathological results were tumor size 4.1cm (3.6-4.7), harvested nodes 63.4 (58.1-68.6) and positive nodes 6.4 (4.6-8.3). SPC and SC were 100% and 94.2%, respectively. Mean following was 22.6 (5-52) months, MOS 40.7 (36.4-45) months and OS was 77.1%. 2 year SV was 100%-I to IIA-B, 73%-III, 67%-IVA and 43%-IVB. We had 27 (30.7%) recurrences, all of them were distant and the main site was peritoneum (14 cases), the DFS was 67.5% with a mean 36 (31.3-40.7) months.

**Image:**



**Conclusions:** High quality D2-lymphadenectomies were performed for aggressive histologies. We had low morbi-mortality and high survival. However, recurrences in peritoneum were still found.

## ***Surgery and quality assurance***

IGCC22-ABS-1262

### **TRENDS IN TREATMENT AND OUTCOMES AMONG GASTRIC CANCER PATIENTS: A LONG-TERM NATIONWIDE STUDY**

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**Objectives:** Treating gastric cancer has evolved in recent decades, however national reports from Western countries on treatment and outcomes remain rare. We aimed to analyze changes in the overall survival rates for surgical and oncological treatment in gastric cancer patients diagnosed between 2000–2008 and 2009–2016, respectively, in Finland.

**Methods:** Among gastric cancer patients diagnosed from 2000 through 2016, data on surgeries, oncological treatments, and time of death were collected from Finnish national registries, with follow-up through the end of 2019. We compared patients diagnosed during 2000–2008 and 2009–2016.

**Results:** We identified 10 506 patients, with a median age of 71 years. A total of 5859 patients (57%) were diagnosed in 2000–2008 compared with 4647 (43%) in 2009–2016. The proportion involving localized diseases decreased from 25% ( $n = 1060$ ) to 17% ( $n = 406$ ) and the proportion of metastasized disease increased from 57% ( $n = 2430$ ) to 64% ( $n = 1503$ ) ( $p < 0.001$ ). The surgery rate was 40% ( $n = 2318$ ) in 2000–2008 and 30% ( $n = 1414$ ) in 2009–2016 ( $p < 0.001$ ). In total, 430 patients (7%) received oncological treatment in 2000–2008 compared to 1280 patients (28%) in 2009–2016. Among all patients, median survival was 10.5 months (95% confidence interval [CI] 9.9–11.1) in 2000–2008 and 11.0 months (95% CI 10.3–11.7) in 2009–2016 ( $p = 0.970$ ). Among patients who underwent gastric surgery, survival improved from 30 months (95% CI 27–33) in 2000–2008 to 38 months (33–42) in 2009–2016 ( $p = 0.002$ ). Patients who underwent gastric surgery and perioperative oncological treatment ( $n = 172$  in 2009–2016) had a median survival of 55 months (95% CI 36–74).

**Conclusions:** The introduction of perioperative treatment has improved outcomes among gastric cancer patients eligible for radical-intent treatment. As preoperative diagnostics have improved, a larger proportion of patients presented with metastasized disease at diagnosis, while a lower proportion of patients underwent diagnostic or gastric surgery.

## ***Surgery and quality assurance***

IGCC22-ABS-1288

### **IMPROVEMENT IN GASTRIC CANCER OUTCOMES IN A UNIVERSAL HEALTH CARE SYSTEM**

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**Objectives:** Quality indices in Gastric Cancer have been followed in Ontario, Canada (population 14 million) for the past 9 years, with feedback to local hospitals and cancer centres for quality improvement (QI) purposes by the Surgical Oncology Program at Ontario Health-Cancer Care Ontario(OH-CCO). Multiple local and regional educational symposia have been undertaken to improve outcomes. This analysis is conducted bi-annually by OH-CCO to assess the impact of the QI programs.

**Methods:** All cases of gastric adenocarcinoma, in which a resection was performed, and a corresponding pathology report existed, were assessed (n=1738). Fiscal Years (FY) 2013-2020 were examined for lymph node (LN) harvest (at least 16 examined), margin status, re-operation, re-admission, and peri-operative mortality.

**Results:** Improvements were achieved for LN harvest (60% FY13 to 79% FY 20); but with variation between regions from 17% to 100%. Margin positive rate increased to 10% in FY20, after decreasing to 4% in 2019, with variation from 0% to 25% between regions. Repeat operation rate was stable at 6%, but with variation from 0% to 13%. Re-admission rates increased slightly to 25%, with variation from 0% to 60%. 30-day and 90-day mortality were stable at 3%, and 6%, respectively.

**Conclusions:** Improvements were achieved in LN harvest, but other parameters were unchanged. Between regions there still exists significant variation, which warrants further examination of processes of care and patient selection to determine if further improvements in peri-operative outcomes may be achieved.

## ***Surgery and quality assurance***

IGCC22-ABS-1308

### **THE PROGNOSTIC VALUE OF OMENTECTOMY IN GASTRIC CANCER SURGERY**

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**Objectives:** Traditionally omentectomy has been thought to prevent disease recurrence. However, its true prognostic value is unclear and it has been suggested that preserving the omentum may even reduce postoperative complications. Our aim was to evaluate the outcome of patients who had undergone gastrectomy with or without omentectomy. **Methods:** In this retrospective study we included 114 consecutive patients from 2014 to 2017 who underwent gastric surgery with curative intent for a suspicion of gastric carcinoma. The primary endpoint was disease specific survival. The clinical data was reviewed from the electronic health records and the survival data was obtained from the population register. The associations of the categorical variables were assessed with the chi-square test and the survival analyses were performed with Kaplan-Meier and Cox regression survival analyses.

**Results:** Of the 114 patients, 58 underwent subtotal and 56 total gastrectomy. Omentum was preserved in 30 and omentectomy was performed on 84 patients. Laparoscopic procedure was performed on 26 and D2 lymphadenectomy on 79 patients. The performance of laparoscopic gastrectomy was significantly associated with the T-stage, 16 of the 26 laparoscopic procedures were on T0-T1 patients ( $p=0.007$ ), and with lymphadenectomy, 16 of the 26 laparoscopic procedures were D1 ( $p<0.001$ ).

In a univariate survival analysis with Kaplan-Meier life-tables, the patients who had undergone gastrectomy with omentectomy had worse survival, but this lacked significance ( $p=0.157$ ). In a multivariate setting, adjusting for T- and N-stages, as well as for D1/D2 lymphadenectomy, omentectomy was not a prognostic factor.

	<b>p-value</b>	<b>HR</b>	<b>95% CI</b>
<b>pT0-2/pT3-4</b>	<0.001	9.054	2.583-31.736
<b>pN0/pN1-3</b>	0.010	3.148	1.323-7.492
<b>Omentectomy</b>	0.678	0.818	0.316-2.114
<b>D1/D2 lymphadenectomy</b>	0.794	0.908	0.442-1.867

**Conclusions:** In our patient material, the omentectomy lacked prognostic significance. Further studies are warranted to evaluate the possible benefits of preserving the omentum.

*Surgery and quality assurance*

IGCC22-ABS-1376

**OPERATION TIME AS A SIMPLE INDICATOR TO PREDICT THE OVERCOMING OF LEARNING CURVE IN GASTRECTOMY**

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**Objectives:** The aim of this study is to identify an indicator to predict the overcoming of the learning curve of distal gastrectomy in gastric cancer surgery.

**Methods:** A retrospective multicenter cohort study was conducted in 2100 patients who underwent radical distal gastrectomy performed by nine surgeons in eight hospitals between 2001 and 2006. For each surgeon, an individual CUSUM chart was formulated in terms of operation time or clinical outcomes, including severe complications, number of retrieved lymph nodes, positive resection margin, and hospital stay. The actual changing points (CPs) of the CUSUM charts were analyzed. Based on the CP, patients were divided into pre-CP and post-CP groups, and the clinicopathologic outcomes and survival data were compared between the groups

**Results:** CP determined by operation time was more reliable than CP determined by a combination of clinical outcomes, as the former was correlated not only with short-term outcomes but also with survival. The outcomes were superior in the postCP group in terms of numbers of harvested lymph nodes, sufficient lymph node harvesting (>15), and negative proximal margins. In a survival analysis, the post-CP group showed better survival than the pre-CP group in stage II (76% vs 86.1% p=0.010) and stage III (51.5% vs 60.6% p=0.042).

**Conclusions:** Overcoming the learning curve of distal gastrectomy for gastric cancer can be better predicted by operation time rather than by a combination of postoperative clinical parameters. It is recommended that surgeons initially operate on early stage cancer patients before overcoming the learning curve.

## ***Surgery and quality assurance***

IGCC22-ABS-1398

### **WHICH RECONSTRUCTION IS BEST IN TERMS OF BILE REFLUX AND QUALITY OF LIFE AFTER DISTAL GASTRECTOMY?**

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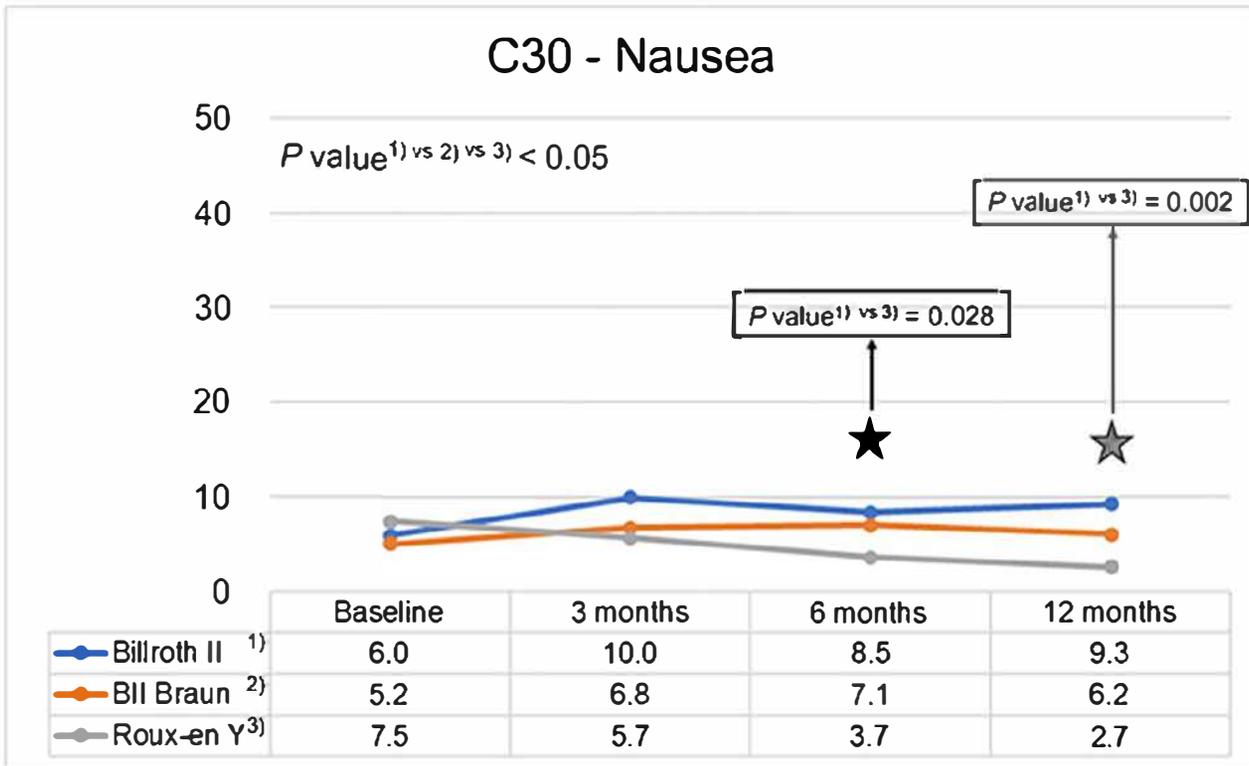
**Objectives:** The Billroth II (BII) reconstruction is technically easier but has more postoperative bile reflux and gastritis than Roux-en Y (RY) reconstruction. It is still unclear whether Braun jejunojejunostomy can prevent bile reflux as RY does. This study compared the postoperative endoscopic findings and Quality of life (QoL) in BII, BII with Braun, and RY reconstruction after distal gastrectomy.

**Methods:** We reviewed the prospectively collected database of 380 patients with laparoscopic distal gastrectomy from 20 institutions in Korea. The patients were classified into three groups according to the reconstruction methods: BII, BII Braun and RY. Endoscopic findings, nutritional status, and QoL during postoperative 1 year were compared among three groups.

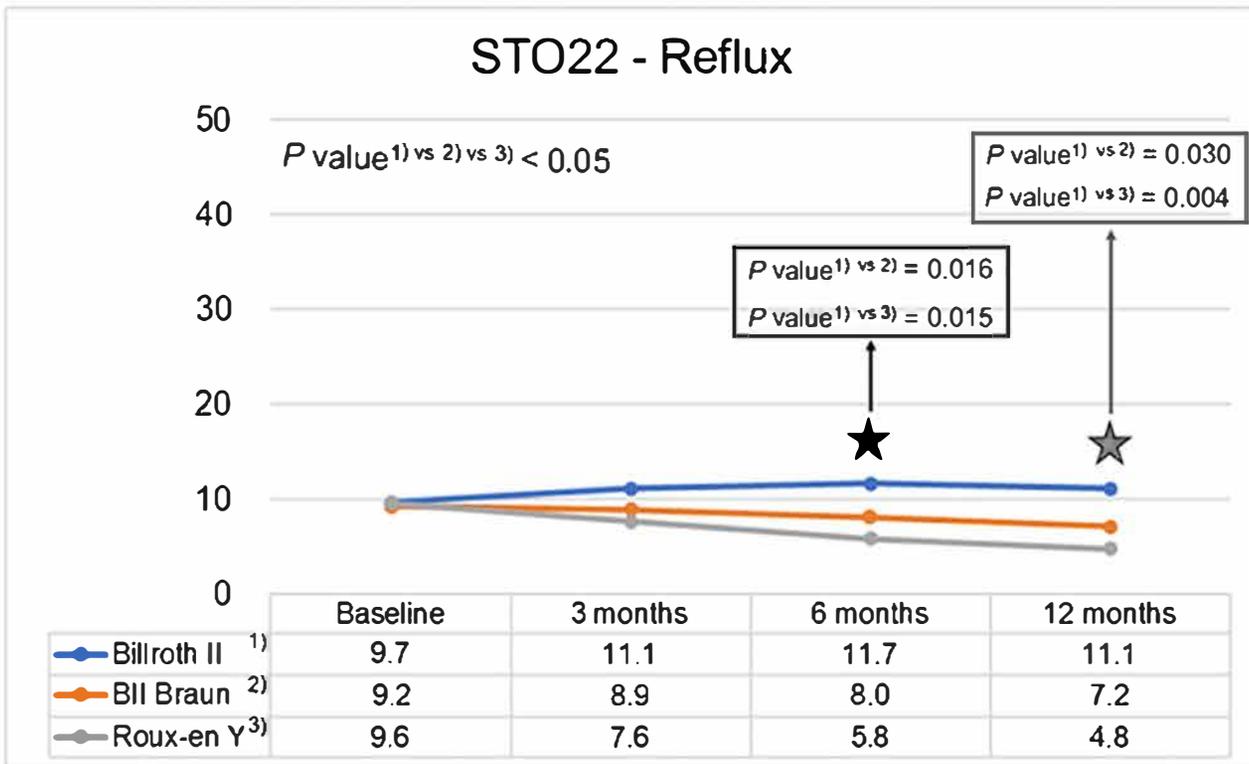
**Results:** The presence of bile reflux was significantly lower in the RY group than in the BII with Braun or the BII group (3.0% vs. 67.8%; 3.0% vs. 84.4%, all  $P<0.001$ ). And the BII with Braun group had significantly less bile reflux than the BII group (67.8% vs. 84.4%,  $P=0.001$ ). The frequency of gastritis after RY anastomosis was significantly lower from that after BII with Braun or the BII group (9.0% vs. 68.3%; 9.0% vs. 85.0%, all  $P<0.001$ ). And the BII with Braun group had significantly less gastritis than the BII group (68.3% vs. 85.0%,  $P<0.001$ ). Multivariate logistic regression revealed that BII reconstruction and bile reflux were the independent risk factors for gastritis. The QoL items with C30-nausea and STO22-reflux were worst in BII group and followed by BII Braun and RY group (all  $P<0.05$ ). Linear regression revealed that RY reconstruction was the only independent factors for better postoperative QoL, after excluding all possible confounding factors (all  $P<0.05$ )

**Image:**

a



b



**Conclusions:** Adding the Braun jejunojunostomy could reduce the bile reflux of BII reconstruction. However, its effect was not as high as in the RY reconstruction. Postoperative QoL items with C30 nausea and STO22 reflux were best in RY, followed by BII with Braun and BII reconstructions.

***Surgery and quality assurance***

IGCC22-ABS-1351

**SURGICAL PROXIMAL SURGICAL MARGIN DISTANCE AND RECURRENCE IN ADVANCED GASTRIC CANCER**

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**Objectives:** In advanced gastric cancer surgery, it is recommended to ensure the proximal marginal distance (PM) at least 3 cm for localized gastric cancer and 5 cm for invasive gastric cancer. However, there are some cases which is difficult to comply with the above criteria such as subtotal gastrectomy. On the other hand, the above PM is designed to ensure negative resection margins, and it is not clear whether there is a risk of recurrence in cases whose PM is shorter than the criterion. Therefore, the purpose of this study was to investigate the PM necessity for prevention of recurrence in advanced gastric cancer surgery.

**Methods:** A total of 144 patients with advanced gastric cancer who underwent distal gastrectomy in Osaka University hospital between April 2013 and December 2018 were included. pStage IV and R1/R2 resections were excluded. The relationship between pathological PM (pPM) and postoperative recurrence was analyzed.

**Results:** pPM was -1.5 cm/ 1.5-3.0 cm/ 3.0- cm in 11/ 35/ 98 cases, and pathological negative resection margin was confirmed in all cases. As for the patient background, there were the tendency that the -1.5 cm group had more disease with UM location, localized gross type, undifferentiated histological type and higher pStage compared to in the 3.0- cm group, and no significant difference between the -1.5 cm and 1.5-3.0 cm group. The prognostic analysis for recurrence-free survival (RFS) showed no significant difference among three groups. Moreover, there were no significant difference of RFS between three groups after the stratification with pStage, gross type and histological type. Postoperative recurrence was observed in 25 patients (3 local, 8 lymph node, 8 peritoneal, 4 liver, and 2 brain), and all of local recurrences were confirmed in the 3.0- cm group.

**Conclusions:** It was suggested that it may be sufficient for prevention of postoperative recurrence if the proximal resection margins are negative in distal gastrectomy for advanced gastric cancer.

## ***Surgery and quality assurance***

IGCC22-ABS-1393

### **ASSESSMENT OF LATE COMPLICATIONS OF CURATIVE GASTRECTOMY**

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**Objectives:** Gastrectomy is the main curative modality for gastric cancer. However, gastric resection can lead to nutritional changes and other long-term abdominal complications. Thus, this study aims to analyze late complications in follow-ups from 2 to 5 years.

**Methods:** Retrospective analysis of all patients who underwent curative-intent gastrectomies for gastric cancer from 2009-18 was performed. Patients with less than 2 years of follow-up or with tumor recurrence before 2 years were excluded. **Results:** 409 patients were included, 57,7% male with a mean age of 62.3 years. Partial gastrectomy and total gastrectomy were performed in 64,5% and 35.5% of the patients respectively. ASA I/II scores were achieved in 81.4% of the cases submitted to surgery. 91% of the patients had BMI > 18.5 kg/m<sup>2</sup> before the procedure. After the procedure, 85.6% of them maintained this BMI level but 70.9 of them had an inferior BMI compared to the preoperative level. The mean hemoglobin was 12.3 g/dl ± 2.1 g/dl before the and 12.6 ± 1.7 during the follow-up. Supplemental iron therapy was prescribed for 32.3% after the procedure. About late abdominal complications, 7.3% of the patients had obstructive acute abdomen requiring surgery, 3.9% had inflammatory acute abdomen, 2.2% had perforated acute abdomen. Among these cases, 9.3% underwent new surgical procedures. Another 2.4% of patients had partial bowel obstruction without surgical treatment.

The incisional hernia was observed in 14.9% of the patients and 3.9% of them had DVT throughout the follow-up. Cholelithiasis and choledocholithiasis were observed in 7.7% and 0.5% of the patients respectively. Delayed emptying was present in 3.9% of the cases and anastomotic stenosis in 2.9%. Only 0.5% of patients had metachronous gastric tumor; 6.1% were diagnosed with other metachronous tumors.

**Conclusions:** During follow-up after the gastrectomy, 9.3% of the patients had an indication for new abdominal surgical procedures, highlighting the incisional hernia occurrences. Iron replacement and weight loss were frequent during follow-up.

***Surgery and quality assurance***

IGCC22-ABS-1080

**A DOUBLE STAPLING TECHNIQUE OF BILLROTH-I ANASTOMOSIS IN TOTALLY LAPAROSCOPIC DISTAL GASTRECTOMY**

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**Objectives:** To explore the technical feasibility, safety, and clinical efficacy of Billroth I anastomosis (B-I) using modified double stapling technique (DST) in totally laparoscopic distal gastrectomy (TLDG).

**Methods:** Clinical data of 105 patients who received TLDG with this modified DST anastomosis from 2017 to 2021 were retrospectively analyzed. As a novel intraabdominal B-I, the gastric remnant and that of the duodenum were put together using circular stapler, and the common stab incision was closed with linear stapler. By this technique, the anastomotic stoma is located on the side of the greater curvature, which promotes the healing of anastomosis by balancing the tension of gastric remnant wall. Besides, the overlap between the cutting edge and the anastomosis is less than Delta-shaped anastomosis, which can ensure relatively reliable blood supply. Data of clinicopathologic characteristics, surgical and postoperative outcomes were collected and expressed as means  $\pm$  standard deviations.

**Results:** The mean reconstruction of the operation was  $22.5 \pm 8.2$  min. The length of upper segment of resection from gastric cancer was  $5.6 \pm 2.8$  cm. Mean blood loss was  $50.5 \pm 20.4$  mL. The average time to ground activities, time to flatus, time to fluid diet and length of hospital stay were  $1.5 \pm 0.8$  days,  $3.2 \pm 1.2$  days,  $3.8 \pm 1.6$  days, and  $7.2 \pm 2.5$  days, respectively. There was no anastomosis-related complication in all the patients.

**Conclusions:** This modified DST method of intraabdominal B-I is a safe and feasible procedure for TLDG and provides satisfactory short-term efficacy.

***Surgery and quality assurance***

IGCC22-ABS-1090

**ADOPTION OF MIS PROGRAM FOR GASTRIC CANCER MANAGEMENT AT A PUBLIC HOSPITAL IN PANAMA**

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**Objectives:** Recently minimal invasive surgery has become a mainstream modality for the multidisciplinary management of gastric cancer

Our aim is to study the feasibility of performing minimal invasive surgery for selected cases both for resection and as part of the staging process for advanced gastric cancer AGC and early gastric cancer EGC.

**Methods:** We retrospectively revised all gastric cancer cases performed at our institution through minimal invasive surgery since 2017, both for resection and staging. We recorded main demographic data of all cases, clinical stage at the time of the surgery and also perioperative features such as surgical time, estimated blood loss and length of stay. 30-day outcomes on morbidity and mortality were also recorded.

**Results:** Overall gastric cancer cases submitted to minimal invasive approach were 6. Two subtotal laparoscopy assisted gastrectomies and four diagnostic laparoscopies. Figures 1 and 2.

Main demographic, perioperative features and outcomes results are shown on table 1.

**Image:**

## Types of Procedure

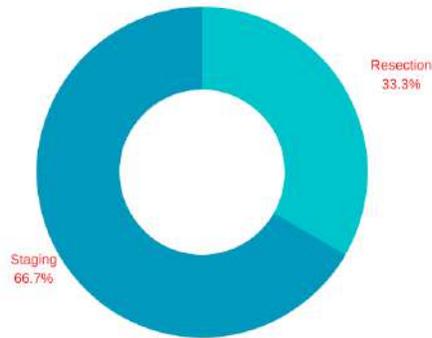


Figure 1. Types of procedure: 2 resections, 4 staging procedures.

## Surgical Procedure

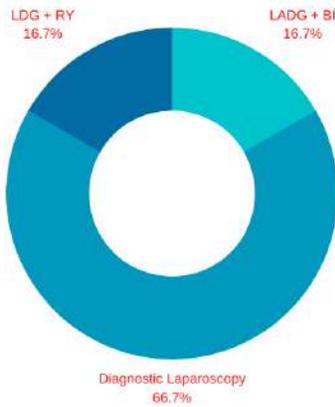


Figure 2. Surgical Procedures: 1 Laparoscopy assisted distal gastrectomy + Billroth I, 1 Laparoscopy distal gastrectomy + Roux en Y, 4 Diagnostic laparoscopy

Table 1. Clinicopathological characteristics, perioperative features and outcomes.

CLINICOPATHOLOGICAL CHARACTERISTICS						
Results:	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Age	68	46	55	46	75	75
Sex	Male	Female	Male	Male	Male	Male
Complaint	Disfagia	Anemia	Abd Pain	Med Ex	Anemia	Anemia
BMI	22,5	34,5	28,2	24,2	21,5	21,5
Past medical	None	DM	COPD, TB	HT, DM	HT	HT
# meds	0	2	3	3	1	1
Resp Fx	Normal	Normal	Restrictive	Normal	Normal	Normal
Hb (g/dL)	13,5	12,4	14,2	11,2	14,3	14,3
Alb	3,2	3,6	3,0	3,6	3,2	3,2
PreOP days	8	3	21	13	14	14
TNM Stage	Ib	II	II	III	Ia	Ia

Abbreviations: BMI: Body Mass Index, # meds: number of medications used, Resp Fx: Respiratory function, Hb: hemoglobin, Alb: albumin, DM: Diabetes Mellitus, HT: Hypertension, COPD: Chronic Obstructive Pulmonary Disease, TB: Tuberculosis.

PERIOPERATIVE OUTCOMES						
Results:	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Surgery	LADG + BI	Dx LAP	Dx LAP	Dx LAP	Dx LAP	LDG + RY
LN Dissect	D2	N/A	N/A	N/A	N/A	D2
Op Time (mj)	275 min	67 min	47 min	55 min	77 min	222 min
EBL (ml)	185 ml	10 ml	5 ml	10 ml	28 ml	210 ml
Laparotomy	+ (anast)	-	-	-	-	-
PosOP Comp	Fullness, UTI	None	None	Seroma	None	Blood Tx
PosOP Days	8	2	2	5	7	11
Morbidity <=30d	No	No	No	No	No	No
Mortality <=30d	No	No	No	No	No	No

Abbreviations: LADG + BI: Laparoscopy assisted distal gastrectomy + Billroth I, Dx LAP: Diagnostic Laparoscopy, LDG + RY: Laparoscopic distal gastrectomy + Roux en Y, LN Dissect: Lymph node dissection, OP Time: operative time, EBL: Estimated blood loss, Anast: anastomosis, PosOP Comp: Postoperative Complication, UTI: urinary tract infection, Tx: Transfusion, PosOP Days: Postoperative days in hospital.

**Conclusions:** We conclude that minimal invasive surgery is feasible and safe even in a community hospital such as our institution. It's our understanding that there might be several hospital policy rules that may improve the implementation of MIS program for malignancies at our hospital such as:

Dedicated committee for acquisition of medical devices for this type of surgeries.

Continuing medical education and training for all multidisciplinary team involved.

Formal program establishment with budget and ward exclusive for GI malignancies.

***Surgery and quality assurance***

IGCC22-ABS-1108

**3D RECONSTRUCTION AND MODELING AFTER RADICAL SURGERY FOR ACUTE BLEEDING GASTRIC CANCER**

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**Objectives:** Conducted CT - modeling with 3D reconstruction in three patients who brought total GT with jejunogastroplasty (artificial stomach )(JGP) with the inclusion of the duodenum.

**Methods:** The visualization of the location of the artificial intestinal reservoir is determined, followed by printing the model on a 3D printer.

**Results:** Visualization of JGP gives a spatial perception of the reservoir, allows you to determine its volume and location in relation to the surrounding organs. The volume of the small intestinal reservoir in three patients after gastrectomy and JGP was 420 ml, 483 ml and 367 ml. The use of preoperative 3D reconstruction makes it possible to simulate the JGP with the specified volume of the small intestinal reservoir, which provides prediction of the optimal course and rehabilitation in the nearest and long term postoperative period.

**Conclusions:** 3D reconstruction and modeling when performing radical surgeries for bleeding gastric GC makes it possible to assess the volume and syntopy of the artificial small bowel reservoir, is essential in the diagnosis of postoperative conditions and pathological syndromes.

***Surgery and quality assurance***

IGCC22-ABS-1142

**IDEA FOR RELIEF OF REFLUX ESOPHAGITIS AND DUMPING IN GASTRODUODENAL DELTA ANASTOMOSIS**

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<sup>1</sup>

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**Objectives:** Gastroduodenal delta anastomotic diameter is large and the anastomotic passage is good. But reflux esophagitis and dumping are occurred occasionally. On the other hand, gastroduodenal anastomotic stenosis by circuler stapler or hand sewing are occurred occasionally. The anastomotic stenosis will be caused by food retention in large remnant stomach and anastomotic edema. The prevention of these anastomotic passage disturbance is small remnant stomach and the cut line of the stomach for acute angle with gastric longitudinal axis. We take it other way round, with ①large remnant stomach and ②the cut line of the stomach for right angle with gastric longitudinal axis, we attempted to prevent of reflux esophagitis and dumping.

**Methods:** These two(①②) procedures were done by 36 cases of gastroduodenal delta anastomosis. 20 cases without ①② procedures were compared.

**Results:** Retention in remnant stomach was increased. Reflux esophagitis was decreased in 19.4% with ①② procedures from 36.8% without ①② procedures. Advanced reflux esophagitis was 0% from 15.8%. But dumping did not decrease.

**Conclusions:** In gastroduodenal delta anastomosis, large remnant stomach and the cut line of the stomach for right angle with gastric longitudinal axis will be effective for prevent of reflux esophagitis.

***Surgery and quality assurance***

IGCC22-ABS-1284

**THE ROLE OF THROMBOCYTE / LYMPHOCYTE RATIO IN SURVIVAL IN GASTRIC-ESOPHAGOGASTRIC JUNCTION CANCERS**

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**Objectives:** Gastric cancer is important health problem of its incidence and prognosis. In recent years, studies have been carried out possible relationship between complete blood count parameters and cancers in terms of prognosis. Relationship between prognostic factors and survival operated for gastric and esophagogastric junction cancer, evaluate the relationship platelet-lymphocyte ratio(PLR), diagnosis with survival and complications.

**Methods:** 93 patients, underwent radical gastrectomy+D2 lymphadenectomy for gastric and esophagogastric junction cancers 2010-2020 in the SBU Izmir Bozyaka Training and Research Hospital General Surgery Clinic 1st Section were included.

**Results:** 67 male, 26 female and mean age was  $63.74 \pm 12.7$ . Patients were divided into two groups for postoperative complication, lymph nodes removed the group with complications was less and the rate of lymphovascular invasion was higher. When the relationship between PLR and the survival of patients in our study is examined; It was statistically shown that the life span was significantly shortened with the increase of PLR. Univariate analysis; age, ASA score, TNM stage, lymphovascular invasion, perineural invasion, pathological lymph nodes removed and PLR effect on survival. Multivariate Cox regression analysis, it was found pathological lymph nodes, lymph nodes removed and age were independent prognostic factors.

**Conclusions:** There is statistically significant relationship between PLR at the time of diagnosis and survival in gastric and esophagogastric junction cancer. As this rate increases, survival rates decrease and prognosis becomes worse. PLR in gastric cancer can be simple, inexpensive and useful predictive biomarker to estimate clinical significance gastric and esophagogastric junction cancer.

## ***Surgery and quality assurance***

IGCC22-ABS-1397

### **EXPLORING THE IDEAL OPERATIVE TIME FOR GASTRIC CANCER: A MULTI-INSTITUTIONAL STUDY**

Shin-Hoo Park<sup>1</sup>, Ye-Rim Shin<sup>1</sup>, Hoon Hur<sup>2</sup>, Chang Min Lee<sup>3</sup>, Hua Huang<sup>4</sup>, Sungsoo Park<sup>1</sup>

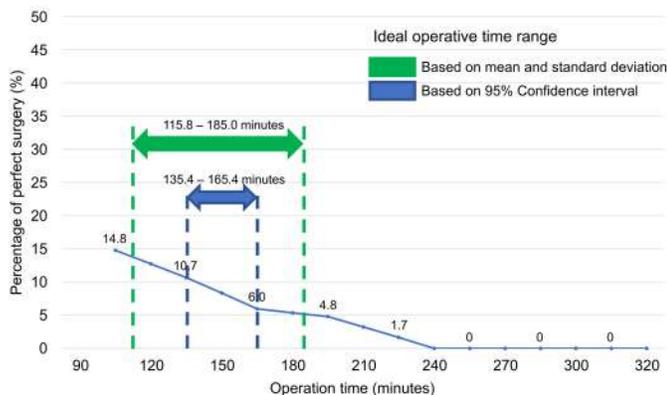
<sup>1</sup>Surgery, Korea University Anam Hospital, Seoul, <sup>2</sup>Surgery, Ajou University Hospital, Suwon, <sup>3</sup>Surgery, Korea University Ansan Hospital, Ansan, Korea, Republic Of, <sup>4</sup>Gastric Surgery, Fudan University Shanghai Cancer Center, Shanghai, China

**Objectives:** While a rushed operation can omit essential procedures, prolonged operative time results in higher morbidity. Nevertheless, the optimal operative time range remains uncertain. This study aimed to estimate the ideal operative time range and evaluate its applicability in laparoscopic cancer surgery.

**Methods:** A prospectively collected multicenter database of 397 patients who underwent laparoscopic distal gastrectomy were retrospectively reviewed. The ideal operative time range was statistically calculated by separately analyzing the operative time of uneventful surgeries. Finally, intra- and postoperative outcomes were compared among the shorter, ideal, and longer operative time groups.

**Results:** The ideal operative time was 135.4–165.4 min. The longer operative time (LOT) group had a lower rate of uneventful surgery than the ideal or shorter operative time (SOT) group (2.8% vs. 8.8% and 2.2% vs. 13.4%, all  $P<0.05$ ). Longer operative time increased bleeding, postoperative morbidities, and delayed diet and discharge (all  $P<0.05$ ). Particularly, an uneventful surgery could not be achieved when the operative time exceeded 240 min. The increased body mass index, bleeding, reconstructive time, Roux-en-Y reconstruction, and annual experiences of <100 cases were independent risk factors for longer operative time, which ultimately increased surgical complications. The ability to retrieve a higher number of lymph nodes and perform  $\geq 150$  gastrectomies annually enabled the surgeon to achieve the highest percentage of uneventful surgery (13.4%), even within a SOT (all  $P<0.05$ ).

#### **Image:**



**Conclusions:** Operative time longer than the ideal time range ( $\geq$ especially 240 min) should be avoided. Efforts to minimize operative time should be attempted with sufficient surgical experience.

***Surgery and quality assurance***

IGCC22-ABS-1384

**FEASIBILITY AND SAFETY OF SELF-BIODEGRADABLE PYLORIC STENTS IN PYLORUS-PRESERVING GASTRECTOMY**

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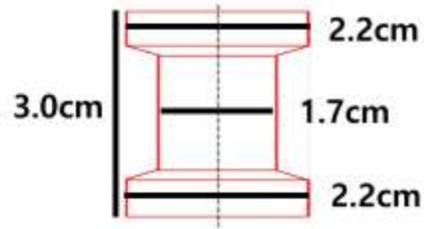
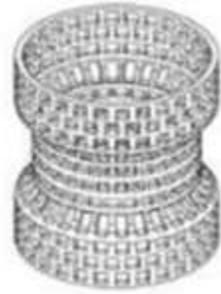
<sup>1</sup>Department of Surgery, Seoul National University Hospital, Seoul, <sup>2</sup>Medical Devices Research, Samyang Biopharmaceuticals Corp., Seongnam-si, <sup>3</sup>Department of Pathology, Seoul National University Hospital, <sup>4</sup>Cancer Research Institute, Seoul National University, Seoul, Korea, Republic Of

**Objectives:** This study aimed to evaluate the feasibility and safety of inserting self-biodegradable stents in the pylorus during the pylorus-preserving gastrectomy to prevent delayed gastric emptying.

**Methods:** Self-biodegradable dumbbell shaped pyloric stents were made from two types of synthetic absorbable sutures materials: Braided construction made of poly-glycolide-co-caprolactone (PGCL, Ethicon, Inc. Vicryl®) or monofilament made of poly-p-dioxanone (PPDO, Ethicon, Inc. PDS II®). Ten pigs weighing 50-60kg were included: 2 sham, 4 PGCL stent and 4 PPDO stent without or with tagging sutures. After gastrostomy, the stent was inserted. Body weight, body temperature, biochemical and abdomen x-ray were measured for 13 days. On postoperative day (POD) 13, euthanasia was performed to obtain pylorus for histologic evaluation.

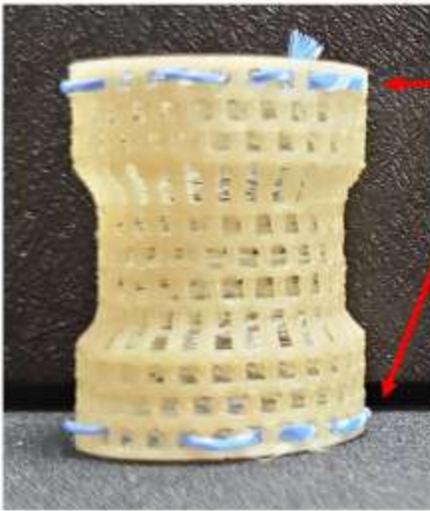
**Results:** Operation was successfully performed in all 10 pigs, including sham. Without tagging suture, both stents migrated within POD 3. However, migration was delayed up to POD 13, when the tagging sutures were applied between stent and stomach wall. Self-degradation of PGCL stent started from POD 3 and either crumbled or was completely excreted from the abdomen within POD 8. In the case of PPDO stent, even though the stent was weakened as self-degradation was progressed, its shape was maintained until POD 13. In the pig with PPDO stent and 2 tagging sutures, an unexpected sudden death due to acute volvulus was observed on POD 10. However, complications such as systemic inflammatory reaction or intestinal perforation, which are considered to be directly related to the biodegradation process of the stent, were not observed during the followed-up period. In terms of body weight, body temperature, serum white blood cell and neutrophil, and histology, there was no significant difference between three groups (sham vs. PGCL vs. PPDO, all  $p > 0.05$ ).

**Image:**



**Poly(glycolide-co-caprolactone) (PGCL)**  
: Braided construction, Vicryl®

**Poly-p-dioxanone (PPDO)**  
: Monofilament, PDS®



X-ray  
detectable tag



**Conclusions:** The concept of inserting both self-biodegradable stents into the pylorus during the surgery seemed feasible and safe in porcine models.

***Surgery and quality assurance***

IGCC22-ABS-1418

**THE ANATOMIC STRUCTURE OF SPLENIC ARTERY INFLUENCES SUPRAPANCREATIC LYMPH NODE DISSECTION IN LAPPG**

Chunchao Zhu<sup>1</sup>, Seong-Ho Kong<sup>1</sup>, Tae-Han Kim<sup>1</sup>, Rene Ronson G. Ang<sup>1</sup>, Michele Diana<sup>2</sup>, Yun-Suhk Suh<sup>1</sup>, Hyuk-Joon Lee<sup>1</sup>, Hui Cao<sup>3</sup>, Han-Kwang Yang<sup>1</sup>

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**Objectives:** The aim of this study is to categorize splenic artery and vein configurations, and examine their influence on suprapancreatic lymph node (LN) dissection in laparoscopic gastrectomy.

**Methods:** Digital Imaging and Communications in Medicine images from 169 advanced cancer patients who underwent laparoscopic gastrectomy with D2 dissection were used to reconstruct perigastric vessels in 3D using a volume rendering program (VP Planning®). Splenic artery and vein configuration were classified depending on the relative position of their lowest part in regard to the pancreas. Number of resected LNs and surgical outcomes were analyzed.

**Results:** The splenic artery was categorized as superficial (36.7%), middle (49.1%), and concealed (14.2%), and the splenic vein was categorized as superior (6.5%), middle (42.0%), and inferior to the pancreas (51.5%). The number of resected LNs around the proximal half of the splenic artery (#11p) and the proportion of the splenic vein located inferiorly to the pancreas were significantly higher in splenic arteries of concealed types. LN metastasis of station #7 was an independent risk factor of LN metastasis in station #11p ( $p = 0.010$ ). Concealed types showed a tendency towards longer operating times, more blood loss, longer hospital stays, and a higher postoperative morbidity.

**Conclusions:** Concealed types of splenic artery are associated with an increased difficulty in the dissection of LN station #11p around the splenic artery. A 3D volume rendering program is a useful tool to rapidly and intuitively identify individual anatomical variations, to plan a tailored surgical strategy, and to predict potential challenges.

## ***Surgery and quality assurance***

IGCC22-ABS-1445

### **INVOLVED MARGINS AFTER CURATIVE GASTRIC CANCER RESECTION – OUTCOME IN A NATIONWIDE COHORT IN SWEDEN**

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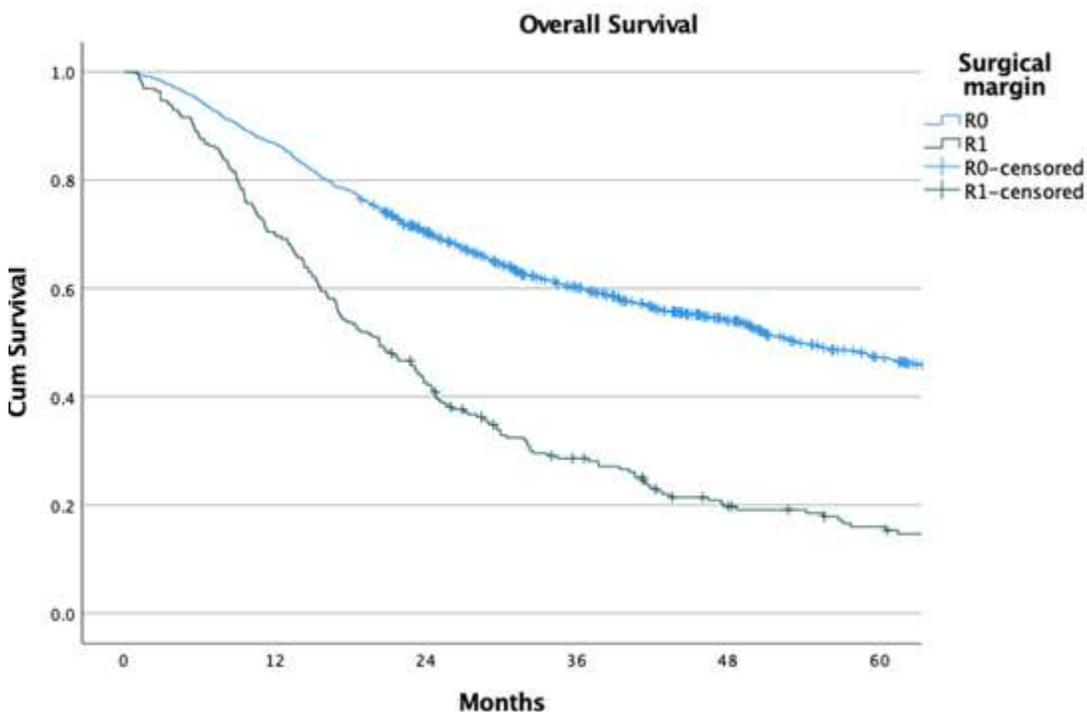
**Objectives:** The aim was to determine incidence and risk factors of R1 and assess impact of R1 on 5-year survival after gastric cancer surgery.

**Methods:** Data from the Swedish National Registry for Esophageal and Gastric cancer on all patients who had undergone resection for gastric cancer between 2006-2017 was assessed and risk factors associated with R1 were analyzed with logistic regression analysis.

The impact of R1 on overall survival was analyzed using a Cox proportional hazard model.

**Results:** In total, 1465 patients were identified of which 227 (15.5 %) had an R1 resection. A positive proximal margin was seen in 90 patients (6.1%), a positive distal margin in 84 (5.7%) and 149 (10.2%) were with a positive circumferential resection margin. Any R1 was associated with advanced tumor stage and high number of positive lymph nodes. R1 patients had a median survival of 20.3 months compared to 53.5 months for R0 patients and overall 5 – year survival was 15.3 % (compared to R0; 47.1%). R1 was independently associated with decreased overall survival, HR 1.86 (95%CI 1.48-2.35).

**Image:**



**Conclusions:** Data from a high volume gastric cancer center showed the high textbook outcome rates. According to our proposed mTO, the minimum number of lymph nodes retrieved should be at least 30, even in advanced gastric cancer, and routine intraoperative frozen study examination is necessary to increase R0 resection.

## ***Surgery and quality assurance***

IGCC22-ABS-1460

### **TEXTBOOK OUTCOME AND SURVIVAL FOLLOWING TOTAL VS PROXIMAL GASTRECTOMY AFTER NEOADJUVANT CHEMOTHERAPY**

Katarzyna Sędlak<sup>1</sup>, Karol Rawicz-Pruszyński<sup>1</sup>, Radosław Mlak<sup>2</sup>, Katarzyna Gęca<sup>1</sup>, Magdalena Skórzewska<sup>1</sup>, Zuzanna Pelc<sup>1</sup>, Wojciech Polkowski<sup>1</sup>

<sup>1</sup>Department of Surgical Oncology, <sup>2</sup>Department of Human Physiology, Medical University of Lublin, Lublin, Poland

**Objectives:** The incidence of proximal localization of advanced gastric cancer (aGC) has been increasing, especially in the West. Proximal gastrectomy (PG) is advocated as an alternative procedure to total gastrectomy (TG) for the upper third localization of the early disease. Optimal reconstruction after the PG is a matter of debate. Textbook outcome (TO) is a composite score consisting of surgical metrics that may optimize treatment outcomes.

This study aimed to compare TO and survival of patients with aGC undergoing TG or PG using one of the two anastomotic techniques: double tract reconstruction (DTR) or posterior esophagogastrostomy with partial neofundoplication (EGF).

**Methods:** We collected data from a prospectively maintained database of all patients treated by a single institution multidisciplinary team between May 2010 and December 2020. Some 144 patients were included who underwent TG and PG with DTR or EGF. The propensity score matching (TG vs. PG) considered sex, age, Lauren histological type, TNM stage, and anatomical location (Table 1).

**Results:** The TO was achieved in 15 (53.6%) patients after TG and in 12 (42.9%) patients after PG ( $p=0.5932$ ). In the univariate analysis, patients treated with neoadjuvant chemotherapy had a nearly five-fold increased chance of achieving the TO ( $OR=4.67$ ;  $p=0.0191$ ). In patients after PG, multivariate analysis confirmed a significantly higher chance (over 24-fold) of TO achievement with the DTR ( $OR=24.55$ ;  $p=0.0023$ ) as compared to EGF.

TG had over the two-fold higher risk of death when compared to PG (mOS: 32 vs. 62 months;  $HR=2.14$ ;  $p=0.0495$ ). In the multivariate survival analysis, PG was associated with decreased risk of death compared to TG ( $HR=0.19$ ;  $p=0.0109$ ).

**Image:**

Table 1. Baseline characteristics and the comparison of the study groups (before and after propensity score-matching).

Variable	Before matching (n=144)		p	After matching (n=56)		p
	PG (n=43)	TG (n=101)		PG (n=28)	TG (n=28)	
<b>Sex</b>						
Male	22 (51.2%)	70 (69.3%)	0.0572	20 (71.4%)	20 (71.4%)	1.0000
Female	21 (48.8%)	31 (30.7%)		8 (28.6%)	8 (28.6%)	
<b>Age (years)</b>						
Median	64	60	0.1347	64	60	0.1172
Min-Max	40-84	30-80		45-83	40-80	
<b>Lauren histological type</b>						
Intestinal	24 (55.8%)	42 (41.6%)	0.2603	17 (60.7%)	12 (42.8%)	0.2016
Mixed	9 (20.9%)	24 (23.8%)		6 (21.4%)	5 (17.9%)	
Diffuse	10 (23.3%)	35 (34.7%)		5 (17.9%)	11 (39.3%)	
<b>pT</b>						
T0	4 (9.3%)	4 (4%)	0.5637	4 (14.3%)	2 (7.1%)	0.8240
T1	4 (9.4%)	5 (6%)		2 (7.1%)	1 (3.6%)	
T2	5 (11.6%)	18 (17.8%)		4 (14.3%)	6 (21.4%)	
T3	20 (46.5%)	46 (45.5%)		11 (39.3%)	11 (39.3%)	
T4a	8 (18.6%)	18 (17.8%)		5 (17.9%)	4 (14.3%)	
T4b	2 (4.7%)	9 (8.9%)		2 (7.1%)	4 (14.3%)	
<b>pN</b>						
N0	21 (48.8%)	44 (43.6%)	0.0063*	12 (42.9%)	15 (53.6%)	0.2131
N1	10 (23.3%)	9 (8.9%)		8 (28.6%)	4 (14.3%)	
N2	8 (18.6%)	14 (13.9%)		7 (25%)	4 (14.3%)	
N3a	4 (9.3%)	14 (13.9%)		1 (3.6%)	2 (7.1%)	
N3b	-	20 (19.8%)		-	3 (10.7%)	
<b>TNM stage</b>						
0	3 (7%)	3 (3%)	0.0275*	3 (10.7%)	2 (7.1%)	0.4964
I	3 (7%)	5 (5%)		1 (3.6%)	1 (3.6%)	
IA	4 (9.3%)	14 (13.9%)		4 (14.3%)	6 (21.4%)	
IB	8 (18.6%)	20 (19.8%)		4 (14.3%)	4 (14.3%)	
IIA	11 (25.6%)	10 (9.9%)		5 (17.9%)	4 (14.3%)	
IIB	10 (23.3%)	15 (14.9%)		10 (66.7%)	5 (17.9%)	
IIIA	3 (7%)	14 (13.9%)		-	3 (10.7%)	
IIIB	1 (2.3%)	20 (19.8%)		1 (3.6%)	3 (10.7%)	
IIIC						
<b>Harvested LNs</b>						
Median	18.5	30	<0.0001*	20	23	0.2382
Min-Max	0-51	6-79		0-51	6-52	
<b>Metastatic LNs</b>						
Median	0	2	0.0275*	1	1	0.7146
Min-Max	0-14	0-54		0-9	0-29	
<b>LNR</b>						
Median	0	0.05	0.1694	0.02	0	0.8509
Min-Max	0-1	0-1		0-1	0-1	
<b>Grading</b>						
G1	1 (2.9%)	2 (2.1%)	0.0706	-	1 (3.8%)	0.4858
G2	20 (57.1%)	34 (35.4%)		13 (59.1%)	12 (46.2%)	
G3	14 (40%)	60 (62.5%)		13 (49.9%)	13 (50%)	
	No data: n=8	No data: n=5		No data: n=6	No data: n=2	
<b>Neoadjuvant chemotherapy</b>						
Yes	31 (72.1%)	72 (71.3%)	1.0000	19 (67.9%)	20 (71.4%)	0.7733
No	12 (27.9%)	29 (28.7%)		9 (32.1%)	8 (28.6%)	
<b>TRG</b>						
1	3 (9.7%)	4 (5.7%)	0.8057	3 (15.8%)	2 (11.1%)	0.9346
2	5 (16.1%)	14 (20%)		3 (15.8%)	4 (22.2%)	
3	13 (41.9%)	33 (47.1%)		8 (42.1%)	8 (44.4%)	
4	10 (32.3%)	19 (27.1%)		5 (26.3%)	4 (22.2%)	
		No data: n=2			No data: n=2	
<b>Anatomical localization</b>						
Esophago-gastric junction	11 (25.6%)	5 (5%)	<0.0001*	5 (17.9%)	5 (17.9%)	1.0000
Upper third	29 (67.4%)	20 (19.8%)		20 (71.4%)	20 (71.4%)	
Middle third	3 (7%)	65 (64.4%)		3 (10.7%)	3 (10.7%)	
Lower third	-	11 (10.9%)		-	-	
<b>CCI</b>						
Median	0	20.9	0.3879	0	0	0.4494
Min-Max	0-100	0-100		0-100	0-100	
<b>Hospitalization time (days)</b>						
Median	10	10	0.5519	9.5	10	0.1550
Min-Max	6-45	3-53		6-31	7-29	
<b>ICU hospitalization</b>						
Yes	4 (9.3%)	17 (16.8%)	0.3079	2 (7.1%)	4 (14.3%)	0.3918
No	39 (90.7%)	84 (83.2%)		25 (92.9%)	24 (85.7%)	
<b>ICU hospitalization time (days)</b>						
Median	5	4	0.4227	3	5.5	0.1400
Min-Max	3-17	1-20		3-3	3-20	
		No data: n=2				

\* statistically significant result, CCI - Comprehensive Complication Index, ICU - intensive care unit, LNs - lymph nodes, LNR - lymph node ratio, PG - proximal gastrectomy, TG - total gastrectomy, TNM - tumor, nodes, metastases, TRG - tumor regression grade.

**Conclusions:** In patients with proximal aGC after neoadjuvant chemotherapy, the TO following TG and PG are similar, but survival benefit after PG may be expected. Randomized comparison of the two procedures (TG vs. PG with DTR) should be undertaken to eliminate a selection bias.

***Surgery and quality assurance***

IGCC22-ABS-1470

**NOVEL MANAGEMENT INDICATIONS FOR POSTOPERATIVE CHYLOUS ASCITES AFTER GASTRIC CANCER SURGERY**

Pengfei Kong<sup>\* 1</sup>, Yonghu Xu<sup>2</sup>, Bo Sun<sup>1</sup>, Dazhi Xu<sup>1</sup>

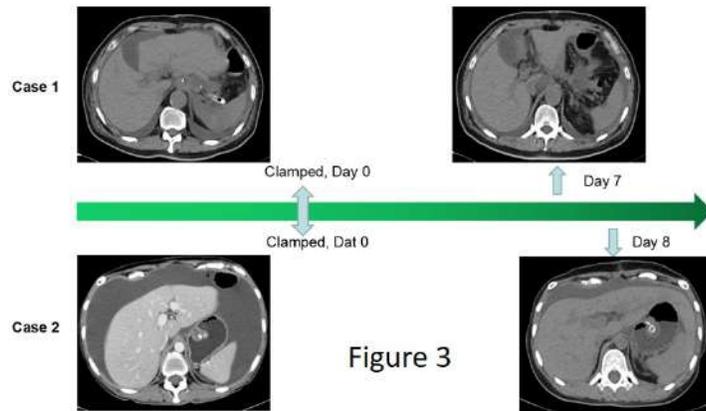
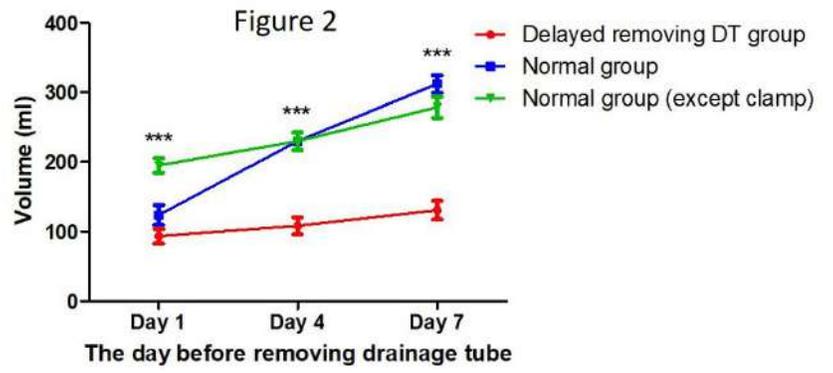
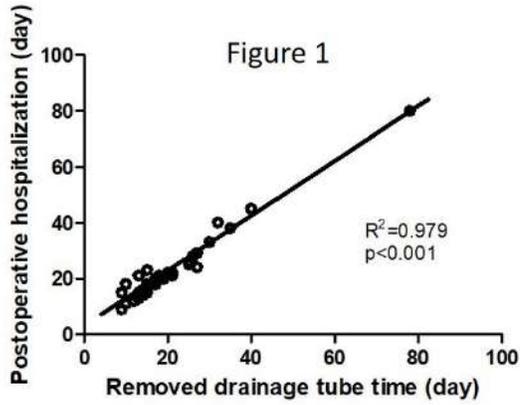
<sup>1</sup>Department of Gastric surgery, <sup>2</sup>Department of surgery, Fudan University Shanghai Cancer Center, Shanghai, China

**Objectives:** This study aimed to propose novel conserve treatment strategies for chylous ascites (CA) after gastric cancer surgery.

**Methods:** The data of patients with CA after gastric cancer surgery in the Fudan University Shanghai Cancer Center (FUSCC) between 2006 and 2021 were retrospectively evaluated.

**Results:** Fifty-three patients were submitted to dissection surgery and occurred CA for gastric cancer in the study period. Postoperative hospitalization time have a significantly positive association with the removal of drainage tube (DT) time ( $R^2=0.979$ ,  $p<0.001$ ). We further certified delay removing DT significantly extended both in total and postoperative hospitalization time (25.8 vs 15.5 days,  $p<0.001$ ; 33.2 vs 24.7 days,  $p<0.001$ ). The multivariate analysis demonstrated postoperative infection and antibiotic usage were independent influence factor for the event of delayed removal of DT. Compared to the delayed group, the clamp group (123.5 vs 93.0 ml,  $p=0.221$ ) and the normal group (except clamp) (195.0 vs 93.0 ml,  $p<0.001$ ) extracted DT in a relatively high drainage volume. The clamp group have a no significant low rate of combined postoperative infection than the normal (except clamp) group (25.0% vs 62.5%,  $p=0.094$ ). The CT imaging of the abdomen showed that the fluid in the abdominal cavity was clearly reduced after the DT was clamped.

**Image:**



**Conclusions:** Infection and antibiotic usage were vital independent influence factors for the delayed removal DT event in the patients with CA. Moreover, appropriate standards for removal of DT can significantly reduce the length of hospitalization. Furthermore, clamping tube might be a recommend selection for postoperative CA conserve treatment.

***Surgery and quality assurance***

IGCC22-ABS-1441

**PERIPANCREATIC PORTAL VEIN CONFLUENCE ALTERATIONS AFTER 30,000 GASTRECTOMIES; THE ROLE OF ICG**

Sahong Kim<sup>\* 1</sup>, Franco J. Signorini<sup>2</sup>, Sara Kim<sup>1</sup>, Ji-Hyeon Park<sup>1</sup>, Seong-Ho Kong<sup>1</sup>, Do-Joong Park<sup>1</sup>, Hyuk-Joon Lee<sup>1</sup>, Han-Kwang Yang<sup>1</sup>

<sup>1</sup>Department of Surgery, Seoul National University Hospital, Seoul, Korea, Republic Of, <sup>2</sup>Department of Surgery, Private University Hospital of Córdoba, Córdoba, Argentina

**Objectives:** The alterations of portal vein confluence are very rare, and most of the literature focused on intrahepatic portal veins or procedures to those intrahepatic structures. We aimed to introduce two cases of extrahepatic alterations of portal vein confluence and discuss the clinical significance of those anomalies and the promising role of near-infrared (NIR) lymphangiography using indocyanine green (ICG).

**Methods:** In Case 1, gastric submucosal injection of ICG (0.05 mg/mL) was performed intraoperatively through a gastroscope. Laparoscopic surgery was conducted under alternate change of conventional visible light mode and NIR mode for exclusively fine dissection of ICG-stained lymphatic tissue. Case 2 patient was diagnosed with advanced gastric cancer and underwent neoadjuvant chemotherapy. The patient was indicated for open surgery, so NIR lymphangiography was not used.

**Results:** In Case 1, the portal vein was situated at the anterior surface of the pancreas head and duodenal second portion with a slight extent of gastrointestinal tract malrotation, with left-sided colon, right-sided small bowel, and polysplenia. Case 2 patient presented an unusual splenic vein course; the splenic vein, which was cranially positioned to the splenic artery near the pancreas tail, abruptly ran downward and topologically concealed the celiac trunk. Despite the unexpected confront of the extrahepatic portal vein confluence anomalies, the operations were ended without any complications. The ICG-guided NIR lymphangiography provided significant assistance for lymph node dissection, avoiding any injuries to surrounding structures.

**Conclusions:** Peripancreatic portal vein confluence alterations can be challenging and even life-threatening during lymph node dissection in gastric cancer surgery because of the unusual arrangement of the large vessels. The application of ICG-guided NIR lymphangiography can help overcome such difficult situations and achieve oncologic precision and safeness in gastric cancer surgery.

***Surgery and quality assurance***

IGCC22-ABS-1472

**TIPS AND TRICKS FOR SAFE AND EFFECTIVE D2 LYMPHADENECTOMY - A CADAVERIC STUDY**

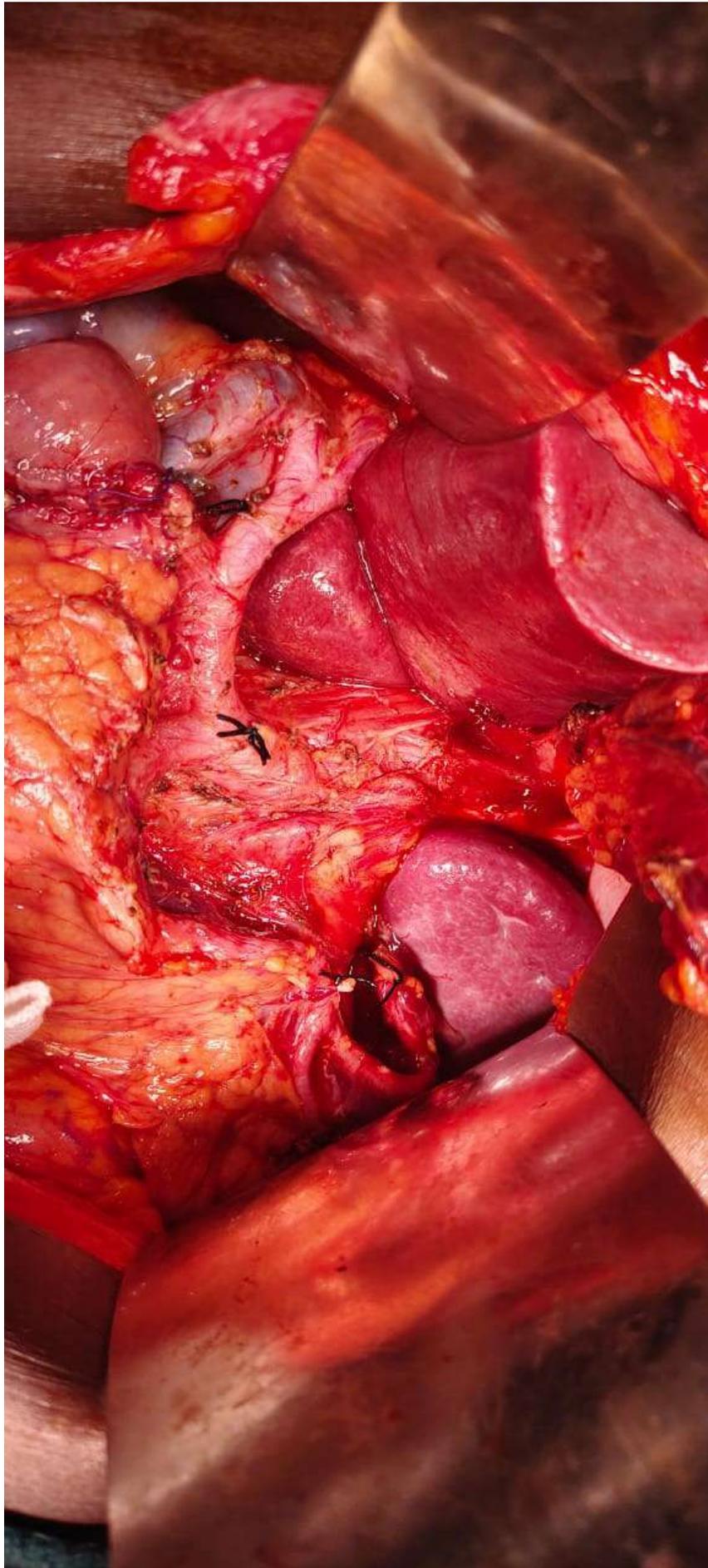
bala mahesh polamreddy \*<sup>1</sup>, aravindan u<sup>1</sup>, senthil K. g<sup>1</sup>, kalyanasundarabharathi v c<sup>1</sup>

<sup>1</sup>Department of surgical gastroenterology, Thanjavur medical college, Thanjavur, India

**Objectives:** D2 gastrectomy is recognised as the standard of care for resectable gastric cancers all over the world. But still the operating approaches to lymph node basins has not been standardized. Our objective is to standardize surgical approaches for safe and effective lymphadenectomy.

**Methods:** Between July and October 2021, 45 cadavers were dissected and lymph node yield calculated based on different approaches proposed i.e. supra pancreatic, GDA first, HDL approach etc. Detailed description of such techniques along with description of mesogastrium and planes with photographs has been done in our study. **Results:** In our study we observed that sticking to concept of mesogastrium and approaching nodal basins along those fascial planes in the order described in this study using photographs and pictorial representation gives us better lymph node yield and expected to improve the safety of the procedure. 15 patients were taken in each group i.e. supra pancreatic, GDA first, HDL approach.

**Image:**



**Conclusions:** Detailed knowledge of fascial planes and lymph node stations is required for effective and safe lymphadenectomy in gastric cancer particularly in minimally invasive surgeries which is cornerstone in preventing recurrence.

***Surgery and quality assurance***

IGCC22-ABS-1468

**STAPLER VERSUS HANDSEWN WEDGE RESTION OF GASTRIC GIST**

Feras Alahmad\* 1

1Surgery, King Salman Armed Forces Hospital, Tabuk, Saudi Arabia

**Objectives:** To compare the outcome of handsewn versus stapler wedge resection of gastric GIST.

**Methods:** Prospective collection of all gastric GIST wedge resections data were done between 2013 and 2019. Total of 54 cases were operated by laparoscopic and open approach. 15 cases were operated by open and excluded . 39 cases were operated laparoscopically. 22 using mechanical staplers and 16 by handsewn techniques.

**Results:** Overall morbidity and mortality showed no significant difference and p value was 0.4. Overall survival and disease free survival were 100%. 20% of the stapler group and 15% of the hansewn group received sandostatin analogue with minimum 1 year treatment.

**Conclusions:** Both stapler and handsewn techniques are valid safe procedures to treat gastric GIST with comparable outcome.

***Surgery and quality assurance***

IGCC22-ABS-1466

**HUGE GASTRIC GIST**

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**Objectives:** To look at the oncological outcome of huge gastric GIST.

**Methods:** Prospective collection of the cases between 2013 and 2021. 15 cases of huge gastric GIST more tge 20 cm. Were operated in our centre.

**Results:** All 15 cases were operated by open technique due to huge size. No morbidity and mortality were found. All patients received somatostatin analogue treatment post operative for minimum 2 years. DFS and overall survival was 100% after minimum follo up of 2 years.

**Conclusions:** Huge gastric GIST can be treated successfully by surgical and somatostatin analogue treatment.

## ***Surgery and quality assurance***

IGCC22-ABS-1461

### **RESECTION MARGIN PRACTICE IN EUROPE**

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**Objectives:** Negative resection margins are essential in the surgical treatment of gastric cancer. However, there is no clear consensus on the values for the adequate resection margins.

**Methods:** We created an online survey to be sent to all accepting participating centers in Europe. The survey content examines the multimodal treatment, surgical approach, and resection margin management for gastric adenocarcinoma in the participating center. The content of the survey was validated using a Delphi method by including 13 experts (surgeon, pathologist, oncologist).

**Results:** After the completion of two Delphi rounds, the experts found a consensus on 45 questions. We separated the questions into four categories: demographics, surgical practice, resection margin practice, and perioperative management. The diffusion of the online survey was done by the investigators using the connexions of the expert's panel. The questionnaire was completed in November 2022 and a first analysis is expected in January 2022 **Conclusions:** The REMARCS survey will help to analyze the actual management of gastric cancer surgically. This survey will pose the basis for further multicentric studies, which will be necessary to determine adequate surgical resection in terms of oncological outcomes.

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1266

**LAPAROSCOPIC PROXIMAL VS. TOTAL GASTRECTOMY FOR UPPER THIRD EGC: KCLASS-05 RANDOMIZED CLINICAL TRIAL**

Do Joong Park<sup>1, 2, 3</sup>, Sang-Uk Han<sup>4</sup>, Woo Jin Hyung<sup>5</sup>, Sun-Hwi Hwang<sup>6</sup>, Hoon Hur<sup>4</sup>, Han-Kwang Yang<sup>1, 3</sup>, Hyuk-Joon Lee<sup>1, 3</sup>, Hyoung-Il Kim<sup>5</sup>, Seong-Ho Kong<sup>1</sup>, Young Woo Kim<sup>7</sup>, Han Hong Lee<sup>8</sup>, Beom Su Kim<sup>9</sup>, Young-Kyu Park<sup>10</sup>, Young-Joon Lee<sup>11</sup>, Sang-Hoon Ahn<sup>2</sup>, Inseob Lee<sup>9</sup>, Yun-Suhk Suh<sup>12</sup>, Ji-Ho Park<sup>11</sup>, Soyeon Ahn<sup>13</sup>, Young Suk Park<sup>12</sup>, Hyung-Ho Kim<sup>12</sup>

<sup>1</sup>Surgery, Seoul National University Hospital, Seoul, <sup>2</sup>Surgery, Seoul National University Bundang Hospital, Seongnam-si, <sup>3</sup>Surgery and Cancer Research Institute, Seoul National University College of Medicine, Seoul, <sup>4</sup>Surgery, Ajou University Hospital, Suwon, <sup>5</sup>Surgery, Yonsei University Severance Hospital, Seoul, <sup>6</sup>Surgery, Pusan National University Yangsan Hospital, Yangsan, <sup>7</sup>Surgery, National Cancer Center, Goyang, <sup>8</sup>Surgery, Catholic University of Seoul St Mary's Hospital, <sup>9</sup>Surgery, Asan Medical Center, Seoul, <sup>10</sup>Surgery, Chonnam National University Hwasun Hospital, Hwasun, <sup>11</sup>Surgery, Gyeongsang National University School of Medicine, Jinju, <sup>12</sup>Surgery, <sup>13</sup>Medical Research Collaborating Center, Seoul National University Bundang Hospital, Seongnam, Korea, Republic Of

**Objectives:** Proximal gastrectomy (PG) with double tract reconstruction has theoretical advantages over total gastrectomy (TG) with similar reflux but has not yet been proven in randomized clinical trial. This study aimed to provide scientific evidence of laparoscopic PG with double tract reconstruction as a standard procedure for proximal early gastric cancer (EGC).

**Methods:** The present trial is multicenter, open-label, randomized, controlled trial with superiority design. From October 2016 to September 2018, we randomly assigned 138 patients with upper third cT1N0M0 gastric adenocarcinoma to laparoscopic PG with double tract reconstruction and laparoscopic TG with esophagojejunostomy. Primary co-endpoints are hemoglobin change and vitamin B12 cumulative supplement quantity after 2 years of operation. Secondary endpoints are rate of postoperative reflux esophagitis, morbidity, mortality, quality of life, overall survival, and disease-free survival.

**Results:** A total of 137 patients were included in the intention-to-treat population for the analysis of the primary outcome (68 in the PG group and 69 in the TG group). The hemoglobin change was  $5.6 \pm 7.4\%$  for the group assigned to PG and  $6.9 \pm 8.3\%$  for the group assigned to TG ( $P=0.349$ ). The cumulative amount of vitamin B12 supplement was  $0.6 \pm 2.0$  mg for the group assigned to PG and  $3.4 \pm 4.1$ mg for the group assigned to TG ( $P<0.001$ ). The late complication rates of PG and TG group were 17.6% and 10.1%, respectively ( $P=0.306$ ). The incidence of reflux esophagitis was not different between PG and TG group (2.9% vs. 2.9%, respectively,  $P=0.999$ ). PG group showed better score than TG group in terms of physical functioning ( $P=0.029$ ). There was no difference of overall and disease-free survival between two groups.

**Conclusions:** Among patients with upper third EGC, laparoscopic PG with double tract reconstruction had less supplement of vitamin B12 than laparoscopic TG without compromising complication rate and survival (ClinicalTrials.gov number, NCT02892643).

### ***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1355

#### **FIVE-YEAR OUTCOMES OF THE KLASS-02 RANDOMIZED CLINICAL TRIAL: LDG VS ODG FOR LOCALLY AGC**

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**Objectives:** The KLASS-02 multicenter, randomized clinical trial showed that laparoscopic surgery was non-inferior to open surgery for patients with locally advanced gastric cancer. The present study assessed the 5-year follow-up results, including 5-year overall (OS) and relapse-free survival (RFS) rates and long-term complications, in patients enrolled in KLASS-02.

**Methods:** The KLASS-02 trial included 974 patients with locally advanced gastric cancer who underwent R0 resection, 492 by laparoscopic and 482 by open gastrectomy. These patients were followed-up for 5 years after enrollment of the last patient. Five-year OS and RFS rates, recurrence patterns, and long-term surgical complications were evaluated.

**Results:** The 5-year OS (88.9% vs. 88.7%;  $P = .953$ ) and RFS (79.5% vs. 81.1%;  $P = .548$ ) rates did not differ significantly in patients who underwent laparoscopic and open distal gastrectomy. The most common types of recurrence were peritoneal carcinomatosis (42.1%), hematogenous metastases (20.8%) and locoregional recurrence (13.8%), with no between-group differences in types of recurrence at each cancer stage. The correlation between 3-year RFS and 5-year OS at the individual level was highest in patients with stage III gastric cancer ( $Rho = .720$ ). The late complication rate was significantly lower in the laparoscopic than in the open surgery group (6.5% vs. 11.0%;  $P = .011$ ). The most common type of complication in both groups was intestinal obstruction (2.6% vs. 5.0%;  $P = .056$ ).

**Conclusions:** The 5-year outcomes of the KLASS-02 trial support the 3-year results, showing that laparoscopic surgery was non-inferior to open surgery in patients with locally advanced gastric cancer. The lower incidence of late complications in the laparoscopic group suggests that this approach can benefit patients with locally advanced gastric cancer.

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1326

**SHORT-TERM OUTCOMES OF ROBOTIC GASTRECTOMY VS OPEN GASTRECTOMY IN GASTRIC CANCER: A RANDOMIZED TRIAL**

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<sup>1</sup>Gastroenterology, Instituto do Câncer do Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo, São Paulo, Brazil

**Objectives:** Robot-assisted gastrectomy has been presented as a safe and feasible method in the treatment of gastric cancer (GC). However, most studies are in Eastern cohorts and, due to differences in patient characteristics - such as BMI and TNM stage - there is great interest in knowing whether the method can be used routinely, especially in the West. Accordingly, this study aimed to compare the short-term outcomes of D2-gastrectomy by robotic and open access.

**Methods:** This is an open-label, single-institution clinical trial performed between 2014 and 2021. GC patients were randomized (1:1 allocation) to receive surgical treatment by robotic (RG) or open (OG) gastrectomy. *Da Vinci Si* platform was used. Inclusion criteria were: gastric adenocarcinoma, stage cT2-4 cN0-1, surgery with curative intent, age 18-80 years, ECOG performance 0-1. Exclusion criteria were: emergency surgery, previous gastric surgery or major abdominal surgery. Primary outcome was operative bleeding. The hypothesis was that there is a 50% reduction in blood loss with RG. As the mean bleeding in the open surgery is 250ml, with a type I error of 0.05 and a study power of 90%, the sample was calculated to 30 patients in each group. The study is registered at [clinicaltrials.gov](https://clinicaltrials.gov) (NCT02292914).

**Results:** Of 65 randomized patients, 5 were excluded (3 palliatives, 1 with obstruction and emergency surgery and 1 for lack of material). Therefore, 31 and 29 were included for final analysis in the OG and RG groups, respectively. No differences were observed between the groups regarding age, sex, BMI, comorbidities, ASA and frequency of total gastrectomy. RG had similar mean of dissected lymph nodes ( $p=0.805$ ), a longer time of surgery ( $p<0.001$ ), and less bleeding ( $p<0.001$ ) compared to OG group. Postoperative complications, length of hospital stay and readmissions in 30-d were equivalent between OG and RG.

**Image:**

**Table.** Clinical, surgical, pathological and postoperative characteristics of patients with gastric cancer - Open gastrectomy and Robotic Gastrectomy Groups

Variables	Open Gastrectomy n = 31 (%)	Robotic Gastrectomy n = 29 (%)	p
<b>Sex</b>			0.205
Female	11 (35.5)	15 (51.7)	
Male	20 (64.5)	14 (48.3)	
<b>Age (years)</b>			0.685
Mean (SD)	58.1 (11.3)	59.3 (11.3)	
<b>Body Mass Index (Kg/m<sup>2</sup>)</b>			0.661
Mean (SD)	23.5 (2.9)	23.8 (3.6)	
<b>Type of resection</b>			0.727
Subtotal	27 (87.1)	24 (82.8)	
Total	4 (12.9)	5 (17.2)	
<b>Charlson Comorbidity Index (CCI)</b>			0.631
0	12 (38.7)	13 (44.8)	
≥1	19 (61.3)	16 (55.2)	
<b>ASA classification</b>			1.0
I	1 (3.2)	1 (3.4)	
II	25 (80.6)	24 (82.8)	
III	5 (16.1)	4 (13.8)	
<b>Tumor size (cm)</b>			0.724
Mean (SD)	3.6 (2.1)	3.9 (2.3)	
<b>Histological Type</b>			0.570
Intestinal	17 (54.8)	18 (62.1)	
Diffuse/mixed	14 (45.2)	11 (37.9)	
<b>No of lymph nodes</b>			0.805
Mean (SD)	42.4 (18.3)	41.3 (15.1)	
<b>pT</b>			0.694
pT1	13 (41.9)	13 (44.8)	
pT2	8 (25.8)	4 (13.8)	
pT3	5 (16.1)	6 (20.7)	
pT4	5 (16.1)	6 (20.7)	
<b>pN</b>			0.866
pN0	18 (58.1)	15 (51.7)	
pN1	5 (16.1)	4 (13.8)	
pN2	3 (9.7)	5 (17.2)	
pN3	5 (16.1)	5 (17.2)	
<b>pTNM</b>			0.859
I	16 (51.6)	13 (44.8)	
II	7 (22.6)	7 (24.1)	
III	8 (25.8)	9 (31)	
<b>Duration of surgery (min)</b>			<0.001
Mean (SD)	214.6 (41.6)	353.8 (96.4)	
<b>Blood loss (mL)</b>			<0.001
Mean (SD)	276.3 (152.1)	123.7 (89.3)	
<b>Length of hospital stay (days)</b>			0.854
Median (IQR)	7 (5 - 10)	7 (6 - 11)	
<b>Postoperative complications (POC)</b>			1.0
non-POC/ Minor POC	28 (90.3)	27 (93.1)	
Major POC	3 (9.7)	2 (6.9)	
<b>Hospital readmission</b>			0.355
No	27 (87.1)	28 (96.6)	
Yes	4 (12.9)	1 (3.4)	

**Conclusions:** RG reduces operative bleeding by more than 50%. The short-term results are similar to OG, although surgical time was longer in RG

**Minimally-invasive and robot-assisted surgery**

IGCC22-ABS-1285

**SHOULD TOTAL OMENTECTOMY BE PERFORMED FOR ADVANCED GASTRIC CANCER?**

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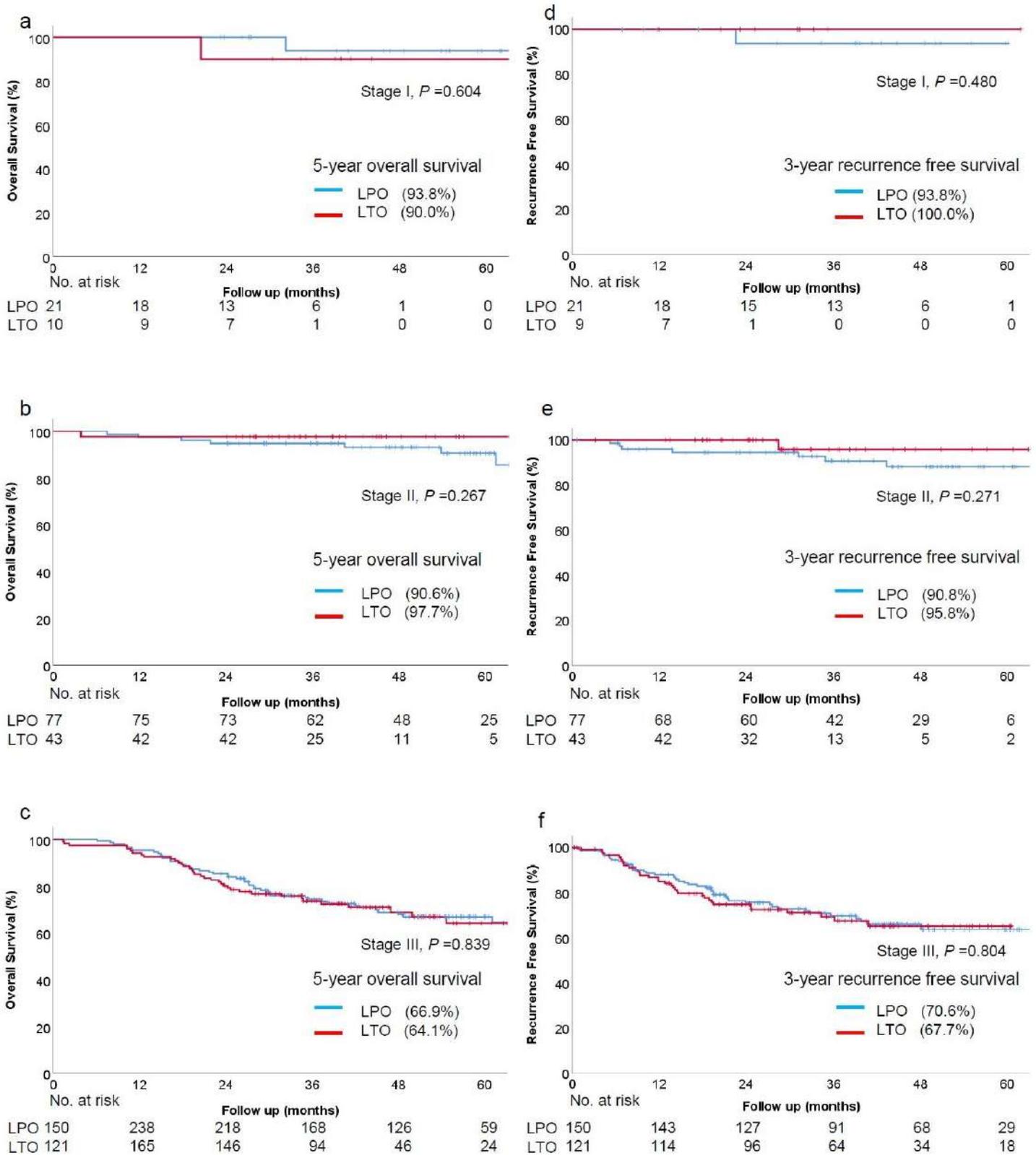
**Objectives:** In the era of minimally invasive surgery, laparoscopic partial omentectomy (LPO) has seen widespread use as a curative surgical procedure for early gastric cancer. However, scientific evidence of the extent of omentectomy during laparoscopic gastrectomy remains unclear for advanced gastric cancer (AGC).

**Methods:** We analyzed 666 eligible patients who underwent laparoscopic gastrectomy for AGC with curative intent between 2014 and 2018. Surgical outcome and postoperative prognosis were compared between LPO and laparoscopic total omentectomy (LTO) groups after 2:1 propensity score matching with age, sex, body mass index, tumor size, pT stage, pN stage, gastrectomy type, and clinical T stage as covariates.

**Results:** After extensive matching, there was no significant difference in pathologic or clinical stages between the LPO (n = 254) and LTO (n = 177) groups. LPO provided a significantly shorter operation time than LTO (199.2 ± 64.8 vs. 248.1 ± 68.3 min,  $P < 0.001$ ). Pulmonary complication within postoperative 30 days was significantly lower in the LPO group (4.4 vs. 10.3%,  $P = 0.018$ ). In multivariate analysis, LTO was the independent risk factor for pulmonary complication (odds ratio [OR] 2.53, 95% confidence interval [95% CI] 1.12-5.73,  $P = 0.025$ ), which became more obvious in patients with a Charlson's comorbidity index of 4 or higher (OR 27.43, 95% CI 1.35-558.34,  $P = 0.031$ ). The 5-year overall survival rate (OS) and 3-year recurrence-free survival (RFS) rates were not significantly different between the two groups, even after stage stratification.

**Image:**

**Figure 1.** Survival analysis between laparoscopic partial omentectomy (LPO) and laparoscopic total omentectomy (LTO) stratified by TNM stage. No significant differences in survival were found between each TNM stage. Overall survival rates for stages I (a), II (b), and III (c). Recurrence free survival rates for stages I (d), II (e), and III (f).



**Conclusions:** LPO provided significantly shorter operation time and less pulmonary complication than LTO without compromising 5-year OS and 3-year RFS for AGC. LTO was the independent risk factor for pulmonary complications, which became more evident in patients with severe comorbidities.

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1172

**LONG-TERM OUTCOMES OF LAPAROSCOPIC SPLEEN-PRESERVING NO.10 LYMPH NODE DISSECTION FOR GASTRIC CANCER**

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**Objectives:** The long-term survival of laparoscopic total gastrectomy combined with spleen-preserving splenic hilar lymphadenectomy (LTGSPL) for advanced upper third gastric cancer (AUTGC) remains controversial. We aimed to evaluate the long-term outcomes of LTGSPL and the prognostic value of No. 10 lymph node (LN) metastasis for patients with AUTGC.

**Methods:** This was a prospective, multicenter, single-arm trial involving 19 centers in China. A total of 251 eligible patients with clinical stage T2, T3, or T4a upper third gastric cancer without distant metastases were enrolled from September 2016 to October 2017. The long-term outcomes were evaluated.

**Results:** A total of 246 patients underwent LTGSPL and completed the study. The 3-year overall survival (OS) and disease-free survival (DFS) were 79.1% and 73.1%, respectively. And the 3-year therapeutic value index of No. 10 LN dissection was 4.5, exceeding the indices for the partial D2 LN group (including No. 5, No. 6, No. 11d and No. 12a LNs). Nineteen (7.7%) patients with No.10 LN metastasis had significantly worse survival than the nonmetastasis group, and multivariate analysis revealed that No. 10 LN metastasis was an independent prognostic factor (OS, HR: 2.513, 95% CI: 1.141-5.535; DFS, HR: 2.422, 95% CI: 1.196-4.904). Moreover, patients with No. 10 LN metastasis were more likely to have recurrence (42.1% vs. 20.7%,  $P = .031$ ), especially when multiple site metastasis was present (21.1% vs. 4.4%,  $P = .013$ ). However, patients with No. 10 LN metastasis who received adjuvant chemotherapy had significantly better OS and DFS than those without adjuvant chemotherapy and achieved the same oncological effect as those without No. 10 LN metastasis.

**Conclusions:** LTGSPL for AUTGC has feasible long-term outcomes. In addition, patients with No. 10 LN metastasis have worse prognoses and adjuvant chemotherapy could be used to improve the long-term survival of these patients. (ClinicalTrials.gov Identifier: NCT02845986)

*Minimally-invasive and robot-assisted surgery*

IGCC22-ABS-1234

**LONG-TERM QUALITY OF LIFE AND NUTRITIONAL RESULTS AFTER SENTINEL NODE NAVIGATION SURGERY**

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**Objectives:** Laparoscopic sentinel node navigation surgery (LSNNS) has been suggested as an alternative to laparoscopic standard gastrectomy (LSG) in patients with early gastric cancer. Here, we present 3-year results of patient-reported quality of life (QOL) and nutritional outcomes, secondary endpoints of the SENORITA trial.

**Methods:** SENORITA trial is a prospective multicenter randomized trial. Patients diagnosed with early gastric cancer of 3 cm or less were randomly allocated (1:1) to LSNNS or LSG. The primary end-point was 3-year disease-free survival and secondary endpoints were QOL assessed using the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 (EORTC QLQ-C30) and EORTC stomach module (STO22) and nutritional parameters at 3, 12, 24, and 36 months after surgery. Linear mixed model analyses was used to evaluate differences between the two groups.

**Results:** From March 2013 to March 2017, 527 patients were included in the modified intention-to-treat analysis population (258 in LSNNS and 269 in LSG group). The LSNNS group had higher physical function score than the LSG group at all time points ( $p=0.002$ ). However, there were no significant differences in other scales of EORTC QLQ-C30. Regarding EORTC QLQ-STO22, pain, eating restriction, anxiety, and taste scores were lower (better QOL) at all time points in the LSNNS group than in the LSG group ( $p=0.002$ ,  $<0.001$ ,  $<0.001$ , and  $<0.001$ , respectively). The summary score of EORTC QLQ-STO22 was also higher in the LSNNS group representing better QOL ( $p<0.001$ ). Body mass index, hemoglobin and total protein were significantly higher in the LSNNS group compared with the LSG group.

**Conclusions:** The LSNNS group had better physical function, less symptoms, better nutritional outcomes compared with the LSG group. These findings showed benefits of stomach preserving surgery and can be used to help decision making about treatment for patients with early gastric cancer.

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IGCC22-ABS-1143

**COMPARISONS OF OUTCOMES BETWEEN LAPAROSCOPIC AND OPEN GASTRECTOMY IN AGC WITH SEROSAL INVASION**

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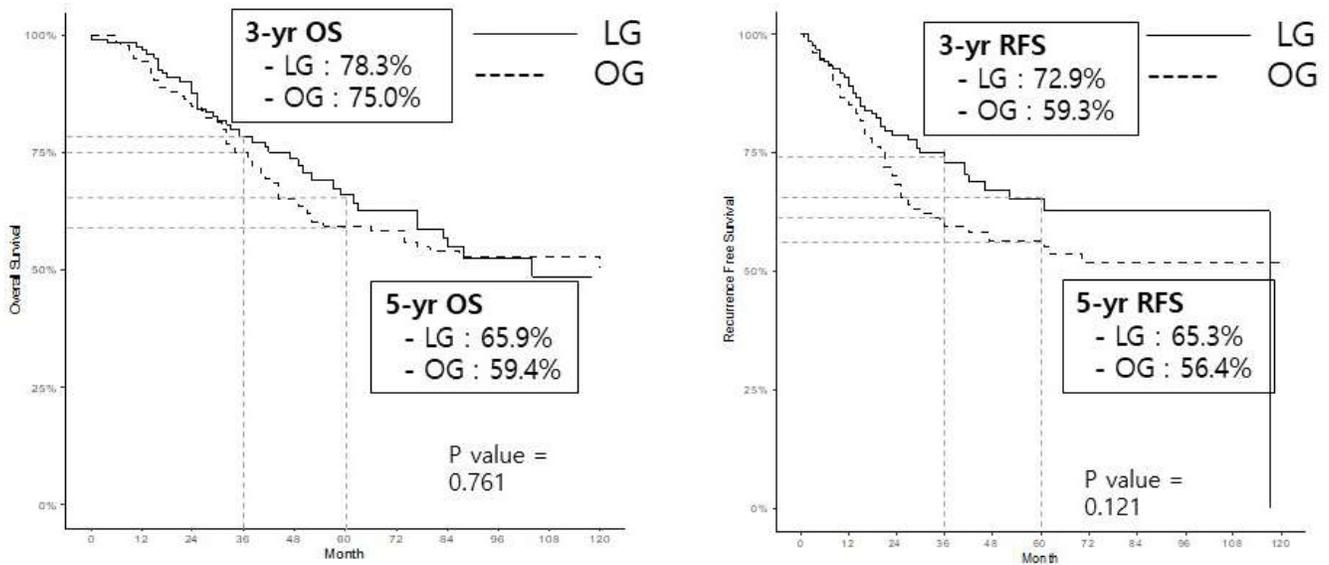
**Objectives:** Laparoscopic gastrectomy (LG) has gradually increased for treatment of advanced gastric cancer (AGC). However, for AGC especially with serosal invasion, there is a lack of evidence on oncologic safety. The aim of the present study is to evaluate the surgical and oncologic outcomes between laparoscopic and open gastrectomy (OG) for gastric cancer with serosal invasion.

**Methods:** We retrospectively reviewed 256 patients who underwent OG and 147 patients who underwent LG for gastric cancer with serosal invasion between August, 2005 and December, 2017. Finally, 124 patients of LG group and 124 patients of OG group were enrolled according to one to one propensity score matching (PSM) analysis. We evaluated surgical and oncological outcomes including overall survival (OS) and recurrence-free survival (RFS).

**Results:** The operation time was slightly longer in the LG group ( $164 \pm 43.86$  mins) than in the OG group ( $156 \pm 37.66$  mins) but didn't show significant difference ( $p=0.063$ ). After surgery, both the time to starting a liquid diet and length of hospital stay were shorter in LG group than OG group ( $p<0.0001$ ). The retrieved lymph nodes of LG group was similar with those of OG ( $40 \pm 16.23$  vs  $38 \pm 14.42$ ,  $p=0.306$ ). In aspect of survival analysis, there was no statistically difference between the two groups. The median follow up period was 38 months postoperatively. In PSM groups, the 3-year OS rates were 78.3% and 75.0% and 5-year OS were 65.9% and 59.4% in the LG and OG groups, respectively. This rate was similar between the two groups ( $p=0.761$ ). Likewise, the 3-year RFS showed similar outcome, which was not statistically significant (3-year: 72.9% vs. 69.3%; 5-year: 65.3% vs. 56.4%;  $p=0.121$ ).

**Image:**

Figure. Overall survival and recurrence-free survival



**Conclusions:** LG for gastric cancer with serosal invasion showed similar postoperative and oncologic outcomes to those of OG. Therefore, laparoscopic gastrectomy for gastric cancer with serosal invasion is feasible and could be considered as a standard treatment.

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IGCC22-ABS-1277

**LAPAROSCOPIC PPG VERSUS DG FOR MIDDLE THIRD EGC; FINAL RESULT OF MULTICENTER RCT (KLASS-04)**

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**Objectives:** Pylorus preserving gastrectomy (PPG), one of the function preserving gastric cancer surgeries, is considered to have benefits in terms of less dumping syndrome, less gallstone formation, less bile reflux gastritis, and better nutritional outcome, compared to distal gastrectomy (DG). However, there is no randomized controlled trial comparing PPG versus DG until now.

**Methods:** We conducted a multicenter randomized controlled trial comparing laparoscopic pylorus preserving gastrectomy (LPPG) versus laparoscopic distal gastrectomy (LDG), named KLASS-04. A total of 256 patients with cT1N0M0 gastric cancer located at middle third of the stomach were randomized intraoperatively and followed for 3 years. **Results:** There was no difference of the incidence of dumping syndrome at 1 year after surgery (13.2% in LPPG vs. 15.8% in LDG,  $p = 0.62$ ). Three year recurrence-free survival was not different between groups (1 recurrence case in each group,  $p=0.98$ ). Gallstone formation after surgery was significantly less in LPPG group (2.33%) compared to LDG group (8.66%,  $p = 0.03$ ). Loss of abdominal fat, assessed by CT volumetry at 1 year after surgery, showed a tendency of less fat volume loss in LPPG group (-132.67 mm<sup>2</sup>) compared to LDG group (-163.11 mm<sup>2</sup>,  $p = 0.085$ ). Total protein loss after 1 year was also significantly less in LPPG group (-0.15 gm/dL) compared to LDG group (-0.35 gm/dL,  $p = 0.0016$ ). Loss of hemoglobin after 1 year was also significantly less in LPPG group (-0.39 gm/dL) compared to LDG group (-0.73 gm/dL,  $p = 0.013$ ). In the per protocol population, there was no significant difference of QOL between groups. **Conclusions:** LPPG has benefits of less gallstone formation and less nutritional deficit, compared to LDG without compromising complication or recurrence. However, the incidence of dumping syndrome was not different. PPG can be applied as an alternative option for middle third early gastric cancer.

*Minimally-invasive and robot-assisted surgery*

IGCC22-ABS-1410

**SURGICAL COMPLICATIONS AFTER OPEN, LAPAROSCOPIC, AND ROBOTIC GASTRECTOMY FOR GASTRIC CANCER**

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**Objectives:** Minimally invasive gastrectomy has become a preferred treatment option rather than open surgery due to its benefits of short-term surgical outcomes, while maintaining oncologic safety. However, there is a lack of evidence for real-world experience comparing minimally invasive surgery with open surgery for gastric cancer.

**Methods:** We retrospectively reviewed a prospective database of 6424 patients with gastric cancer who underwent radical gastrectomy between 2013 and 2019. The number of patients who underwent gastric cancer surgery via open, laparoscopic, and robotic approaches was 1944, 2991, and 1489, respectively. To estimate the impact of the operative method for surgical complications, we analyzed adjusted logistic regression by reducing the effect of confounding factors.

**Results:** In the multivariable analysis after adjustment, open gastrectomy was associated with surgical complications compared to laparoscopic (adjusted OR, 0.792; 95% confidence interval [CI], 0.611-0.974; P=0.027) and robotic gastrectomy (adjusted OR, 0.762; 95% CI, 0.596-0.974; P=0.030). Of the surgical complications, fluid collection was associated with open gastrectomy compared with laparoscopic (adjusted OR, 0.415; 95% CI, 0.283-0.608; P<0.001) and robotic gastrectomy (adjusted OR, 0.399; 95% CI, 0.245-0.649; P=0.0002).

**Conclusions:** In the real-world situation, open gastrectomy was a risk factor for surgical complications compared to laparoscopic and robotic gastrectomy. Especially, open gastrectomy was highly associated with fluid collection than other types of operative approaches.

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IGCC22-ABS-1244

**LAPAROSCOPIC COMPARED WITH OPEN D2 GASTRECTOMY: A PSM ANALYSIS OF THE IMIGASTRIC DATABASE**

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**Objectives:** The laparoscopic approach in gastric cancer surgery is being increasingly adopted worldwide. However, studies focusing specifically on laparoscopic gastrectomy with D2 lymphadenectomy are still lacking in the literature. This retrospective study aimed to compare the short-term and long-term outcomes of laparoscopic versus open gastrectomy with D2 lymphadenectomy for gastric cancer.

**Methods:** The protocol-based, international IMIGASTRIC registry was queried to retrieve data on patients undergoing laparoscopic or open gastrectomy with D2 lymphadenectomy. Eleven predefined, demographical, clinical, and pathological variables were used to conduct a 1:1 propensity score matching (PSM) analysis to investigate intraoperative and recovery outcomes, complications, pathological findings, and survival data between the two groups. Predictive factors of long-term survival were also assessed.

**Results:** A total of 3033 patients were selected from the IMIGASTRIC database. After PSM, a total of 1248 patients, 624 in the laparoscopic group and 624 in the open group, were matched and included in the final analysis. The total operative time (median 180 versus 240 min,  $p < 0.0001$ ) and the length of the postoperative hospital stay (median 10 versus 14.8 days,  $p < 0.0001$ ) were longer in the open group than in the laparoscopic group. The proportion of patients with in-hospital complications was higher in the open group (21.3% versus 15.1%,  $p = 0.004$ ). There was no significant difference between the groups in five-year overall survival rates (77.4% laparoscopic versus 75.2% open,  $p = 0.229$ ). **Conclusions:** The adoption of the laparoscopic approach for gastric resection with D2 lymphadenectomy shortened the length of hospital stay and reduced postoperative complications with respect to the open approach. The five-year overall survival rate after laparoscopy was comparable to that for patients who underwent open D2 resection. The types of surgical approaches are not independent predictive factors for five-year overall survival.

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IGCC22-ABS-1177

**ROBOTIC TOTAL GASTRECTOMY SHOWS BETTER SHORT-TERM ADVANTAGES COMPARED WITH LAPAROSCOPIC SURGERY**

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**Objectives:** Robotic surgery may be advantageous for complex surgery. The purpose of this study was to compare the intraoperative and postoperative short-term outcomes of spleen-preserving splenic hilar lymphadenectomy (SPSHL) during robotic and laparoscopic total gastrectomy.

**Methods:** From July 2016 to December 2020, the clinicopathological data of 115 patients who underwent robotic total gastrectomy combined with robotic SPHSL (RSPSHL) and 697 patients who underwent laparoscopic total gastrectomy combined with laparoscopic SPHSL (LSPSHL) were retrospectively analyzed. A 1:2 ratio propensity score matching (PSM) was used to balance the differences between the two groups to compare the intraoperative and postoperative short-term outcomes.

**Results:** After PSM, the baseline preoperative characteristics of 115 patients in the RSPSHL group and 230 patients in the LSPSHL group were balanced. The dissection time of the region of the splenic artery trunk in the RSPSHL group ( $5.4 \pm 1.9$  mins vs.  $7.8 \pm 3.6$  mins,  $P < 0.001$ ) was significantly less than that in the LSPSHL group. The examined No. 10 LNs ( $2.6 \pm 2.3$  vs.  $2.0 \pm 2.2$ ,  $P = 0.032$ ) and No. 11d LNs ( $0.9 \pm 1.0$  vs.  $0.6 \pm 0.9$ ,  $P = 0.006$ ) in the RSPSHL group was significantly higher than that in the LSPSHL group. The dissection rate of No.10 LNs (78.3% vs. 70.0%,  $P = 0.104$ ) and No.11d LN (54.8% vs. 40.4%,  $P = 0.012$ ) in the RSPSHL group was also higher than that in the LSPSHL group. The RSPSHL group was significantly better than the LSPSHL group in postoperative recovery such as time to ambulation, time to first flatus, and time to first intake (all  $P < 0.05$ ). The splenectomy rates of the two groups were similar (1.7% vs. 0.4,  $P = 0.539$ ), and there was no significant difference in morbidity and mortality within postoperative 30 days (13.0% vs. 15.2%,  $P = 0.589$ ).

**Conclusions:** Compared to LSPSHL, RSPSHL has more advantages in terms of intraoperative and postoperative short-term outcomes. For complex SPHSL, robotic surgery may be a better choice.

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IGCC22-ABS-1148

**LAPAROSCOPIC GASTRECTOMY FOR ADVANCED GASTRIC CANCER: INITIAL EXPERIENCE IN A DEVELOPING COUNTRY**

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**Objectives:** The applicability and oncological efficacy of laparoscopic gastrectomy (LG) remains controversial for locally advanced gastric cancer which requires extensive lymph node dissection. The aim of this study is to evaluate the feasibility and outcomes of LG with D2 lymphadenectomy for gastric cancer.

**Methods:** Between October 2016 and December 2020, fifty patients with resectable (cT2-4aN0-3bM0) gastric cancer who underwent totally laparoscopic gastrectomy with D2 lymphadenectomy

**Results:** Preoperative chemotherapy was administered to thirty two patients (64%), twenty nine patients (58%) underwent distal gastrectomy, twenty one patients (42%) underwent total gastrectomy. The average number of lymph nodes retrieved was 26 (14-59), All resected margins were tumor free. The mean operative time and amount of blood loss were 266min (170-420) and 155ml (60-300), respectively. Conversion to an open procedure was performed in two patients (4%). The median hospital stay period was 7 days (5-43), and the median time to start oral fluids was 4 days (3-35). Postoperative complications were detected in 7 patients (14%). There were two cases of mortality (4%) in the postoperative period, and three patients required reoperation (6%).

**Conclusions:** Totally laparoscopic gastrectomy with D2 lymphadenectomy can be carried out safely, with good results in terms of postoperative course, complications, mortality and in accordance with oncologic principles.

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1140

**ROUX-EN-Y OR MODIFIED BILLROTH II AFTER LAPAROSCOPIC DISTAL GASTRECTOMY FOR GASTRIC CANCER**

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**Objectives:** For reconstruction after distal gastrectomy for gastric cancer (GC), Roux-En-Y (R-Y) has benefits in bile reflux and residual gastritis, while Billroth II (B-II) is simple and superior in operation time. A modified B-II (MB-II) with antireflux technique may reduce the reflux. This study aims to compare outcomes of R-Y and MB-II after laparoscopic distal gastrectomy (LDG).

**Methods:** A retrospective study included GC patients underwent LDG with anastomosis by MB-II or R-Y. Outcomes including operation time, blood loss, postoperative complications, time of first flatus, hospital stay, one-year endoscopic findings after surgery and quality of life (QoL) were recorded.

**Results:** 225 GC patients underwent LDG were included, 120 in R-Y, 105 in MB-II. There were no differences in characteristics between two groups in median age, gender, BMI, NRS score, pathological stage, median tumor size. MB-II was statistically shorter than R-Y in operation time ( $180.1 \pm 30.0$  vs  $222.3 \pm 55.1$  min,  $p=0.0001$ ), blood loss was similar ( $59.2 \pm 48.6$  vs  $69.7 \pm 84.3$ ,  $p=0.247$ ). The incidence of overall postoperative complications was not significantly different (12.5% in R-Y vs 10.5% in MB-II,  $p=0.636$ ). Morbidity of anastomosis complications was also similar (4.2% in R-Y vs 4.8% in MB-II,  $p=0.829$ ). Time of first flatus was significantly shorter in MB-II than R-Y ( $3.2 \pm 1.6$  vs  $4.3 \pm 2.4$ ,  $p=0.0001$ ). MB-II was also superior to R-Y in hospital stay ( $7.6 \pm 1.4$  vs  $9.3 \pm 2.1$ ,  $p=0.0001$ ). At one year postoperatively, on endoscopic findings, there were no statistically differences in gastric residue, remnant gastritis and bile reflux between two groups ( $p=0.449$ ,  $p=0.241$  and  $p=0.195$ , respectively).

There were differences in QoL based on DAUGS20 scoring system (R-Y 25.7, MB-II 26.5,  $p=0.758$ ).

**Conclusions:** There were no differences in postoperative complications, risk of bile reflux, gastric residue and remnant gastritis, and QoL between two groups, while the MB-II was superior to R-Y in terms of operation time and postoperative recovery.

*Minimally-invasive and robot-assisted surgery*

IGCC22-ABS-1371

**COMPARISON BETWEEN BIPOLAR, ULTRASONIC SHEARS AND HYBRID DEVICE DURING LAPAROSCOPIC GASTRECTOMY**

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**Objectives:** The aim of this study was to compare intraoperative inflammatory response and short-term surgical outcome according to the type of energy-based devices used for laparoscopic distal gastrectomy.

**Methods:** The patients scheduled for laparoscopy distal gastrectomy due to clinical stage I gastric cancer in two different medical centers were prospectively randomized into three groups: Ultrasonic shear (US), advanced bipolar (BP) and ultrasonic-bipolar hybrid (HB). The parameters of clinicopathological outcomes, including operative time, intraoperative blood loss, postoperative biochemical, interleukin-6 and 10, hospitalization, and complication rate, were analyzed. The amount of lymphatic leakage was measured by a semi-quantitative measurement method by submucosal injection of indocyanine green and measurement of near-infrared signal out of used gauzes.

**Results:** The levels of C-reactive protein (CRP), which is a surrogate marker for inflammatory response and complication, were significantly lower in BP group compared to in US or HB group: On the postoperative day 2 (9.1 vs. 11.1 vs. 12.9,  $p=0.001$ ) and the postoperative day 4 (7.4 vs. 9.7 vs. 9.6,  $p=0.026$ ). Intraoperative blood loss was also significantly lower in BP than in US or HB (26.0 vs. 43.7 vs. 34.7  $p=0.026$ ). ICG fluorescence intensity indicating lymphatic leakage was 21.5 in US, 22.8 in BP, and 28.1 in HB, and there was no significant difference between groups ( $p=0.792$ ). The operative time, postoperative cytokine levels, hospitalization and complication rate were not different between three groups. **Conclusions:** BP device may reduce intraoperative blood loss and postoperative CRP level compared to US and HB. However, there was no significant difference between the three devices in terms of overall perioperative outcomes.

*Minimally-invasive and robot-assisted surgery*

IGCC22-ABS-1327

**LAPAROSCOPIC GASTRECTOMY FOR ADVANCED GASTRIC CANCER: IS IT ACCEPTABLE TECHNIQUE & ONCOLOGIC OUTCOME**

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**Objectives:** Laparoscopic gastrectomy is widely used for the treatment of early gastric cancer due to benefits. With increasing surgical experience, indications for laparoscopic surgery have been extended to locally advanced tumor stages. The aim of this study is to evaluate a feasibility, overall short-term morbidity, mortality and long-term oncologic outcome for locally advanced gastric cancer.

**Methods:** At UMC, laparoscopic gastrectomy and D2 lymphadenectomy was applied for gastric cancer since 2008 and is being indicated for local advanced gastric cancer with T2-4a.

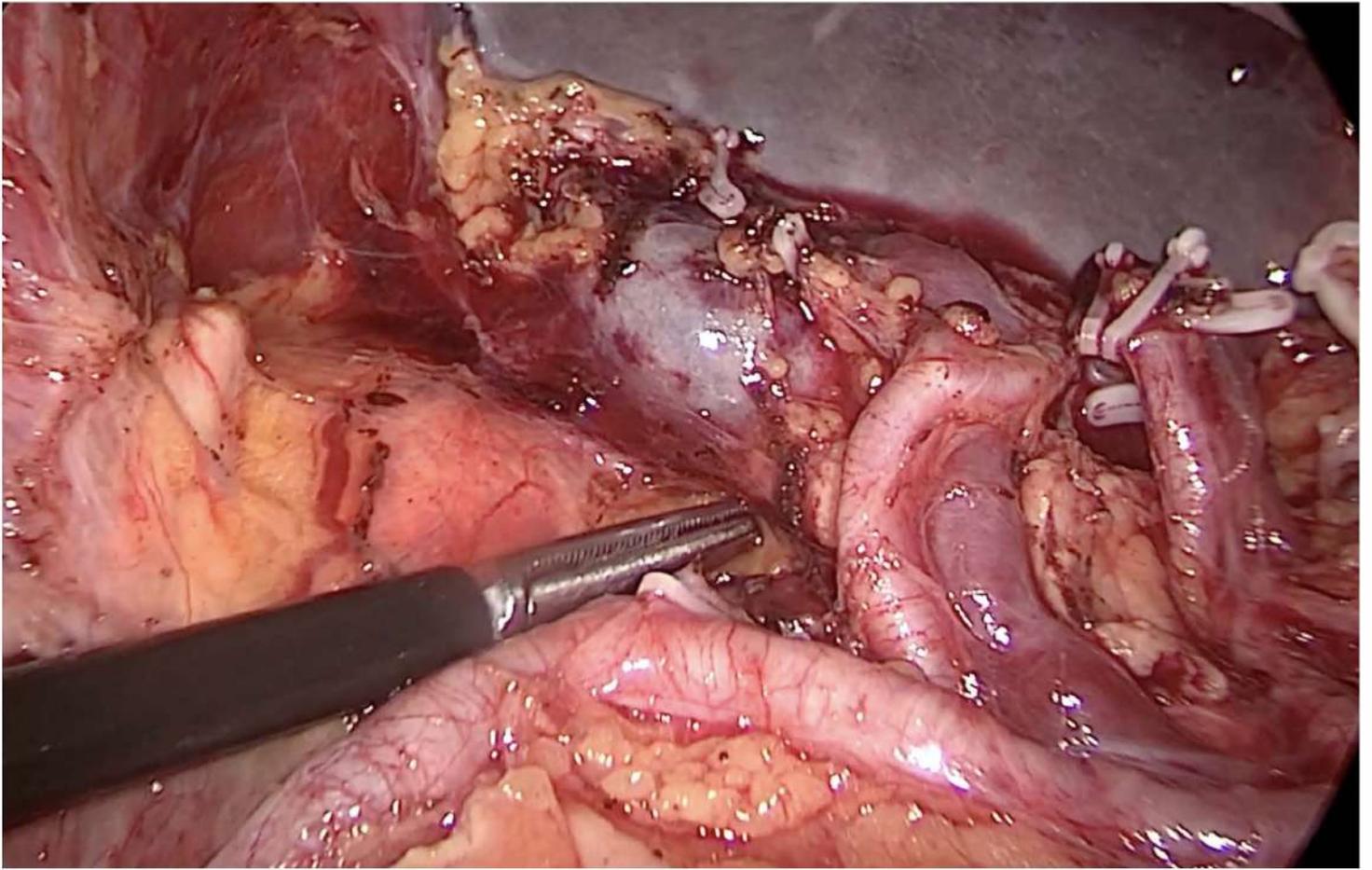
If lesion was T4a and located at pyloric, D2 plus (+ groups 12b, p) was performed.

Splenic hilar lymphadenectomy (group 10) is performed for lesions located at the middle or upper third of the stomach with total or near total (distal subtotal) gastrectomy.

For tumors penetrating the serosa of the posterior gastric wall (T4a), bursectomy may be performed with the aim of removing microscopic tumor deposits in the lesser sac.

**Results:** There are 1230 patients affected gastric adenocarcinoma between Mar 2008 and Mar 2021 at UMC were undergone laparoscopic gastrectomy (1009 distal and 221 total). Stages of the tumor were IIA 252 (20.5%), IIB 290 (23.6%), IIIA 438 (35.6%), IIIB 188 (15.3%) and IIIC 62 (5.1%) patients. The overall postoperative morbidity were 4.9% (60 patients), most of them is minor complications. There are 15 cases affected major complications including anastomotic leak (7 cases), duodenal stump leak (3 cases), postoperative bleeding (3 cases), early intestinal obstruction (2 cases). The mean hospital stay was 7.5 days. Two patients was died within 30-post operative period due to pulmonary embolism and severe infection. 92.3% of patients are followed up. One-year, three-year and five-year overall survival rates were 93.5%, 85.4% and 68.5%, respectively.

**Image:**



**Conclusions:** Laparoscopic gastrectomy is technical feasibility, safe technique and providing an acceptable oncologic outcomes in AGC.

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1230

**RISK FACTORS FOR THE SEVERITY OF COMPLICATIONS IN MINIMALLY INVASIVE TOTAL GASTRECTOMY**

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**Objectives:** Minimally invasive gastrectomy is a promising surgical method with well-known benefits, including reduced postoperative complications. However, for total gastrectomy of gastric cancers, this approach does not remarkably reduce the risk of complications. Therefore, we aimed to evaluate the incidence and risk factors for the severity of complications associated with minimally invasive total gastrectomy for gastric cancer.

**Methods:** The study included 392 consecutive patients with gastric cancer who underwent either laparoscopic or robotic total gastrectomy from 2011 to 2019. Clinicopathological and operative characteristics were assessed to determine features related to postoperative complications after minimally invasive total gastrectomy. Binomial and multinomial logistic regression models were used to identify the risk factors for overall complications and for mild and severe complications, respectively.

**Results:** Of 103 (26.3%) patients experiencing complication, 66 (16.8%) and 37 (9.4%) developed mild and severe complications, respectively. On multivariate analysis, more intraoperative bleeding was the only risk factor for overall complication (odds ratio [OR]=1.02, 95% confidence interval [CI]: 1.001-1.04;  $p=0.044$ ). On multivariate multinomial regression analysis, independent predictors of severe complication included obesity (OR=2.56, 95% CI: 1.02-6.43;  $p=0.046$ ), advanced stages (OR=2.90, 95% CI: 1.13-7.43;  $p=0.026$ ), and more intraoperative bleeding (OR=1.04, 95% CI: 1.02-1.06;  $p=0.001$ ). Operation time was the only independent risk factor for mild complications (OR=1.06, 95% CI: 1.001-1.13;  $p=0.047$ ).

**Conclusions:** Risk factors for mild and severe complications were associated with surgery, indicating surgical difficulty. Surgeons should be aware of these potential risks related to the severity of complications to reduce surgery-related complications after minimally invasive total gastrectomy for gastric cancer.

*Minimally-invasive and robot-assisted surgery*

IGCC22-ABS-1233

**DIFFERENT RISK FACTORS FOR LEAKAGE AND STENOSIS AFTER MINIMALLY INVASIVE TOTAL GASTRECTOMY**

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**Objectives:** Minimally invasive gastrectomy is a promising surgical method with well-known benefits, including faster postoperative recovery. However, for total gastrectomy for gastric cancer, this approach does not remarkably reduce the risk of anastomotic complications. Therefore, our aim was to evaluate the incidence and risk factors for anastomotic stenosis and leakage associated with minimally invasive total gastrectomy for gastric cancer.

**Methods:** The study group included 428 consecutive patients with gastric cancer who underwent either laparoscopic or robotic total gastrectomy from 2009 to 2019. Clinicopathologic and operative characteristics were compared between patients with stenosis, leakage, and no anastomotic complications. Multivariate multinomial logistic regression was used to identify risk factors for complications.

**Results:** Anastomotic stenosis and leakage occurred in 23 (5.4%) and 10 (2.3%) of patients, respectively. On multinomial regression analysis, female sex was associated with a higher rate of stenosis (adjusted odds ratio [OR]=2.68, 95% confidence interval [CI]: 1.05-6.85; p=0.039). A longer proximal margin (adjusted OR=0.68, 95% CI: 0.49-0.95; p=0.022) and use of linear stapler for esophagojejunostomy (adjusted OR=0.12, 95% CI: 0.03-0.43; p=0.001) were related to a lower rate of stenosis. Operative time was the only independent risk factor for leakage relative to no anastomotic complication (adjusted OR=1.14, 95% CI: 1.02-1.27; p=0.018).

**Conclusions:** Based on our findings, the potential risk factors for anastomotic stenosis after minimally invasive total gastrectomy for gastric cancer are female sex, use of a circular stapler for esophagojejunostomy, and a shorter proximal margin, with a longer operative time being the only independent risk factor for leakage.

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1343

**SHORT-TERM OUTCOMES OF LAPAROSCOPIC GASTRECTOMY IN 3 CENTERS OF LATIN AMERICA**

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**Objectives:** Laparoscopic surgery has gained increasing popularity for the treatment of gastric cancer (GC) worldwide. However, patients' characteristics, tumor operative techniques, and in-hospital treatment differ according to regional variations. Thus, this study aimed to compare the clinicopathologic and surgical outcomes of laparoscopic gastrectomy (LG) in GC patients from 3 different countries – Brazil (BRA), Chile (CHL), and Argentina (ARG). This Project was developed to attempt to establish a cooperative group of minimally invasive surgery in South America. This report describes the first joint data analysis.

**Methods:** In this multicenter study, we reviewed the data of LG between 2006-2020 in CHL, 2010-2019 in BRA, and 2020-2021 in ARG. All included patients had a diagnosis of gastric adenocarcinoma, in whom the tumor was considered surgically resectable. Diagnostic laparoscopy and wedge resections were excluded.

**Results:** A total of 246 patients were included: 144 (58.5%) from CHL, 92 (37.4%) from BRA and 10 (4.1%) from ARG. Most were male (53.3%) with a mean age of 61.5 years old. Regarding the differences between countries, patients from CHL were older ( $p=0.002$ ) and had a higher body mass index ( $p=0.023$ ). Lower third tumors accounted for 70% of cases in BRA, while in CHL and ARG the frequency was 35.4% and 30%, respectively ( $p<0.001$ ). The extent of resection and lymphadenectomy, Lauren type, TNM stages, type of anastomosis and reconstruction were different between countries (all  $p<0.05$ ). The length of hospital stay was longer in ARG ( $p=0.008$ ). There was no significant difference in postoperative complications and mortality rates between the 3 countries.

**Image:**

**Table.** Clinical, surgical, pathological and postoperative characteristics of patients with gastric cancer who performed laparoscopic gastrectomy – Brazil, Chile and Argentina.

Variables	Brazil n = 92 (%)	Chile n = 144 = (%)	Argentina n = 10 (%)	p
<b>Sex</b>				0.875
Female	42 (45.7)	69 (47.9)	4 (40)	
Male	50 (54.3)	75 (52.1)	6 (60)	
<b>Age (years)</b>				0.002
Mean (SD)	58.6 (13.8)	63.8 (12.5)	54 (12.3)	
<b>Body Mass Index (Kg/m<sup>2</sup>)</b>				0.023
Mean (SD)	24.8 (4.7)	26.4 (4.2)	24.7 (3.4)	
<b>ASA classification</b>				0.564
I / II	73 (79.3)	122 (84.7)	9 (90)	
III / IV	19 (20.7)	22 (15.3)	1 (10)	
<b>Tumor location</b>				<0.001
Lower third	66 (71.7)	51 (35.4)	3 (30)	
Middle third	20 (21.7)	52 (36.1)	6 (60)	
Upper third	6 (6.5)	41 (28.5)	1 (10)	
<b>Extent of lymphadenectomy</b>				<0.001
D1	10 (10.9)	54 (37.5)	0 (0)	
D2	82 (89.1)	90 (62.5)	10 (100)	
<b>Type of resection</b>				<0.001
Subtotal	70 (76.1)	64 (44.4)	1 (10)	
Total	22 (23.9)	80 (55.6)	9 (90)	
<b>Type of anastomosis</b>				<0.001
Manual	0 (0)	86 (59.7)	0 (0)	
Stapler	92 (100)	58 (40.3)	10 (100)	
<b>Reconstruction</b>				0.119
Roux-en-Y	91 (100)	135 (95.7)	10 (100)	
BI or BII	0 (0)	6 (4.3)	0 (0)	
<b>Histological Type</b>				0.003
Intestinal	42 (45.7)	69 (47.9)	3 (30)	
Diffuse	50 (54.3)	60 (41.7)	7 (70)	
Not specified	0 (0)	15 (10.4)	0 (0)	
<b>Tumor size (cm)</b>				0.080
Mean (SD)	3.3 (2.0)	3.2 (2.2)	4.8 (2.3)	
<b>No of lymph nodes retrieved</b>				0.089
Mean (SD)	42.3 (18.6)	36.4 (21.6)	38.3 (10.2)	
<b>pT</b>				0.005
T1/T2	57 (62)	101 (70.1)	2 (20)	
T3/T4	35 (38)	43 (29.9)	8 (80)	
<b>pN</b>				0.010
N0	50 (54.3)	102 (70.8)	4 (40)	
N+	42 (45.7)	42 (29.2)	6 (60)	
<b>pTNM</b>				0.012
I / II	65 (70.7)	115 (79.9)	4 (40)	
III / IV	27 (29.3)	29 (20.1)	6 (60)	
<b>Residual tumor</b>				0.029
R0	92 (100)	133 (92.4)	9 (90)	
R1/R2	0 (0)	11 (7.6)	1 (10)	
<b>Length of hospital stay</b>				0.008
Median (IQR)	8 (5 – 11.7)	7 (6 - 9)	11 (9 - 14.75)	
<b>Postoperative complications (POC)</b>				0.056
None/Minor POC	78 (84.8)	135 (93.8)	10 (100)	
Major POC	14 (15.2)	9 (6.2)	0 (0)	
<b>30-day Mortality*</b>				1.0
No	89 (96.7)	47 (95.9)	10 (100)	
Yes	3 (3.3)	2 (4.1)	0 (0)	
<b>90-day Mortality*</b>				0.808
No	84 (93.3)	41 (95.3)	6 (100)	
Yes	6 (6.5)	2 (4.7)	0 (0)	

\* Follow-up data not available for some cases

**Conclusions:** LG showed differences even between South American countries regarding patient and tumor characteristics, and surgical aspects – but similar short-term outcomes. The inclusion of more centers may contribute to better identification of the LG scenario in GC treatment in Western countries

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1195

**SINGLE-INCISION VERSUS MULTI-PORT LAPAROSCOPIC DISTAL GASTRECTOMY A RANDOMIZED CONTROLLED TRIAL**

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**Objectives:** Surgical skills and devices have evolved to a level that allowed the paradigm in minimally invasive surgery is to shift towards patient quality of life (QOL) and satisfaction. Such innovations allow technically demanding procedures such as single-incision distal gastrectomy (SIDG) to become more feasible. However, there have been no reports of a randomized trial comparing SIDG to multi-port gastrectomy. This study evaluates the postoperative outcomes and patient QOL of SIDG compared to conventional totally laparoscopic distal gastrectomy (TLDG).

**Methods:** This study was designed as a prospective phase II randomized controlled study. Patients diagnosed with early gastric cancer in the distal 2/3<sup>rd</sup> of the stomach were randomized to either TLDG or SIDG group. All operations were performed by a single surgeon. Primary endpoint was pain score using the visual analogue scale on postoperative day (POD) 1. Other outcomes include operative data, complications, and patient QOL using the European Organization for Research and Treatment of Cancer C-30 and STO22 modules.

**Results:** A total of 43 patients were enrolled to each group from September 2017 to February 2020. There was no statistical difference in age, sex, body mass index, and comorbidity score. Mean operation time was  $157.4 \pm 53.5$  minutes in the TLDG group and  $148.9 \pm 50.1$  minutes in the SIDG group ( $p = 0.445$ ). There was no difference in POD1 pain scores between the two groups (TLDG =  $3.5 \pm 0.8$ , SIDG =  $3.4 \pm 1.0$ ,  $p = 0.818$ ). No additional trocars were used in the SIDG group, and there was no conversion to an open procedure in both groups. One (2.4%) patient in each group had a postoperative complication that needed invasive intervention. Mean hospital stay was  $6.2 \pm 2.1$  days in the TLDG group and  $6.3 \pm 2.8$  days in the SIDG group ( $p=0.829$ ).

**Conclusions:** There was no difference in POD1 pain scores between SIDG and TLDG. SIDG did not increase short-term morbidity compared to TLDG.

*Minimally-invasive and robot-assisted surgery*

IGCC22-ABS-1171

**SHORT-TERM OUTCOMES OF LAPAROSCOPIC GASTRECTOMY AFTER NEOADJUVANT CHEMOTHERAPY FOR GASTRIC CANCER**

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**Objectives:** Laparoscopic surgical approaches for gastric cancer after neoadjuvant chemotherapy (NACT) are increasing, yet limited evidence of the safety and effectiveness.

**Methods:** The prospective single-armed clinical trial enrolled 80 NACT patients who underwent laparoscopic gastrectomy(LG). In addition, to better analyze the outcomes of this study, 1:2 propensity score matching (PSM) was performed, and a control group containing 160 LG patients without NACT was established.

**Results:** The final analysis included the NACT group (n=80) and the control group (n=160). The general clinical data of both groups were comparable. The NACT group showed less intraoperative bleeding (p=0.013), recovers more quickly (all p<0.05). The two groups were not largely different in terms of postoperative complications (p=0.586) or severe complications (p=0.055). Patients with ypT4 stage and ypN3 stage disease accounted for 20.7% and 23.8% of the NACT group, respectively, which were significantly lower than those in the control group (p=0.008). The number of metastatic lymph nodes was 4.8±7.0 in NACT groups, which was lower than that in the control group (p<0.001). In the NACT group, the major pathological regression rate was 27.5%, while the objective radiological response rate (CR+PR) was 64.0%. In contrast to nonresponding patients, objectively responding patients had a shortened operating time (p<0.001), less intraoperative bleeding (p<0.001), and fewer metastatic lymph nodes (p=0.005). The nonresponding patients were similar to those in the control group in terms of short-term effects.

**Conclusions:** LG could achieve improved short-term outcomes through NACT tumor downstaging without increasing postoperative complications. Further multicenter and prospective clinical trials are suggested.

*Minimally-invasive and robot-assisted surgery*

IGCC22-ABS-1222

**COMPARISON OF THE QOL BETWEEN LPG WITH DTR AND LTG: A PROPENSITY SCORE MATCHING ANALYSIS**

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**Objectives:** Laparoscopic proximal gastrectomy (LPG) with double tract reconstruction (DTR) is an emerging function-preserving surgery for upper one-third gastric cancer.

This is the first study that evaluates the quality of life of LPG with DTR compared to laparoscopic total gastrectomy (LTG) by propensity score matching.

**Methods:** We retrospectively collected 35 LPG with DTR and 35 LTG using PSM between January 2014 and December 2018 at Seoul National University Bundang Hospital. The patient's quality of life was analyzed using the European Organization for the Research and Treatment of Cancer (EORTC) Core Quality of Life (QoL) Questionnaire and the EORTC QoL Questionnaire-Stomach module from prospectively maintained database and hospital electronic medical chart.

Each QoL scale of both groups was compared at preoperatively, 3 months, 12 months, and 24 months after surgery. The surgical outcomes, postoperative complications, iron deficiency anemia, vitamin B12 replacement, and nutritional parameters were also analyzed. The gastric emptying scan was performed at postoperative 4 months, 12 months, and 24 months in the LPG with DTR group to evaluate the proportion of food passing through the remnant stomach versus the proximal jejunum.

**Results:**

There were no significant differences in the surgical outcomes and postoperative complications between the two groups. LTG group was more prone to be deficient in vitamin B12 ( $p = 0.036$ ) despite requiring more replacement of vitamin B12 ( $p < 0.001$ ).

The LPG with DTR group showed less nausea and vomiting symptoms within the 2 years after surgery on QoL analysis ( $p < 0.026$ ).

The gastric emptying scan showed that the food inflow to the remnant stomach increased over time ( $r_2 = 0.862$ ). It was correlated with post-gastrectomy symptoms such as fatigue, nausea, vomiting and pain.

**Conclusions:**

The LPG with DTR showed better QoL with comparable surgical outcomes and complications over LTG for preventing vitamin B12 deficiency and improving life quality.

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1394

**LONG-TERM OUTCOMES OF LAPAROSCOPIC TOTAL GASTRECTOMY FOR GASTRIC CANCER**

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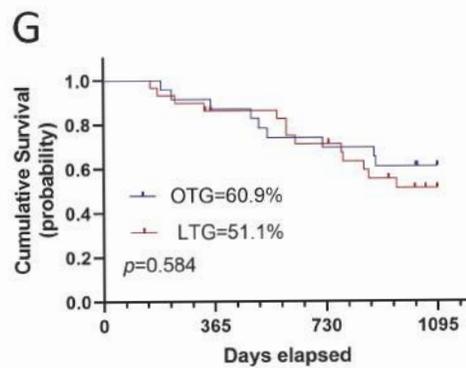
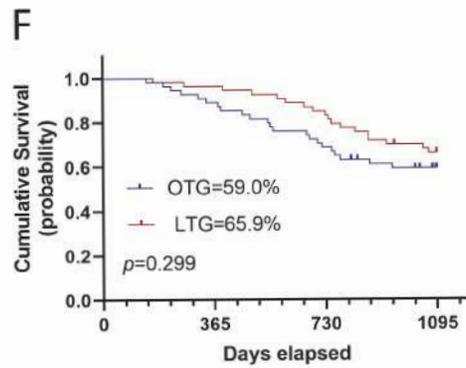
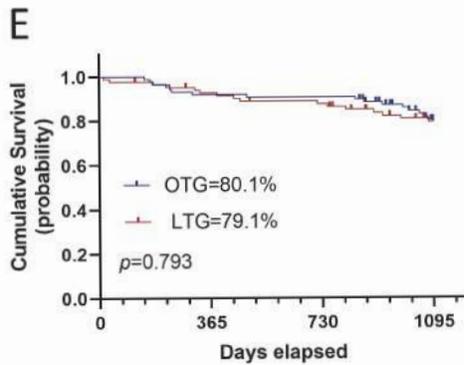
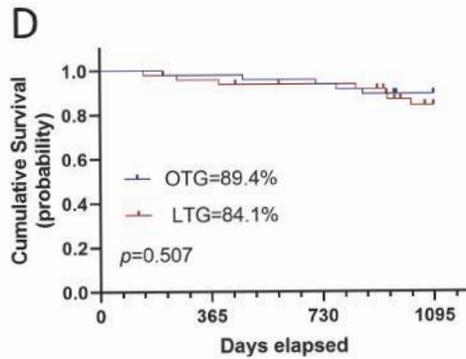
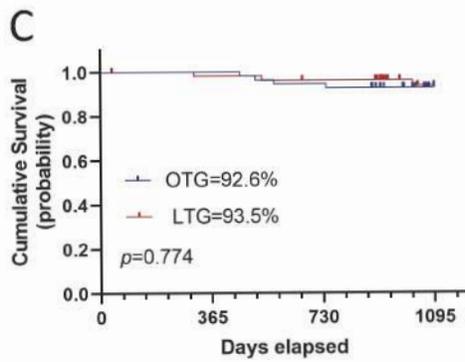
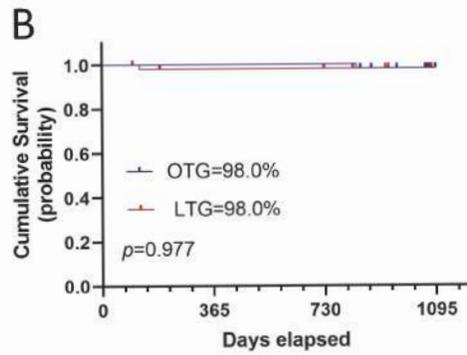
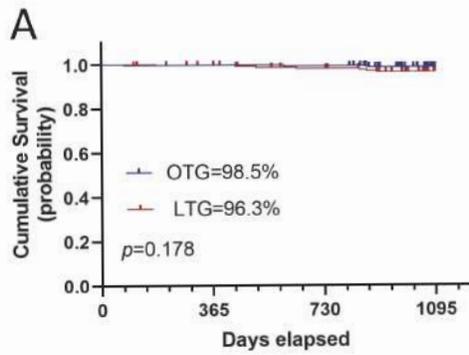
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**Objectives:** The long-term oncologic and surgical outcomes of laparoscopic total gastrectomy for patients with early and locally advanced gastric cancer are still pending. The aim of this study is to investigate its efficacy and safety to provide reference for the guidance of current clinical practice.

**Methods:** A total of 2667 patients who were treated with curative intent were retrospectively collected between January 2011 and December 2017 from 4 large volume centers. Various clinicopathologic factors possibly affecting the choice of surgical procedure and influencing clinical prognosis were confirmed to generate propensity scores. After propensity score matching (PSM), 516 pairs of patients were selected to examine the efficacy and safety of laparoscopic total gastrectomy (LTG) over open total gastrectomy (OTG).

**Results:** Patients and tumor characteristics in the OTG group and the LTG group were well balanced after PSM. The LTG group presented significant advantages with respect to shorter time to ambulation, first flatus, and postoperative hospital stay. The morbidity of the case-matched group was 18.4% in the OTG group and 15.7% in the LTG group, which showed no statistical significance ( $p=0.247$ ). The 3-year overall survival (OS) was 88.2% in the OTG and 86.7% in the LTG group. OS was not statistically different at each cancer stage in our study. Age, neoadjuvant chemotherapy (NAC), pathological TNM stage and nerve invasion were found as independent risk factors for overall survival.

**Image:**



**Conclusions:** The long-term oncological and surgical outcomes of laparoscopic total gastrectomy for GC patients are not inferior over matched patients undergoing open total gastrectomy. The number and composition of enrolled patients in the present study not only ensure the feasibility of LTG for early GC but also set as reliable reference for prospective randomized trials investigating the safety and efficacy of LTG for patients at locally advanced stage.

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1248

**FLUORESCENCE IMAGE-GUIDED LYMPHADENECTOMY USING INDOCYANINE GREEN IN ROBOTIC GASTRECTOMY**

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**Objectives:** The objective of this study was verifying the feasibility and the role of a lymphadenectomy assisted by fluorescence imaging during robotic gastrectomy.

**Methods:** This is an interventional prospective study. Inclusion criteria: cT1-cT3 and cN0-N+. Description: the day before surgery, the ICG was injected endoscopically into the submucosa around the tumor (0.83mg / mL, 0.3mL x 4-6). Each patient underwent a robotic total D2 gastrectomy. The lymph node stations were sent to the pathologist in different containers and further subdivided according to fluorescence.

**Results:** Twenty patients were included in this study (Female=65%; mean age=73±9.56y). Among the pathological findings: mean tumor size=41.4mm±28.03; EGC was found in 45% of cases; 45% of patients had no Lns metastases (N0, no.=9), 20% had up to 2 metastatic Lns (N1, no.=4), 5% 3 to 6 metastatic Lns (N2, no.=1) and 30% a significant lymphnode spread with more than 7 metastatic Lns (N3a, no.=3; N3b no.=3). The 60% of patients showed an advanced stage of disease (II-III). No intraoperative major complications occurred. The total operative time was 324.61min±80.85, the EBL=103ml±102.83. The fluorescence detection rate was 100%. The total number of Lns analyzed was 1522Lns with a mean per patient=76.1Lns±25.41. The number of positive Lns for metastasis was 115Lns (mean=5.75Lns±9.11), consequently 1407Lns were free from disease. Total perigastric Lns=1155 (75.88%), while total extra-perigastric Lns=355 (24.12%). In the fluorescent tissue, 1349Lns were identified (88.63%).

All the 115 metastatic Lns were fluorescent, while all Lns found in the non-fluorescent tissue areas were free from disease.

**Conclusions:** Some advantages were found: easier detection of nodes in the adipose tissue and dissection in challenging anatomical sites, detection of small Lns that may escape at the normal view, checking the completeness of the lymphadenectomy at the end of the procedure.

*Minimally-invasive and robot-assisted surgery*

IGCC22-ABS-1417

**PRESERVATION OF HEPATIC BRANCH OF VAGUS NERVE REDUCES THE RISK OF GBS FORMATION AFTER GASTRECTOMY**

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**Objectives:** Injury to the vagus nerve has been proposed to be associated with occurrence of gallstones after gastrectomy. We investigated the effect of preservation of hepatic branch of the vagus nerve on prevention of gallstones during laparoscopic distal (LDG) and pylorus-preserving gastrectomy (LPPG).

**Methods:** Preservation of the vagus nerve was reviewed of cT1N0M0 gastric cancer patients underwent LDG (n = 323) and LPPG (n = 144) during 2016–2017. Presence of gallstones was evaluated by ultrasonography (US) and computed tomography (CT). Incidences of gallstones were compared between the nerve preserved (h-DG, h-PPG) group and sacrificed (s-DG, s-PPG) group. Clinicopathological features were also compared.

**Results:** The 3-year cumulative incidence of gallstones was lower in the h-DG (2.7%, n = 85) than the s-DG (14.6%, n = 238) (p = 0.017) and lower in the h-PPG (1.6%, n = 123) than the s-PPG (12.9%, n = 21) (p = 0.004). Overall postoperative complication rate was similar between the h-DG and s-DG (p = 0.861) as well as between the h-PPG and s-PPG (p = 0.768). The number of retrieved lymph nodes station #1 and 3-year recurrence-free survival were not significantly different between the preserved group and sacrificed group. Injury to the vagus nerve (p = 0.001) and high body mass index (BMI) ( $\geq 27.5$  kg/m<sup>2</sup>) (p = 0.040) were found to be independent risk factors of gallstone formation in multivariate analysis.

**Conclusions:** Preservation of hepatic branch of the vagus nerve can be recommended for LDG as well as LPPG of early gastric cancer patients to reduce postoperative gallstone formation.

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1474

**RECONSTRUCTION METHOD AFTER LAPAROSCOPIC PROXIMAL GASTRECTOMY -  
ESOPHAGOGASTROSTOMY VS DOUBLE-TRACT.**

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**Objectives:** The optimal method for reconstruction after proximal gastrectomy has not been established. Therefore, we compared the treatment results of major two reconstruction method in our department; esophagogastrostomy and double-tract method.

**Methods:** We retrospectively analyzed the patient background, surgical factors, and postoperative course in 120 patients who underwent laparoscopic or robotic proximal gastrectomy from January 2015 to December 2018. The esophagogastrostomy (EG) and the double-tract method (DT) were compared.

**Results:** Of the total 120 cases, 93 were in the EG group and 27 were in the DT group. There were no significant differences in age, gender, BMI, and ASA-PS between the two groups, but esophageal invasion was significantly more in the EG group at 41 (44%): 5 (19%) ( $p = 0.028$ ). The operation time (minutes) and bleeding (g) were 297 (138-613): 315 (172-577) and 15 (0-845): 20 (0-1590), respectively, showing no significant difference. No anastomotic stenosis of CD Grade 3 or higher was observed, and anastomotic leakage was equivalent to each group; 3 (3.2%): 1 (3.7%). Body weight (preoperative ratio, %) at 3 months, 6 months, and 1 year after surgery was also 89.0 (78.9-104.7): 89.1 (82.0-96.8), 86.7 (64.2-104.1): 89.8 (72.8-95.8), 87.2 (71.7-104.7): 87.1 (72.6-100.8), respectively, showing no significant difference. In the EG group, reflux esophagitis of LA classification Grade C or higher was observed in 8 patients (8.6%) 1 year after the operation, but all of them had good symptom control with oral medication. In the DT group, there were two cases (7.4%) in which the residual stomach could not be observed with an endoscope.

**Conclusions:** There were no significant differences in surgical factors and postoperative nutritional status between the two groups. We are currently planning a randomized trial comparing the two.

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1139

**MINIMALLY INVASIVE RECOVERY PROGRAM IN THE ERA OF MINIMALLY INVASIVE GASTRECTOMY FOR GASTRIC CANCER**

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**Objectives:** In 2016, Kaiser Permanente Northern California Gastric Cancer Surgery Group implementing a minimally invasive recovery program for patients who underwent curative-intent minimally invasive gastrectomy and D2 lymphadenectomy for gastric cancer. This study evaluated the effect of the program on short term outcomes.

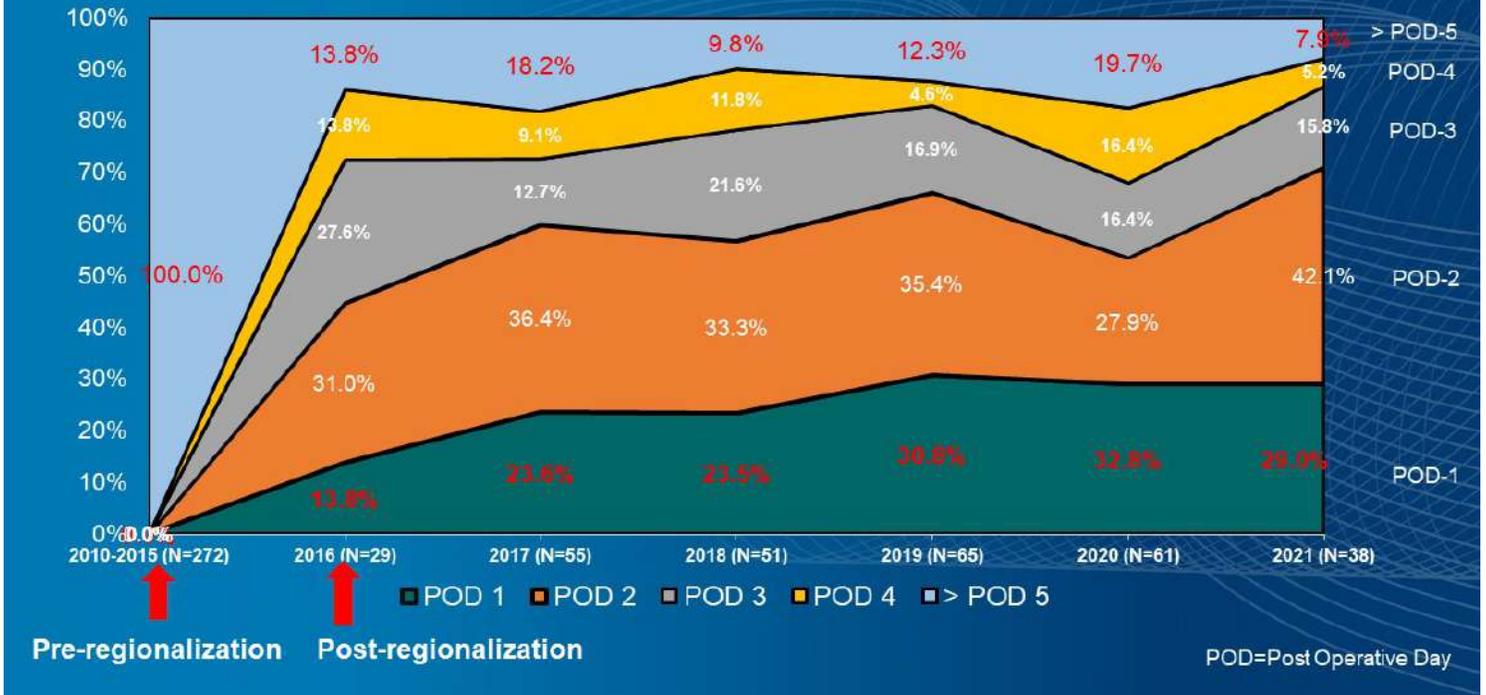
**Methods:** This prospective cohort study included all patients who underwent curative-intent elective minimally invasive gastrectomy and lymphadenectomy from April 2016 to July 2021. The minimally invasive recovery program involves a comprehensive perioperative education, nutritional and physical optimization, minimally invasive surgical approach, multimodality pain management, postoperative early oral intake and ambulation, no nasogastric tube, no drains, no feeding tube, no upper GI study and early removal of the urinary catheter. Information was obtained from the electronic medical record and chart review. We compared the length of hospital stays, 30-days readmission and re-operation rate and 90-days mortality.

**Results:** There were 571 patients (272 in pre-implementation and 299 during the Post-implementation), median age of 68, and 40% female. The length of stays (median) was seven days (pre-implementation) and decreased to three days (2016) and two days (2017-2021) ( $P < 0.0001$ ), with 80 patients (26.8%) went home a day after their gastrectomy (Figure 1). There was no statistical difference in group patients who went home on POD 1 and > POD 2 with the 30 days readmission rate (10% vs 10.5%) and re-operation rate (11.3% vs 10%) with 90 days mortality rate of (0% vs 0.7%).

Table 2

**Image:**

**Figure 1: Minimally Invasive Recovery Program**  
 Length of Hospital Stay (d), following Gastrectomy for Cancer  
 Pre-regionalization vs Post-regionalization



**Conclusions:** A significant perioperative care paradigm change can take place safely when the minimally invasive recovery program is applied. These changes required comprehensive patient education, perioperative optimization, and full multidisciplinary approach support. Such initiatives can result in substantial improvement in patient care and cost-effectiveness in gastric cancer surgery care delivery.

*Minimally-invasive and robot-assisted surgery*

IGCC22-ABS-1381

**ANATOMICAL POSITION OF THE PANCREAS AS A RISK FOR PANCREATIC FISTULA AFTER LAPAROSCOPIC GASTRECTOMY**

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**Objectives:** Pancreatic fistula (PF) is a serious problem after laparoscopic gastrectomy (LG) and real-world evidence from a Japanese nationwide survey showed that LG for gastric cancer is more frequently accompanied by postoperative PF than is open gastrectomy. Hence, the compression-free pancreas procedure was introduced in LG to avoid PF in 2016 and became prevalent thereafter in our institution. This study aimed to validate the correlation between the anatomical position of the pancreas and PF and demonstrate the decreased risk of PF with the increased prevalence of the compression-free procedure.

**Methods:** Patients who underwent LG for gastric cancer from 2005 to 2019 in our institution were retrospectively reviewed. The correlations between PF and clinicopathological factors including two anatomical parameters were measured: distance from the anterior pancreas to the aorta (P-A length) and angle from the superior pancreas to the celiac artery root (UP-CA angle). The change in the incidence of PF over time from 2014 to 2019 with the increased prevalence of the compression-free procedure was analyzed.

**Results:** Among 3,485 patients, grade  $\geq$ III PF was observed in 62 (1.8%). The UP-CA angle [odds ratio (OR), 2.683; 95% confidence interval (CI), 1.573–4.574;  $P < 0.001$ ], male (OR, 2.241; 95% CI, 1.111–4.519;  $P = 0.024$ ), and body mass index (OR, 1.765; 95% CI, 1.036–3.008;  $P = 0.037$ ) were independently correlated with grade  $\geq$ III PF. In association with the prevalence of the compression-free pancreas procedure, PF decreased each year (OR, 0.688; 95% CI, 0.591–0.800;  $P < 0.001$ ) irrespective of UP-CA angle.

**Conclusions:** This study validated the significant correlation of the anatomical position of the pancreas with PF after LG and showed a lower risk of PF with a higher prevalence of the compression-free procedure even in patients with a high-risk anatomical position of the pancreas.

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1042

**DOES THE LAPAROSCOPIC GASTRECTOMY MAKE YOU HUNGRIER THAN OPEN SURGERY?**

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**Objectives:** We propose that laparoscopic surgery produces lesser postoperative anorexia compared to open surgery by reducing the postoperative inflammatory serum leptin surge. The aim of the present study was to compare the postoperative serum leptin levels, the nutritional status at discharge and to determine the correlation between leptin and pathologic and prognostic factors that might be associated with tumour progression and prognosis between laparoscopic and open surgery.

**Methods:** Fifty-four consecutive patients with adenocarcinoma of the stomach operated either with open or laparoscopic surgeries were included in the study. The serum levels of leptin were determined before and on day seven after surgery. Correlations between demographic and pathological characteristics, serum levels of leptin, haemoglobin and albumin were analysed.

**Results:** The linear regression model identified a significant correlation between low relative concentration of leptin on day seven and laparoscopic surgery (Beta -0.688;  $p < 0.0001$ ). In the subgroup with CRP levels below 100 mg/l serum level of albumin on day seven after surgery was significantly higher in patients after laparoscopic surgery. No significant difference was noted in the duration of the hospital stay between groups.

**Conclusions:** Laparoscopic surgery produced significantly lower relative leptin concentrations on day seven and higher serum albumin levels in the subgroup with CRP levels below 100 mg/l at discharge. These results suggested that laparoscopic gastric cancer surgery might reduce postoperative leptin response leading to a better nutritional status at discharge compared to open surgery.

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1170

**LAPAROSCOPIC GASTRECTOMY FOR GASTRIC CANCER: 10-YEAR EXPERIENCE IN A TEACHING CENTER**

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**Objectives:** Laparoscopic surgical approaches for gastric cancer are increasing, yet limited evidence between the learning curve and long-term outcomes. To analyze survival in GC patients at a single center over 10 years and characterize the relationship between the learning curve and prognosis.

**Methods:** This retrospective cohort study studied 3674 patients who underwent laparoscopic radical gastrectomy for gastric cancer. Cusum and Cox regression were used to assess the association between the surgeon's experience and the 3 years overall survival (OS).

**Results:** The 3-year OS of all patients was 71.8%. This increase of 3-year OS was associated with laparoscopic cases ( $r=0.638$ ,  $p=0.047$ ). Analysis of the CUSUM curve showed a significant change in the 3-year OS of 1400 cases. Further propensity score matching of patients during and after the learning curve ( $<1400$  and  $\geq 1400$  cases) showed a significant difference in the 3-year OS between the two groups (68.5% vs. 72.3%,  $p=0.045$ ). Cox regression analysis verified that in  $\geq 1400$  cases, prior laparoscopic surgery ( $p=0.045$ ), textbook outcome (TO) and the number of retrieved lymph nodes (LNs) were the independent protective factor. The LN non-compliance rate was an independent risk factor. In contrast, the rate of TO and the median number of retrieved LNs were significantly higher after the learning curve ( $\geq 1400$  cases). Furthermore, the rates of LN non-compliance were significantly lower ( $p<0.05$ ).

**Conclusions:** Increasing laparoscopic surgical experience is associated with surgical quality and prognostic improvement in patients with gastric cancer. But improvements in outcome accrued slowly over a long period.

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1386

**INTRACORPOREAL OVERLAPPING ANASTOMOSIS METHOD IN MINIMALLY INVASIVE PYLORUS-PRESERVING GASTRECTOMY**

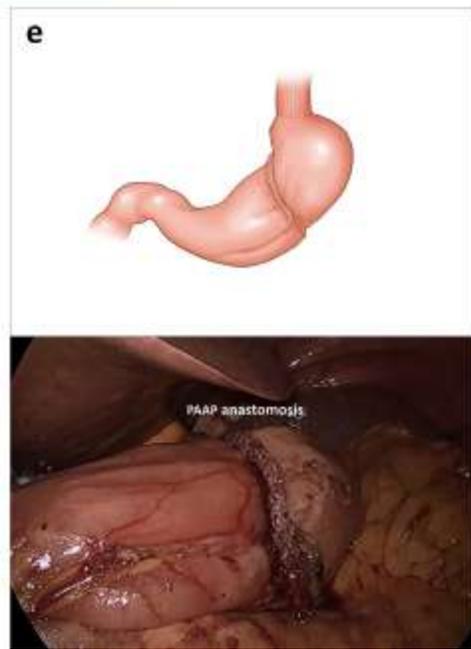
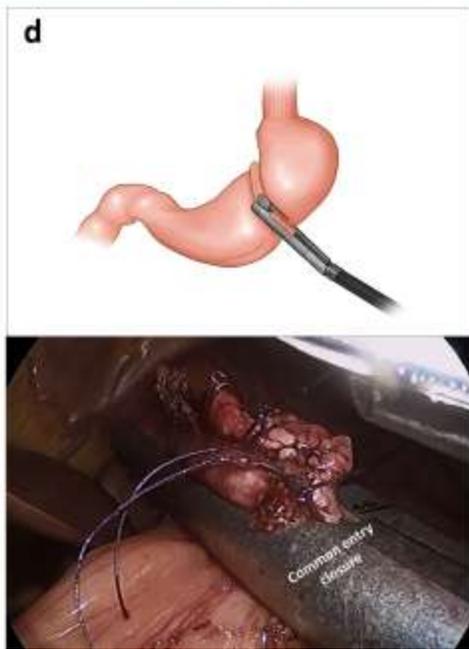
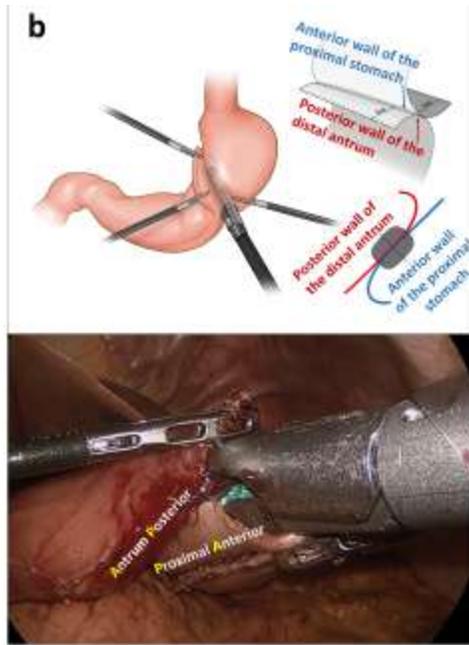
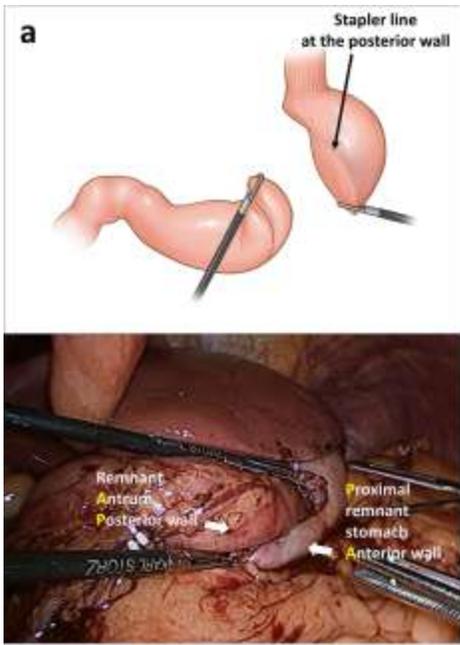
Ji-Hyeon Park<sup>1</sup>, Seong-Ho Kong<sup>1</sup>, Jong-Ho Choi<sup>1</sup>, Yun-Suhk Suh<sup>1</sup>, Do Joong Park<sup>1</sup>, Hyuk-Joon Lee<sup>1</sup>, Han-Kwang Yang<sup>1</sup>  
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**Objectives:** To evaluate the feasibility and safety of intracorporeal overlapping gastrogastrostomy between the proximal anterior wall and antrum posterior wall (PAAP; PAAP anastomosis) of the stomach in minimally invasive pylorus-preserving gastrectomy (PPG) for early gastric cancer (EGC).

**Methods:** From December 2016 to December 2019, 17 patients underwent minimally invasive PPG with PAAP anastomosis for EGC in the high body and posterior wall of the stomach. Intraoperative gastroscopy was performed with the rotation maneuver during proximal transection. A longer antral cuff (>4–5 cm) was created for PAAP than for conventional PPG ( $\leq 3$  cm) at the point where a safe distal margin and good vascular perfusion were secured. Because the posterior wall of the proximal remnant stomach was insufficient for intracorporeal anastomosis, the anterior wall was used to create an overlapping anastomosis with the posterior wall of the remnant antrum. The surgical and oncological outcomes were analyzed, and the stomach volume was measured in patients who completed the 6-month follow-up. The results were compared to those after conventional PPG (n=11 each).

**Results:** PAAP anastomosis was successfully performed in 17 patients. The proximal and distal resection margins were  $2.4 \pm 1.9$  cm and  $4.0 \pm 2.6$  cm, respectively. No postoperative complications were observed during the 1-year follow-up esophagogastroduodenoscopy (n=10). The postoperative remnant stomach (n=11) was significantly larger with PAAP than with conventional PPG ( $225.6 \pm 118.3$  vs.  $99.1 \pm 63.2$  mL;  $P=0.001$ ). The stomach length from the anastomosis to the pylorus was  $4.9 \pm 2.4$  cm after PAAP.

**Image:**



**Conclusions:** PAAP anastomosis is a feasible alternative for intracorporeal anastomosis in minimally invasive PPG for highly posteriorly located EGC.

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1462

**COMPARISON OF ROBOTIC-ASSISTED AND LAPAROSCOPY-ASSISTED GASTRECTOMY - DATA OF A 5-YEAR PERIOD**

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**Objectives:** The role of robotic-assisted gastrectomy (RAG) for cancer is under discussion since controversial evidence has been presented regarding potential benefits of robotic assisted procedures over laparoscopy-assisted ones.

**Methods:** Out of 3810 primary gastric cancer resections from 2013 to 2017, 272 were carried out as RAG and 1417 as laparoscopy-assisted gastrectomy (LAG), which were to be compared retrospectively. Propensity-score matching was performed to compare both groups. Patient cohort was compared overall and for each resection type separately, which was the exact matching criteria besides sex, age and p-T and pN-category as covariates.

**Results:** For each method RAG and LAG, 46 total gastrectomies, 95 distal gastrectomies, 5 proximal gastrectomies and 125 pylorus-preserving gastrectomies were matched. Overall localized and systemic complication rate were 13.6% and 7.0% for LAG and 15.8% and 5.9% for RAG ( $p=0.468$  and  $0.600$ ). For each resection type subgroup there was not significant difference found in regard of overall complication, major complication, minor complication, comprehensive complication index, hospital stay or numbers of retrieved lymph nodes. For the detailed organ-based complication neither RAG nor LAG showed any significant increase of any type of complication. Long-term survival data are awaited soon.

**Conclusions:** These data collected over a 5-year period suggest that no benefits can be found for robotic-assisted gastrectomy accounting for all resection types. The robotic assisted approach presents as another well established, but non-superior treatment option compared to laparoscopy-assisted gastrectomy for gastric cancer.

*Minimally-invasive and robot-assisted surgery*

IGCC22-ABS-1264

**TOTALLY LAPAROSCOPIC TOTAL GASTRECTOMY USING THE MODIFIED OVERLAP METHOD AND OPEN TOTAL GASTRECTOMY**

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**Objectives:** The best anastomosis technique for totally laparoscopic total gastrectomy (LTG) has not been established. We sought to investigate the effectiveness and surgical outcomes of LTG using the modified overlap method compared with open total gastrectomy (OTG) using the circular stapled method.

**Methods:** We performed 151 and 131 surgeries using LTG with the modified overlap method and OTG for gastric cancer between March 2012 and December 2018. Surgical and oncological outcomes were compared between groups using propensity score matching. In addition, we analyzed the risk factors associated with postoperative complications. **Results:** Patients who underwent LTG were discharged earlier than those who underwent OTG (LTG [9.62 ± 5.32] vs. OTG [13.51 ± 10.67],  $p < 0.05$ ). Time to first flatus and soft diet were significantly shorter in LTG group. The pain scores at all postoperative periods and administration of opioids were significantly lower in the LTG group than in the OTG group. No significant difference in early, late and EJ-related complications or 5-year recurrence free and overall survival between groups. Multivariate analysis demonstrated that BMI (OR, 1.824; 95%CI 1.029–3.234,  $p = 0.040$ ) and ASA score (OR, 3.154; 95% CI 1.084–9.174,  $p = 0.035$ ) were independent risk factors of early complications. Additionally, age was associated with  $\geq 3$  CDC and EJ-related complications.

**Conclusions:** Although LTG with the modified overlap method showed similar complication rate and oncological outcome with OTG, it yield lower pain score, earlier bowel recovery, and discharge. Surgeons should perform total gastrectomy cautiously and delicately in patients with obesity, high ASA scores, and older ages.

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1159

**TRANSVAGINAL OR TRANSUBILICUS,WHICH IS MORE SUITABLE IN FEMALE PATIENTS WITH GASTRIC CANCER?**

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<sup>1</sup>Department of gastric surgery, <sup>2</sup>Department of Gynecology, Cancer Hospital of China Medical University (Liaoning Cancer Hospital and Institute), Shenyang, China

**Objectives:** Natural Orifice Specimen Extraction(NOSE)laparoscopic surgery is emerging as a new and promising technique,especially in gastric cancer(GC).However, whether the transvaginal specimen extraction had advantages compared to the transumbilicus following the totally laparoscopic gastrectomy(TLG)was debatable.

**Methods:** Between January 2016 and July 2021, 37 consecutive female patients with GC who underwent either NOSES or TLG were included. The analysis also included additional case studies. The data showing short-term and complication outcomes were compared.

**Results:** 12 patients underwent NOSES,and 25 patients underwent TLG.The patients undergoing the NOSES had more shorter operative time( $239.3\pm 21.5$  vs.  $256.1\pm 21.2$  min, $P=0.031$ ),shorter specimen extraction time( $17.0\pm 4.2$  vs. $30.8\pm 4.3$  min, $P<0.01$ ) compared to the TLG group.No significant difference was observed in the comparison of the radical validity including estimated blood loss,the number of harvested LNs and the comparisons of distal and proximal margin.In the postoperative recovery comparisons,the patients undergoing the NOSES had shorter time to first fluids( $3.9\pm 0.5$  vs. $5.6\pm 1.2$  day, $P<0.01$ ),time to starting a soft diet( $5.6\pm 0.7$  vs. $7.7\pm 1.7$  day, $P<0.01$ ) compared to the those underwent the TLG.Postoperative pain in the NOSES group was significantly less than in the TLG group.Postoperative hospital stay days in the NOSES group were shorter than the TLG group( $10.2\pm 2.2$  vs.  $12.4\pm 2.9$  days, $P=0.030$ ).Overall,the postoperative complications were similar between two groups( $P=0.438$ ).When more cases were included, the results were similar.The NOSES also reduced hospital costs for GC patients.The NOSES procedure was performed on menopausal females as well as premenopausal patients.

**Conclusions:** The transvaginal specimen extraction following the TLG was a safer and more reliable method as compared to the transumbilicus extraction specimen with reduced trauma, faster recovery, and less postoperative pain.

*Minimally-invasive and robot-assisted surgery*

IGCC22-ABS-1383

**ESTIMATION OF THE REMNANT GASTRIC VOLUME IN GASTRECTOMIES USING 3D SEGMENTATION MODEL FROM CT SCAN**

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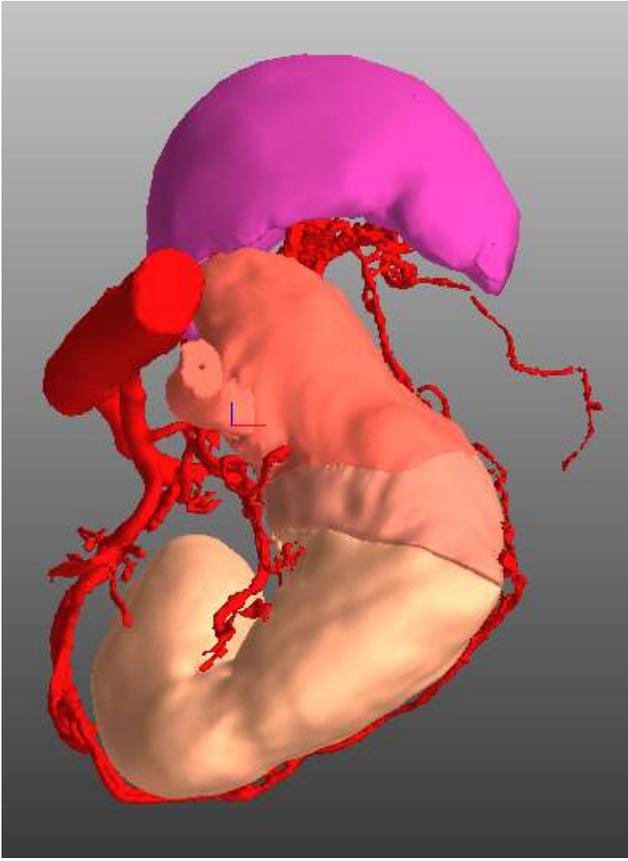
<sup>1</sup>Cancer Research Institute, <sup>2</sup>Department of surgery, <sup>3</sup>Department of Radiology, Seoul National University Hospital, Seoul, Korea, Republic Of

**Objectives:** The aim of this study is to find correlation between the length of the stomach filled with air in the preoperative CT scan and those in the pathologic specimen, and to simulate partial gastrectomies in the 3D reconstructed model to measure the volume of the remaining stomach as well as to find corresponding anatomical landmarks.

**Methods:** The lumen of the stomach filled with air from the CT scan of 30 early gastric cancer patients who underwent total gastrectomy was segmented using an AI based software (MEDIP™, MedicalIP, Seoul, Korea). The lengths of the greater curvature (GC) and lesser curvature (LC) measured by the software were compared with those measured in actual stomach specimen. Ten CT scans restored with 1mm or lesser thickness was selected for segmentation of the perigastric arteries. Diverse partial gastrectomy was simulated in the 3D reconstructed stomach, and the relationship between the proportion of the remnant stomach volume and possible anatomical landmarks were explored.

**Results:** The mean lengths of GC and LC in stomach specimen were 23.18mm±3.24mm and 17.02mm±2.88mm, whereas the lengths estimated by 3D rendering of the stomach CT were 43.11mm±3.06mm and 18.26mm±2.94mm, respectively. The lengths of the LC were similar, but the length of the GC was 1.88 (+/-0.2) times longer in 3D rendering than that of the specimen. The simulated resection line for removing 2/3 of the distal stomach was located around the first or the second branch of the left gastroepiploic artery (LGEA) in most cases. The resection line for removing 1/2 of the proximal stomach correlated with the line connecting the point in the LC approximately 5cm from the gastroesophageal junction to the point where the left and right gastroepiploic artery meet in majority of cases.

**Image:**



**Conclusions:** Estimation of the remaining volume and corresponding anatomical landmark was feasible in the 3D reconstructed virtual model of the stomach. It could be helpful in making surgical plans as well as in explaining the extent of the resection to the patients.

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1043

**ERAS PROTOCOL COMBINED WITH LAPAROSCOPIC GASTRIC CANCER SURGERY IN THE WEST. A RETROSPECTIVE STUDY.**

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**Objectives:** We determined the impact of the ERAS protocol on the postoperative recovery in laparoscopically operated patients for early and advanced gastric cancer in a Western centre.

**Methods:** Fifty-seven laparoscopically operated patients were included in the study (19 in the ERAS and 38 in the CC group). Postoperative recovery parameters and serum CRP levels were compared.

**Results:** The average number of dissected lymph nodes was significantly higher in the ERAS group (28±9 LNs in the ERAS vs. 19.9±13 LNs in the CC;  $p = 0.026$ ). Operation time was significantly shorter in the ERAS group (260(112) min in ERAS vs. 300(40) min in CC;  $p = 0.025$ ). In both groups, we observed no 30-day mortality. The ERAS group had no morbidity. Patients in the CC group had significantly more complications (25.6%;  $p = 0.009$ ). Patients in the ERAS group had a significant shorter hospital stay compared to the CC group (7.5(4) days in the ERAS vs. 11(6) days in the CC;  $p = 0.003$ ). Time to first bowel movement was similar and needed IV analgesic treatment was similar in both groups. Patients in the ERAS group had significantly smaller pain scores on days one to three. Total medical costs were significantly higher in the ERAS group ( $p < 0.0001$ ). There were no significant differences in the 30-day readmission rate between groups (15.8% in both groups). The readmission rate in the patient group less than 65 years was 0% in the ERAS and 5.3% in the CC group ( $p = \text{NS}$ ). The multivariate logistic regression model identified hospital stay (HR: 0.567; 95%CI: 0.326-0.985;  $p = 0.044$ ), and the pain scores on day one (HR: 0.12; 95%CI: 0.022-0.662;  $p = 0.015$ ) and two (HR: 0.134; 95%CI: 0.026-0.693;  $p = 0.017$ ) as significantly related to ERAS protocol.

**Conclusions:** Our results confirm that the ERAS protocol can be safely used in elderly patients with early and advanced gastric cancer. It reduces the hospital stay and pain scores on days one and two. The perioperative treatment did not influence the compliance of patients in the ERAS group.

*Minimally-invasive and robot-assisted surgery*

IGCC22-ABS-1406

**LIGATION OF ABERRANT LEFT HEPATIC ARTERY IN LAPAROSCOPIC GASTRECTOMY FOR GASTRIC CANCER**

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**Objectives:** There are still lot of controversies whether aberrant left hepatic artery (ALHA) originating from left gastric artery should be ligated or preserved during gastric cancer (GC) surgery. We aimed to investigate this issue.

**Methods:** A retrospective review of ALHA cases who had laparoscopic gastrectomy for gastric cancer from 2012 to 2016 was done. Type of ALHA variants using Michel's classification of hepatic arterial anatomy and diameter of each vessel were evaluated by 2 radiologists. Postoperative hepatic function and surgical outcome were collected until 6 months after surgery.

**Results:** Results showed that if the diameter of ALHA was larger than 1.5mm, a transient elevation of SGOT and SGPT on postoperative day 2 was observed in the ligated cases. No differences were observed in operation time, amount of blood loss, overall complication rate, hospital stay, and number of lymph nodes retrieved between the ligated and preserved replaced left hepatic artery (RLHA) and accessory left hepatic artery (aLHA) group.

**Conclusions:** In this study, we conclude that ligation of ALHA seems to be safe as none of the patients suffered adverse outcome. A transient rise in postoperative SGOT and SGPT levels were seen after ligating ALHA >1.5mm in diameter regardless of subtype.

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1304

**ONCOLOGICAL SAFETY OF DUET TLDG IN GASTRIC CANCER**

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**Objectives:** Laparoscopic distal gastrectomy(LDG) is a treatment method for patients with gastric cancer. The lack of assistants makes it difficult to proceed with laparoscopic gastrectomy. This study aimed to compare oncological outcomes of patients with gastric cancer undergoing 3 port totally laparoscopic distal gastrectomy(duet TLDG) to those of patients undergoing TLDG with assistants(triple TLDG).

**Methods:** This retrospective study included 151 patients with gastric cancer who underwent duet TLDG(60 patients) or triple TLDG (91 patients) at Korea university Guro Hospital from May 2015 to Feb 2018.

**Results:** Operating time was shorter for duet TLDG than for triple TLDG ( $133.43 \pm 26.11$  min vs.  $146.36 \pm 40.49$  min,  $P=0.030$ ). The number of harvested lymph node were similar ( $38.12 \pm 15.56$  vs  $35.81 \pm 14.60$ ,  $P=0.359$ ). Age, sex, depth of invasion, TNM stage, combine resection, anastomosis type, range of omentectomy, complication, and adjuvant treatment had no significance difference between the two groups . The median follow up time was 53.97 months. There are no difference survival between the two groups. ( $P=0.154$ )

**Conclusions:** Duet TLDG for early gastric cancer is feasible and safe procedure .

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1430

**ROBOTIC TOTAL GASTRECTOMY WITH DOUBLE LOOP INTRACORPOREAL RECONSTRUCTION: OUTCOMES OF 100 PROCEDURES**

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**Objectives:** The aim of this analysis is to show the outcomes of our series of patients that underwent a total gastrectomy with a robotic approach and highlight the technical details of a proposed solution for the reconstruction phase. **Methods:** Data of gastrectomies performed from May 2014 to October 2020, were extracted and analyzed. Basic characteristics of patients, surgical and clinical outcomes were reported. The technique for reconstruction (Parisi's Technique) consists on a loop of bowel shifted up antecolic to directly perform the esophago-enteric anastomosis followed by a second loop, measured up to 40 cm starting from the esojejunosomy, fixed to the biliary limb to create an enteroenteric anastomosis. The continuity between the two anastomoses is interrupted just firing a linear stapler, so obtaining the Roux-en-Y by avoiding to interrupt the mesentery.

**Results:**

One-hundred patients were considered in the present analysis. Estimated blood loss was  $100 \pm 75$  mL, 4 conversions to open surgery occurred (4%), R0 resections were obtained in all cases. Hospital stay was  $6 \pm 3.47$  days, 1 anastomotic leakage occurred (1%). Overall, a fast functional recovery was shown with a median of  $4 \pm 1.83$  d in starting a solid diet. A total of 10 patients presented hospital complications, 3 patients underwent reoperation.

**Conclusions:** Robotic surgery and the adoption of a tailored reconstruction technique have increased the feasibility and safety of a minimally invasive approach for total gastrectomy. The present series of patients shows its implementation in a western center with satisfying short-term outcomes.

*Minimally-invasive and robot-assisted surgery*

IGCC22-ABS-1450

**INTRACORPOREAL VS EXTRACORPOREAL ANASTOMOSIS FOR RECONSTRUCTION FOLLOWING LAPAROSCOPIC GASTRECTOMY**

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**Objectives:** Total intracorporeal anastomosis with double loop reconstruction following gastrectomy was firstly described by Professor Parisi. It allows proper identification of segment and minimal bowel manipulation during anastomosis with initial study showing favorable short-term outcomes. The aim of this study was to evaluate the perioperative outcomes of this technique performed in our institution.

**Methods:** This is a retrospective cohort study comparing the outcomes between total intracorporeal (IA) versus extracorporeal anastomosis (EA) in gastrectomy for gastric cancer patients. The primary outcome was the rate of anastomotic leakage. The secondary outcomes included anastomotic bleeding, postoperative ileus, internal herniation, median length of hospital stay and mortality.

**Results:** Between July 2017 to June 2021, 35 patients were included in the IA group and 31 patients were in EA group. The baseline characteristics between the two groups including age ( $p=0.865$ ), sex ( $p=0.386$ ), ASA grade ( $p=0.524$ ), tumour location ( $p=0.529$ ), tumour staging ( $p=0.157$ ) were similar. Although IA group had a longer operative time (334min vs 293min,  $p=0.013$ ), there was no conversion to open due to anastomosis or anastomotic obstruction. Anastomotic leakage rate were comparable between IA and EA groups (5.7% vs 9.7%,  $p=0.659$ ). There was no significant difference in other perioperative morbidities including anastomotic bleeding (0.0% vs 3.2%,  $p=0.470$ ), postoperative ileus (8.6% vs 0.0%,  $p=0.241$ ), internal herniation (0.0% vs 3.2%,  $p=0.470$ ). The length of hospital stay was similar (8 days vs 9 days,  $p=0.485$ ). The 30-day mortality was also comparable (2.9% vs 0.0%,  $p=1.000$ ).

**Conclusions:** Total intracorporeal anastomosis with double loop reconstruction following gastrectomy is a safe and feasible technique with similar perioperative morbidities and complication rate compared with conventional extracorporeal reconstruction. Its potential merit for postoperative pain and wound complications necessitated further structured study.

## ***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1405

### **IS IT TIME FOR INDOCYANINE GREEN GUIDED LYMPH NODE DISSECTION IN GASTRIC CANCER SURGERY?**

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**Objectives:** We performed the first meta-analysis to collaborate the surgical outcomes and effectiveness of the use of indocyanine green (ICG) near-infrared (NIR) guided lymph node dissection (LND) in minimally invasive gastric cancer surgery compared to no ICG use.

**Methods:** Inclusion criteria for the meta-analysis were studies involving patients who underwent either laparoscopic or robotic radical gastrectomy and compared LND using either ICG or no ICG. All retrospective and prospective studies published in English language from January 2000 to June 2021 were included. Editorial comments, case reports, reviews, meta-analyses were excluded. The meta-analysis was performed using Cochrane Review Manager software.

**Results:** A total of ten studies (one randomized, nine observational) were included involving 1288 patients (559 ICG versus 726 non-ICG group). The overall sensitivity and specificity were 57.5% [52%, 62.7%] and 45.6% [35.2%, 56.5%], respectively. The pooled positive and negative predictive values (NPV) were 2.1% [0.4%, 11%] and 99.4% [90%, 100%], respectively. The total number of harvested lymph nodes were significantly higher in the ICG group, with an overall mean difference (MD) of 7.27 [5.88, 8.67] ( $p < 0.001$ ). The lymph node non-compliance rate and total volume of blood loss were significantly lower in the ICG group, with a mean risk difference (RD) of -22% [-30%, -13%] ( $p < 0.001$ ) and a MD of -10.8ml [-15.7, -5.9] ( $p < 0.001$ ), respectively. The total operative time was similar between the ICG and non-ICG group (MD: -4.77 minutes [-9.89, -0.34];  $p = 0.07$ ). There was no significant difference in the complication rate between the two groups (RD: -2% [-6%, -3%];  $p = 0.47$ ).

**Conclusions:** ICG NIR guided LND in gastric cancer surgery increases lymph node harvest. With a high NPV, it achieves clearance of almost all metastatic nodes. Compared to no ICG use, ICG NIR guided LND reduces lymph node non-compliance rates and blood loss while having comparable operative time and complication rates. Larger randomized trials are required to validate findings.

*Minimally-invasive and robot-assisted surgery*

IGCC22-ABS-1165

**ROBOT-ASSISTED PROXIMAL GASTRECTOMY WITH DOUBLE TRACT RECONSTRUCTION AND SHORT-TERM SURGICAL RESULTS**

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**Objectives:** Robotic-assisted gastric surgery has been covered by insurance since 2018 in Japan. In our hospital, robot-assisted laparoscopic gastrectomy was started in September 2020. In this report, we describe the initial short-term results of robot-assisted proximal gastrectomy (RPG) plus double tract reconstruction at our hospital.

We performed robot-assisted gastrectomy using the da Vinci Surgical System Xi, and esophageal resection for RPG was performed using a SureForm 60 through a 12 mm port inserted on the right lateral side. A 5 cm small incision is made in the upper median abdomen and a part of the gastrectomy and reconstruction (Jejuno-gastrostomy and jejuno-jejunostomy) is performed outside the wound. Esophago-jejunostomy is performed by the Overlap method with robotic assistance, and the common foramen is closed by verbed suture(V-Loc).

**Methods:** We performed 24 robot-assisted gastric malignancy surgeries at our hospital from September 2020 to July 2021, and examined the short-term postoperative results of 6 RPGs.

**Results:** The age range was 47-77 years (mean 65 years), BMI was 23.1, lymph node dissection was D1+ dissection, operation time was 408.3 minutes, consolation time was 234.2 minutes, blood loss was 100ml, mean number of dissected lymph nodes was 32.2, oral start date was 7.6 (2-28) days, and postoperative hospital stay was 13.6 (8-33) days, and the complication was anastomosis leakage of C-D classification Grade IIIa in one patient.

**Conclusions:** We reported the short-term results of robot-assisted laparoscopic hilar gastrectomy plus double tract reconstruction at our hospital. In the future, it is necessary to improve the results by accumulating more cases and devising and standardizing the technique.

*Minimally-invasive and robot-assisted surgery*

IGCC22-ABS-1286

**FEASIBILITY AND SAFETY OF PURE SINGLE-INCISION LAPAROSCOPIC TOTAL AND PROXIMAL GASTRECTOMY FOR EGC**

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**Objectives:** There has been few reports of pure single incision laparoscopic total gastrectomy (SITG) or proximal gastrectomy (SIPG) for early gastric cancer (EGC), not yet addressing surgical feasibility .

**Methods:** : We analyzed all pure SITG or SIPG with double tract reconstruction cases for EGC including the first case between March 2013 and December 2020. Comparison group included all multiport totally laparoscopic total/proximal gastrectomy (TLTG/TLPG) procedures performed in the same period. SITG/SIPG was performed in patients with without any significant systemic comorbidities through 3cm vertical transumbilical incision without assistant port. Perioperative clinicopathologic characteristics and postoperative morbidity were analyzed before and after 1:1 propensity-score matching (PSM) including sex, BMI, age and type of resection, year of operation, institution as matching parameter.

**Results:** Overall 21 patients with SITG and 13 patients with SIPG were compared to those with TLTG (n=263) and TLPG (n=208). There was no conversion to open or multiport approach in SITG/SIPG group. The number of retrieved lymph nodes at each station was not significantly different between SITG/SIPG and TLTG/TLPG. After PSM, operation time was similar between SITG/SIPG and TLTG/TLPG ( $222.4 \pm 64.3$  vs.  $221.6 \pm 67.1$ ,  $P=0.953$ ). proximal resection margin ( $3.5 \pm 2.8$ cm vs.  $3.2 \pm 2.7$ cm,  $P=0.602$ ) and distal resection margin ( $7.6 \pm 4.4$ cm vs.  $8.7 \pm 5.2$ cm,  $P=0.318$ ) were not significantly different. Overall complication rate (32.4% vs. 20.6%,  $P=0.161$ ) and major systemic complication rate (2.9% vs. 3.9%,  $P=0.176$ ) was not significant different in SITG/SIPG than in TLTG/TLPG. Length of stay was slightly longer after SITG/SIPG than after TLTG/TLPG ( $11.9 \pm 15.4$  vs  $8.7 \pm 7.1$ ,  $P=0.247$ ).

**Conclusions:** Pure SITG/SIPG may be feasible and safe for selected patients with EGC.

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1054

**SAFETY AND FEASIBILITY OF 3D LAPAROSCOPIC ASSISTED VERSUS OPEN GASTRECTOMY IN THE TREATMENT OF CRS**

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**Objectives:** Minimally invasive techniques are increasingly used in the treatment of gastric cancer, but there are few studies about 3D laparoscopic surgery in the treatment of CRS. This study aims to explore safety and feasibility 3D laparoscopic assisted surgery compare with open surgery in the treatment of CRS

**Methods:** All clinical data of 62 patients with CRS who underwent surgical treatment in the First Medical Center of PLA General Hospital from January 2016 to January 2021 were retrospectively collected and analyzed. All patients were confirmed to be residual gastric malignant tumor by gastroscopy and biopsy before surgery. All patients were treated with 3D laparoscopically assisted or open surgery by experienced physicians with at least senior experience. Operation time, intraoperative blood loss, time of first postoperative defecation and defecation, time of first postoperative water intake, postoperative length of hospital stay, incidence of complications, number of lymph node dissection, 30-day readhospital rate, 1-year, 3-year and 5-year overall survival rates were compared between the 3D laparoscopic surgery group and the open surgery group

**Results:** Among 62 patients with gastric stump cancer. In the 3D laparoscopic surgery group, compared with the open surgery group, the time of first postoperative exhaust and defecation (3.2 vs 3.9d), the mean postoperative hospital stay (14.4 vs 12.1d), the number of lymph node dissection (19.4 vs 20.0), There was no significant difference in 1-year, 3-year and 5-year overall survival rates (67.5%, 34.4%, 11.7% vs 72.1%, 31.4%, 10.8%). The mean operation time (237.9 vs 214.6min), intraoperative blood loss (213.2 vs 297.4ml), first time to take water after operation (3.9 vs 5.9d) and complication rate (15.5%vs19.4%) were significantly different between the two groups (P <0.05)

**Conclusions:** 3D laparoscopic assisted surgery is a safe and feasible surgical method for the treatment of gastric stump cancer in the selection of appropriate patient groups

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1257

**EARLY LEARNING CURVE EXPERIENCE WITH ROBOTIC GASTRECTOMY**

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**Objectives:** The purpose of this study was to describe our early experience with robotic gastrectomy for gastric adenocarcinoma.

**Methods:** This case series was performed in a tertiary university cancer referral center by one consultant upper gastrointestinal surgeon. Outcomes measured include patient demographics, operative time, rates of complete resection, surgical complications, pain score and learning curve.

**Results:** Five female patients with gastric adenocarcinoma were reviewed. All patients presented with symptoms of dyspepsia. The average age was 54.8 (range 42 to 73) and the average BMI was 25.7 (range 20.9 to 33). Three of our patients were ASA I and two were ASA II. The average operative duration was 400.6 minutes (range 364 to 478 minutes) and the average blood loss was 72ml (range 10 to 100 ml). Four patients underwent D2 subtotal gastrectomy with Roux-en-Y reconstruction. One patient underwent D1+ proximal gastrectomy with double tract reconstruction. The average length of stay was 5.2 days (range 4 to 7 days). Post-operative pain was calculated using a visual analogue scale and all our patients were pain free upon discharge. Histological examination showed two patients with stage I and three patients with stage III disease. All five patients had clear resection margins. There were no post-operative complications at 1-week, 1-month and 3-months after surgery.

**Conclusions:** Robotic gastrectomy is a feasible alternative to laparoscopic gastrectomy. Our early results show good postoperative pain, morbidity and a short post-operative hospital stay. There are good oncological outcomes with clear resection margins for both early and advanced gastric cancer. Although the operative time was long, we believe that this will improve with increasing experience.

*Minimally-invasive and robot-assisted surgery*

IGCC22-ABS-1340

**RARE CAUSE OF UPPER GASTROINTESTINAL BLEEDING IN A YOUNG ADULT, WITH A REVIEW OF LITERATURE**

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**Objectives:** Duplication cyst along the alimentary canal is a congenital anomaly which is rare and usually incidentally found at endoscopy or radiological imaging. It can develop anywhere along the alimentary canal with only 4% occurrence in the stomach. Only few cases of gastric duplication cysts were reported to be symptomatic along with its complications. Diagnostic modalities includes oesophageogastroduodenoscopy (OGDS), endoscopic ultrasound (EUS), Computerized tomography (CT) scan and magnetic resonance imaging (MRI). However, the best option to confirm the diagnosis is complete resection of the lesion.

**Methods:** literature review on reported cases of gastric duplication cyst

**Results:** Other modalities to diagnose this cyst includes endoscopic ultrasound (EUS), computed tomography (CT) scan and magnetic resonance imaging (MRI).

**Conclusions:** In conclusion, duplication cysts of the stomach should be considered as one of the differentials when we encounter submucosal gastric masses despite the rarity. Complications such as bleeding, perforation, obstruction and malignant transformation has been reported. As a result, surgical excision should be performed to avoid such complications and especially in symptomatic patients.

***Minimally-invasive and robot-assisted surgery***

IGCC22-ABS-1426

**THE IGREENGO STUDY. ROLE OF ICG IN ADVANCED GASTRIC CANCER SURGERY. MULTICENTRIC STUDY PROTOCOL.**

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**Objectives:** The near infra-red/indocyanine green imaging fluorescence (NIR/ICG) technology is showing promising results in several fields of surgery. The clinical value of NIR/ICG technology in surgical treatment of advanced gastric cancer (AGC) is not clearly established. Whether its application can guide the intraoperative surgical conduct, potentially changing it, has never been investigated before.

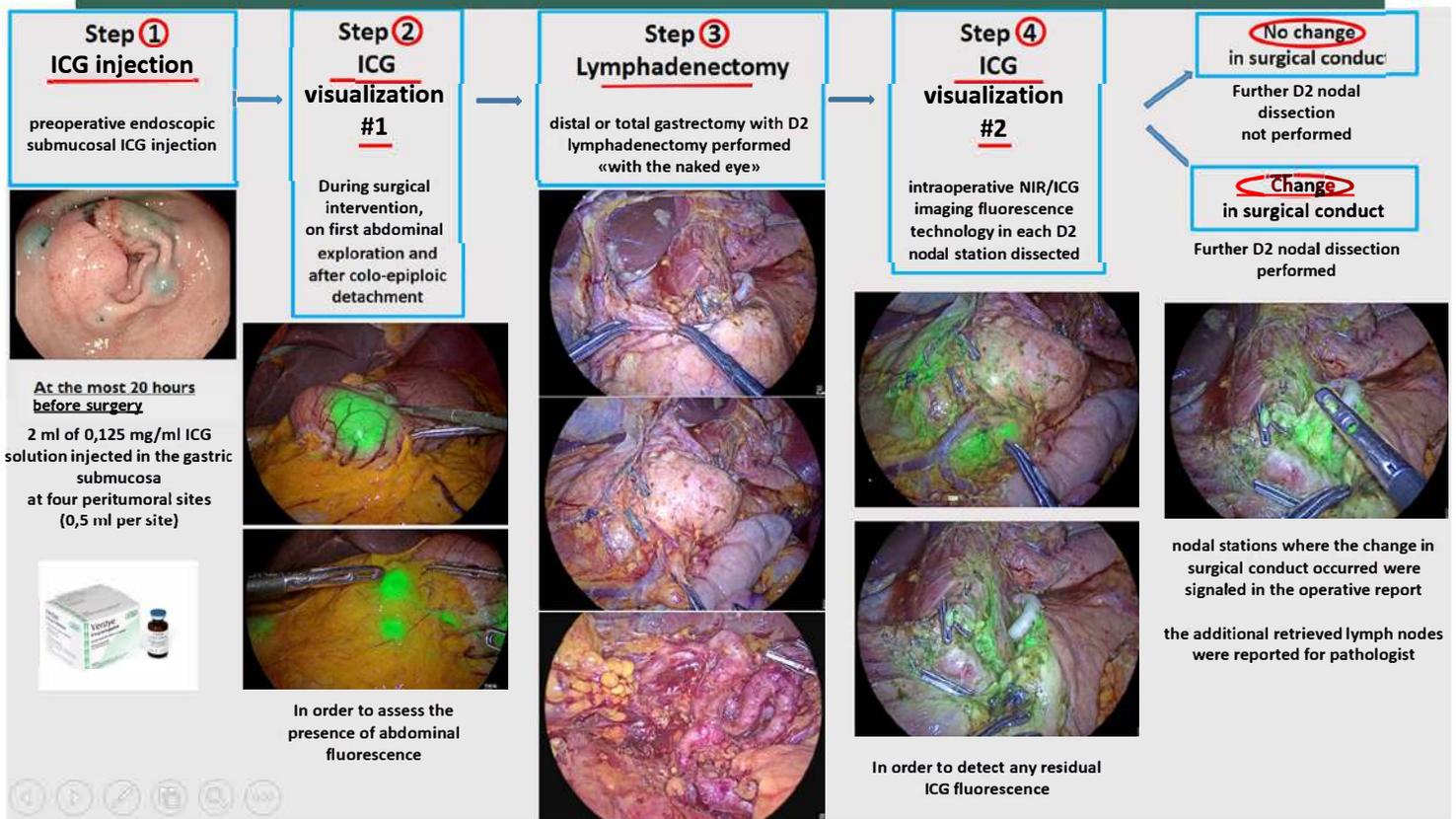
**Methods:** This is the "iGreenGO" (indocyanine Green Gastric Observation) study protocol: an international prospective multicentre study. Western patients who undergo curative-intent gastrectomy with D2 lymphadenectomy for AGC constitute the study cohort. High-volume western hospitals will be allowed to participate in the study. Patients undergo preoperative upper gastrointestinal endoscopy for submucosal peritumoral ICG injection at the most 20 hours before surgery; intraoperative endoscopy before starting dissection is also allowed. The primary endpoint is "change in surgical conduct" (CSC) at the moment of intraoperative NIR/ICG technology activation after a D2 lymphadenectomy performed "with the naked eye". Secondary endpoints include the pattern of abdominal fluorescence distribution according to tumor and patient characteristics, the preoperative clinical variables associated with CSC and incidence of stage migration due to NIR/ICG application.

**Results:** The sample size was calculated by considering the estimated incidence of intraoperative change of the surgical conduct when using ICG technology. Data from the literature indirectly suggest an approximate rate of such event around 17%. A sample size of 350 patients will be necessary to obtain a measurement with an estimated precision of 4% with a confidence level of  $1-\alpha = 95\%$ .

**Image:**

# STUDY PROTOCOL

## The iGreenGO (Indocyanine Green Gastric Observation) study



**Conclusions:** The iGreenGO study will be the first study to investigate the intraoperative clinical role of ICG for surgical treatment of AGC in a large cohort of Western patients. Results from the present study can further clarify the role of the ICG technology in helping the surgeon during lymphadenectomy for AGC.

***Multidisciplinary treatment of localized gastric cancer***

IGCC22-ABS-1048

**TISLELIZUMAB, APATINIB, OXALIPLATIN PLUS S1 FOR TYPE 4?LARGE TYPE 3 AND BULKY N(+) GASTRIC CANCER**

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**Objectives:** We aimed to investigate the efficacy and safety of S1/oxaliplatin chemotherapy plus tislelizumab, a novel engineered anti-PD-1 monoclonal antibody, and apatinib, an inhibitor of VEGFR-2, in the neoadjuvant therapy of Borrmann IV, large Borrmann III type and Bulky N positive advanced gastric cancer (GC).

**Methods:** This was a single-arm, open-label design (ChiCTR1900023924). Eligible patients (pts) had histologically proven HER-2 negative, advanced GC with Borrmann IV, large Borrmann III type and Bulky N positive. The surgery was performed after 4 cycles of drug treatment.

**Results:** Among the 17 pts eligible for preoperative efficacy evaluation, the median age was 57 years. The histological types were mainly signet ring cell carcinoma and poorly differentiated adenocarcinoma. Among the 17 pts eligible for preoperative efficacy evaluation, 15 achieved partial response (PR), 1 had stable disease (SD), and 1 had progressive disease (PD), resulting in an overall response rate of 88.2% and a disease control rate of 94.1%. Of the 15 pts with PR, 14 achieved R0 resection. 7 cases were diagnosed with pathological grade 0-Ia (PRR). The incidence of adverse events (AEs) was 76.5%. The common hematologic AEs were neutropenia (64.7%), leukopenia (64.7%), and the common nonhematologic AEs included cutaneous adverse reactions (29.4%), oral mucositis (29.4%) and fatigue (70.6%).

**Image:**

Figure 1 Flow chart of treatment

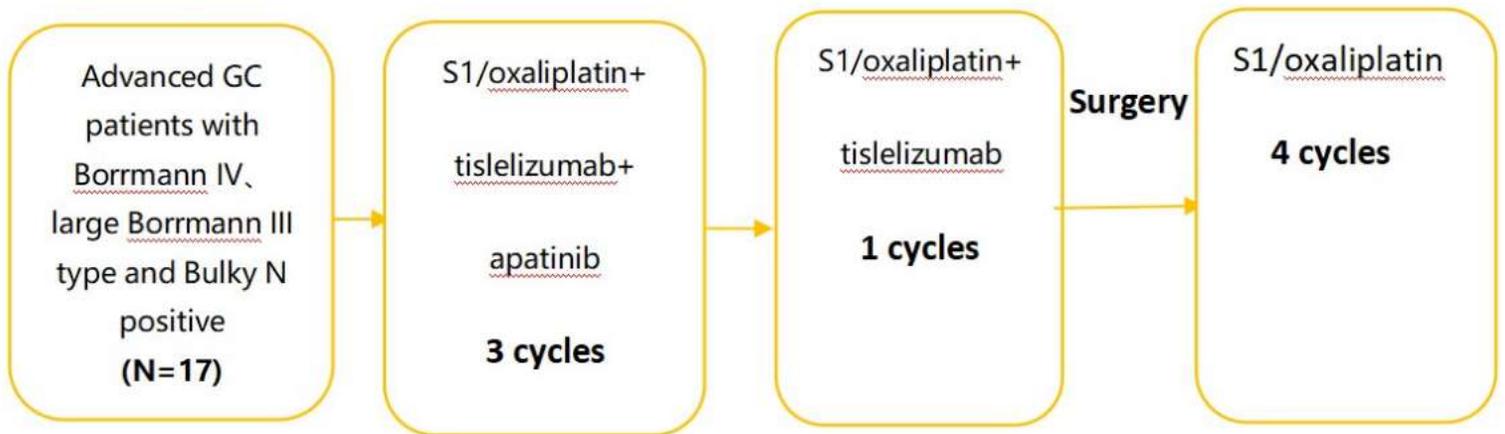
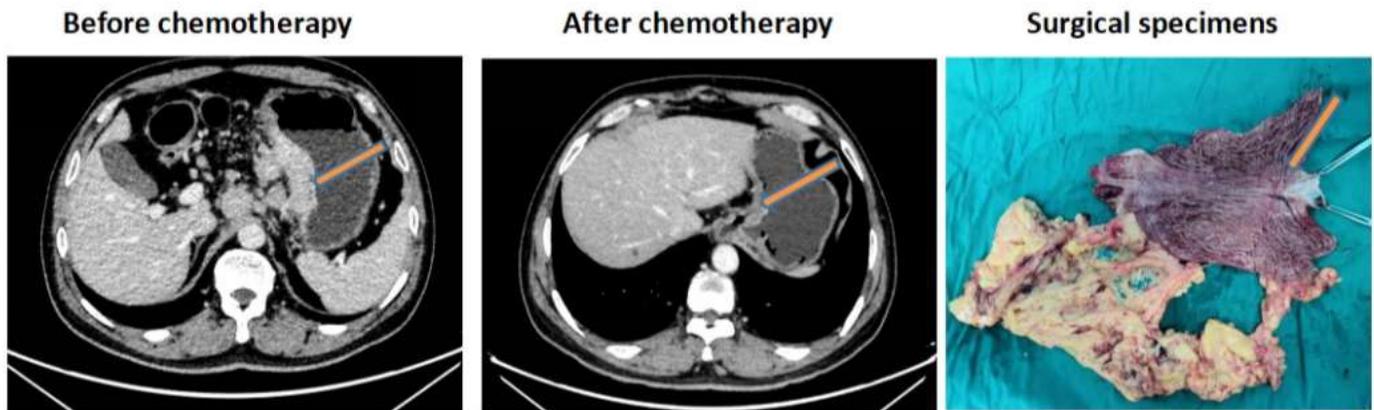


Figure 2: Bulky N+ Case



**Conclusions:** Tislelizumab combined with apatinib and oxaliplatin plus S1 chemotherapy shows clinical benefits in Borrmann IV, large Borrmann III type and Bulky N positive advanced GC, with acceptable safety profile.

***Multidisciplinary treatment of localized gastric cancer***

IGCC22-ABS-1097

**CLINICAL STAGING ACCURACY, TREATMENT RESPONSE AND SURVIVAL AMONG GASTRIC CANCER PATIENTS.**

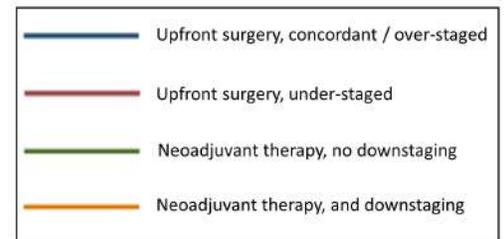
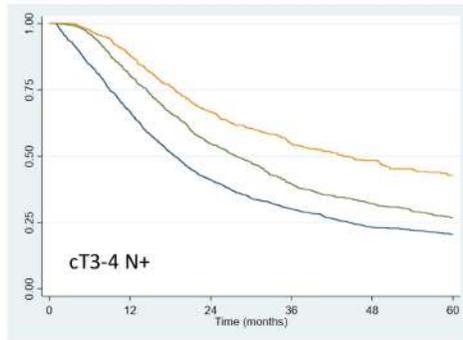
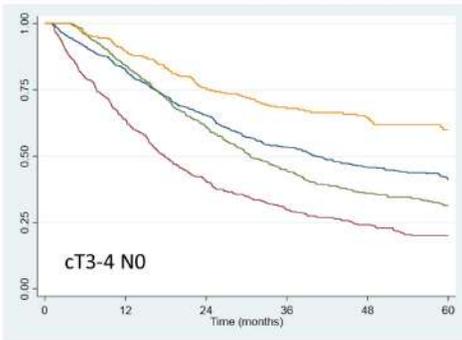
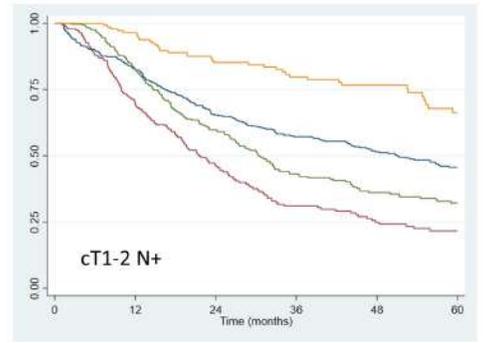
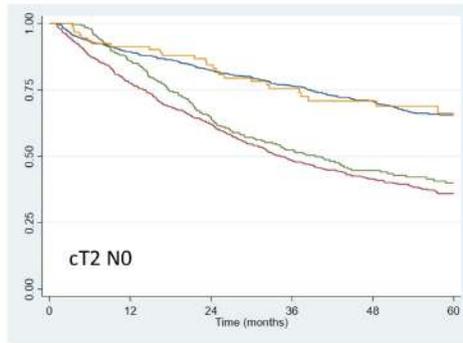
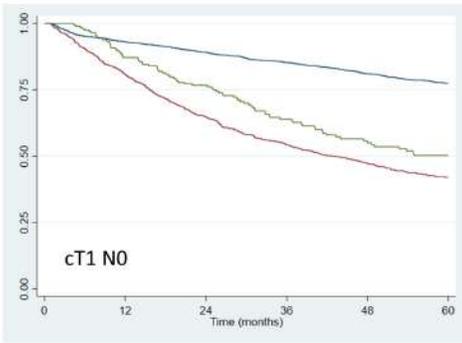
Wilson Luiz Da Costa Jr<sup>1</sup>, Hop S. Tran Cao<sup>2</sup>, Xiangjun Gu<sup>1</sup>, Nader N. Massarweh<sup>3</sup>

<sup>1</sup>Department of Medicine / Epidemiology and Population Sciences, Baylor College of Medicine, <sup>2</sup>Department of Surgical Oncology, University of Texas M. D. Anderson Cancer Center, Houston, <sup>3</sup>Division of Surgical Oncology, Department of Surgery, Emory University School of Medicine, Atlanta, United States

**Objectives:** To evaluate whether the benefit associated with NAT is contingent on achieving a treatment response through studying the association between clinical staging accuracy, treatment received, response to neoadjuvant therapy, and survival.

**Methods:** This is a national cohort study of clinical stage Ib-III GC patients in the National Cancer Data Base (2006-2015) treated either with upfront resection or NAT followed by surgery. For NAT patients, Bayesian analysis was used to ascertain staging concordance and to account for potential down-staging. The association between staging concordance, treatment received, response to NAT, and survival was evaluated with multivariable Cox regression. **Results:** The cohort included 13,340 patients treated at 1,124 hospitals. Among them, 8,964 underwent upfront resection, and 4,376 were treated with NAT. Staging concordance ranged from 86.1% for those with cT3-4N+ disease to 34.7% for those with cT2N0 tumors. Overall survival (OS) at 5-years ranged from 66.7% (95% CI 64.9%-68.5%) among cT1N0 patients to 26.5% (24.9%-28.2%) among those with cT3-4N+ disease. Relative to correctly staged/over-staged patients treated with upfront surgery, NAT was associated with a decreased risk of death in the presence of disease down-staging among those with cT1-2N+ (HR 0.43 [0.30-0.61]), cT3-4N0 (HR 0.69 [0.54-0.88]), and cT3-4N+ (HR 0.51 [0.48-0.58]) tumors, and in the absence of down-staging among cT3-4N+ patients (HR 0.83 [0.74-0.92]). Conversely, NAT without down-staging increased the risk of death among those with cT2N0 (HR 2.48 [1.94-3.17]), cT1-2N+ (HR 1.64 [1.31-2.05]), and cT3-4N0 disease (HR 1.34 [1.14-1.58]).

**Image:**



**Conclusions:** NAT is associated with improved survival for GC when disease down-staging occurs and, in some cases, even in the absence of treatment response. Accurate ascertainment of clinical staging, improving treatment response rates, and identifying patients with a low likelihood of response to NAT should be the focus of future studies.

***Multidisciplinary treatment of localized gastric cancer***

IGCC22-ABS-1105

**LAUREN HISTOTYPES IN PATIENTS UNDERGOING PERIOPERATIVE CHEMOTHERAPY FOR GASTRIC/GE-JUNCTION CANCERS**

Daniel Reim\*<sup>1</sup>, Alexander Novotny<sup>1</sup>, Rebekka Schirren<sup>1</sup>

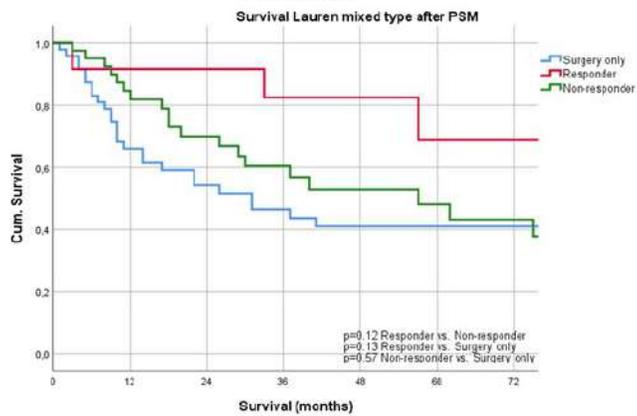
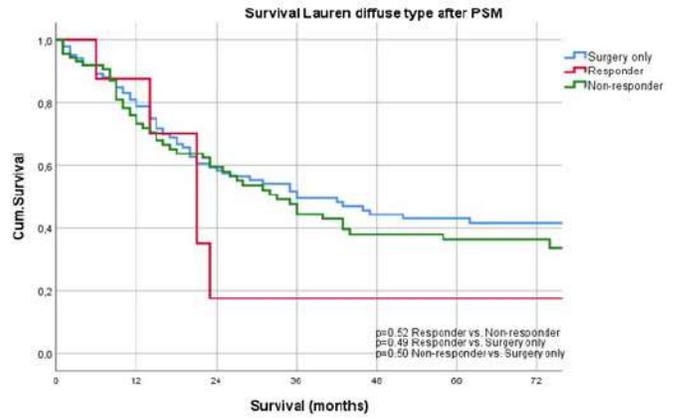
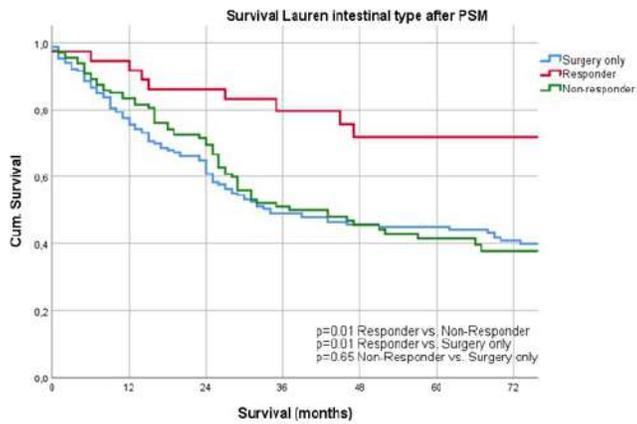
<sup>1</sup>Department of Surgery, TUM School of Medicine, Munich, Germany

**Objectives:** The purpose of this analysis was to analyze the outcomes of multimodal treatment that are related to Lauren histotypes in gastro-esophageal cancer (GEC).

**Methods:** Patients with GEC between 1986 and 2013 were analyzed. Uni- and multivariate regression analysis were performed to identify predictors for overall survival. Lauren histotype stratified overall survival (OS)-rates were analyzed by the Kaplan-Meier method. Further, propensity score matching (PSM) was performed to balance for confounders.

**Results:** 1290 patients were analyzed. After PSM, the median survival was 32 months for patients undergoing primary surgery (PS) and 43 months for patients undergoing neoadjuvant chemotherapy (nCTx) ahead of surgery. For intestinal types, median survival time was 34 months (PS) vs. 52 months (nCTx+surgery)  $p = 0.07$ , 36 months (PS) vs. (31) months (nCTx+surgery) in diffuse types ( $p = 0.44$ ) and 31 months (PS) vs. 62 months (nCTx+surgery) for mixed types ( $p = 0.28$ ). Five-/Ten-year survival rates for intestinal, diffuse, and mixed types were 44/29%, 36/17%, and 43/33%, respectively. After PSM, Kaplan-Meier showed a survival benefit for patients undergoing nCTx+surgery in intestinal and mixed types.

**Image:**



**Conclusions:** Lauren histotype might be predictive for survival outcome in GEC-patients after neoadjuvant/perioperative chemotherapy.

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IGCC22-ABS-1178

**OFFSET EFFECT OF ADJUVANT CHEMOTHERAPY ON GASTRIC CANCER PATIENTS WITH POSTOPERATIVE COMPLICATIONS**

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**Objectives:** The potential additive influence of postoperative adjuvant chemotherapy (PAC) on prognosis of patients with stage II/III gastric cancer (GC) who experienced complications after radical surgery is unclear.

**Methods:** The whole group was divided into a postoperative complication (PC) group and a postoperative non-complication (non-PC) group, and the overall survival (OS) rate, recurrence-free survival (RFS) rate and recurrence rate were compared between the two groups of patients.

**Results:** A total of 1563 patients were included in this analysis. There were 268 patients (17.14%) in the PC group and 1295 patients (82.86%) in the non-PC group. The 5-year OS rate of the PC group was significantly lower than that of the non-PC group (55.2% vs 63.3%,  $p=0.016$ ), and there was no significant difference in the 5-year RFS rate (53.7% vs 58.8%,  $p=0.14$ ). A comparative analysis of recurrence patterns showed no significant difference between the PC group and the non-PC group in the site of recurrence or median time to recurrence (both  $p>0.05$ ). PAC significantly improved the OS and RFS rates of patients with and without PCs (both  $p<0.05$ ), and it showed no significant difference between the PC group and the non-PC group who received PAC (both  $p>0.05$ ). Stratified analysis showed that PAC only improve the OS or RFS rate of stage III patients (both  $p<0.05$ ). Further stratified analysis of the time interval (TI) from radical operation to initiation of PAC in the PC group showed that a TI within 6 weeks ( $<6$  weeks) improved only the OS and RFS rates of stage III patients, while when a TI after 6 weeks ( $\geq 6$  weeks), a benefit was observed in stage II and III patients (both  $p<0.05$ ).

**Conclusions:** PAC can abolish the negative effect of PCs on the long-term survival of patients with stage III GC; for stage II patients, the above offset effect is affected by the TI. Delaying PAC initiation after 6 weeks may not improve the survival of patients with stage II GC after complications.

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IGCC22-ABS-1182

**DYNAMIC EFFICACY OF ADJUVANT CHEMOTHERAPY FOR ADVANCED GASTRIC CANCER PATIENTS**

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<sup>1</sup>Department of Gastric Surgery, Fujian Medical University Union Hospital, Fuzhou, China

**Objectives:** The long-term dynamic impact of adjuvant chemotherapy (ACT) on recurrence of advanced gastric cancer (AGC) remains unclear.

**Methods:** Data of AGC patients who underwent radical gastrectomy between January 2010 and October 2015 were assessed. Inverse probability of treatment weighting (IPTW) was performed to reduce selection bias between the ACT and observational (OBS) group. Conditional recurrence-free survival (cRFS) and restricted mean survival time (RMST) were used to assess the benefits of ACT.

**Results:** A total of 1661 AGC patients were included (ACT group, n=1236; OBS group, n=425). Overall, Recurrence hazard gradually declined whereas cRFS increased over the years. Following IPTW adjustment, the RFS rates were higher in the ACT group for patients at baseline, or being recurrence-free for 1 year and 2 years, respectively (all  $P < 0.05$ ), but were comparable with that in the OBS group for patients had recurrence-free for 3 years or more (all  $P > 0.05$ ). Similarly, the 5-year  $\Delta$ RMST between the ACT and OBS groups witnessed the same tendency. Furthermore, hematological recurrence rate was significantly lower in the ACT group ( $P < 0.05$ ). However, no significant differences in hazard rates were demonstrated at other recurrence sites (all  $P > 0.05$ ).

**Conclusions:** Although ACT provided substantial benefit for AGC patients, the RFS differences between ACT and OBS diminished over time, and tended to similar after 3 years recurrence-free, which is helpful for clinicians to guide surveillance and alleviate the patients' anxiety. Further prospective large-scale studies are warranted.

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IGCC22-ABS-1184

**INDIVIDUAL SURVEILLANCE STRATEGY FOR ADVANCED GASTRIC CANCER BASED ON DEEP LEARNING**

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<sup>1</sup>Department of Gastric Surgery, Fujian Medical University Union Hospital, Fuzhou, China

**Objectives:** The excellent individual strategy for advanced gastric cancer (AGC) has not been clarified. To determine excellent individual surveillance strategy for AGC patients and compare the cost-effectiveness with other strategies recommended by current guidelines.

**Methods:** A total of 1661 AGC patients who underwent radical resection in our center from January 2010 to October 2015. 423 patients from Mayo Clinic were considered as external validation. The random forest model was used to predict the dynamic recurrence risk of AGC patients and construct the individual surveillance strategy.

**Results:** The median follow-up length of the training cohort (n=1661) and external validation cohort (n=423) were 59 and 46 months, respectively. Univariate and multivariate analysis showed that pathological T and pathological N staging were independent prognosis factors for recurrence-free survival of AGC patients in the training cohort and the external validation cohort. The dynamic recurrence risk of patients with pathological stage II was significantly lower than that of patients with pathological stage III within 3 years, and then tended to similarity. The risk based follow-up strategy showed that the time distribution of the follow-up arrangements for patients with pathological stage II gastric cancer was more even than that for patients with pathological stage III (mainly concentrated within 2 years after surgery). Compared with the existing NCCN and JGCA guidelines, pathological stage II patients who adopt the best follow-up strategy can obtain better cost-effectiveness, while there is no obvious advantage in pathological stage III patients.

**Conclusions:** This study found that there is a significant difference in the risk of recurrence between pathological stage II and III patients, and the current guidelines cannot distinguish the follow-up of patients. The risk based strategies established in our study was more cost-effective than existing guidelines. Prospective large-sample studies are warranted.

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IGCC22-ABS-1186

**EFFICACY OF NEOADJUVANT CHEMOTHERAPY FOR NEUROENDOCRINE CARCINOMA/MIXED NEUROENDOCRINE CARCINOMA**

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<sup>1</sup>Department of Gastric Surgery, Fujian Medical University Union Hospital, Fuzhou, China

**Objectives:** The clinical efficacy of neoadjuvant chemotherapy in gastric neuroendocrine carcinoma/mixed neuroendocrine carcinoma ((MA)NEC) is unclear.

**Methods:** Retrospective analysis of 1173 patients who underwent gastric (MA)NEC surgery from 24 centers in China from 2007 to 2017. A 1:4 propensity score-matching was used to compare the short- and long-term outcomes of neoadjuvant chemotherapy and nonneoadjuvant chemotherapy.

**Results:** A total of 220 patients were included in the analysis, 44 cases in the neoadjuvant chemotherapy group (NCG) and 166 cases in the nonneoadjuvant chemotherapy group (Non-NCG). There was no significant difference in general clinicopathological data between the two groups after propensity score matching. Although there was no significant difference in overall complications between the two groups (18.2% vs 26.1%,  $p=0.273$ ), the severe complications in the NCG were significantly higher than that in the Non-NCG (9.1% vs 1.1%,  $p=0.016$ ). The 3-year overall survival rates of all patients (56.8% vs 44%,  $p=0.485$ ), MANEC patients (54.7% vs 42.2%,  $p=0.729$ ) and NEC patients (59.4% vs 45%,  $p=0.476$ ) between NCG and Non-NCG were not significantly different. The lung (11.4% vs 2.7%,  $p=0.046$ ) recurrence rate of NCG patients was significantly higher than that of Non-NCG patients, especially in early relapse (26.7% vs 6.5%,  $p=0.042$ ) and stage III (17.4% vs 3%,  $p=0.023$ ) patients.

**Conclusions:** The incidence of severe complications in patients with gastric (MA)NEC after neoadjuvant chemotherapy is significantly higher than that of patients with nonneoadjuvant chemotherapy. Special attention should be paid to the lung recurrence of NCG patients with stage III or early recurrence in the follow-up process.

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IGCC22-ABS-1194

**POSTOPERATIVE FOLLOW-UP FOR GASTRIC CANCER NEEDS TO BE INDIVIDUALIZED ACCORDING TO AGE**

Wen-Wu Qiu<sup>1</sup>, Qi-Chen He<sup>1</sup>, Qi-Yue Chen<sup>1</sup>, Ping Li<sup>1</sup>, Chao-Hui Zheng<sup>1</sup>, Changming Huang<sup>1</sup>

<sup>1</sup>Department of Gastric Surgery, Fujian Medical University Union Hospital, Fuzhou, China

**Objectives:** Few studies have reported the the association between the pattern and time point of recurrence in different groups stratified by age in postoperative survival of patients with gastric cancer.

**Methods:** The clinicopathological data and recurrence data of 2028 patients with GC who underwent curative surgery from January 2010 to March 2015 were enrolled in this study. Patients were grouped according to age : young group (YG) ( $\leq 45$  years old) (n=180) and non-young group (OG) (>45 years old) (n=1848) .

**Results:** A total of 2028 patients were enrolled. The young group had better 5-year OS and DFS than the non-young group. In peritoneal recurrence, the cumulative incidence of recurrence in YG group was higher than that in OG group (P < 0.001). In distant recurrence, the cumulative incidence of recurrence YG was always lower than that of OG (P=0.004). Recurrence hazard function varied over time between the two groups: in the peritoneal metastasis, the recurrence hazard for YG was higher and earlier than that of OG and the YG group was observed during five years after surgery with two recurrence peaks in 8.5 months and in 41.5 months. In distant recurrence, the recurrence hazard for OG had an earlier and higher single peak than that of YG (6.0 months).

**Conclusions:** The recurrence characteristics of patients with gastric cancer after curative resection between young group and older group are different. Personalized follow-up strategies should be developed according to the age and time point after operation for the early detection of recurrences and saving medical resources.

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IGCC22-ABS-1198

**DEVELOPMENT AND VALIDATION OF METABOLIC SCORING TO MONITOR RECURRENCE EARLY IN GASTRIC CANCER**

Si-Jin Que<sup>1</sup>, Jun-Yu Chen<sup>1</sup>, Qi-Yue Chen<sup>1</sup>, Ping Li<sup>1</sup>, Chao-Hui Zheng<sup>1</sup>, Changming Huang<sup>1</sup>

<sup>1</sup>Department of Gastric Surgery, Fujian Medical University Union Hospital, Fuzhou, China

**Objectives:** To develop and validate a simple metabolic score (Metabolic score, MS) for use in evaluating the prognosis of gastric cancer (GC) patients and dynamically monitor for early recurrence.

**Methods:** We retrospectively collected general clinicopathological data of patients who underwent radical gastrectomy for GC between September 2012 and December 2017 in the Department of Gastric Surgery of the Fujian Medical University Union Hospital. Using a random forest algorithm to screen preoperative blood indicators into the Least absolute shrinkage and selection operator (LASSO) model, we developed a novel MS to predict prognosis.

**Results:** Data of 1974 patients were used to develop and validate the model. Total cholesterol (TCHO), bilirubin (TBIL), direct bilirubin (DBIL), and 15 other metabolic indicators had significant predictive value for the prognosis using the random forest algorithm. In the overall population, 533 patients (27.0%) had high and 1441 (73%) had low MS status. High MS status was related to tumor progression. The KM curves of 3-year OS and RFS for training set patients showed low MS had a better prognosis than high MS (OS: 79.4% vs 59.7%,  $P < 0.001$ ; RFS: 76.0% vs 56.2%,  $P < 0.001$ ). A total of 771 patients were included for dynamic MS analysis. MS was persistently elevated after the operation in samples of the relapsed ( $n=113$ ) but not the non-relapsed patients ( $n=658$ ).

**Conclusions:** We have developed and validated MS to predict the long-term survival of GC patients and allow early monitoring of recurrence. This will provide physicians with simple, economical, and dynamic tumor monitoring information.

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IGCC22-ABS-1221

### **DEVELOPMENT OF THE PERI-GASTRIC AND PERI-GRAM (PERITONEAL RECURRENCE INDEX AND NOMOGRAM)**

Annamaria Agnes\*<sup>1</sup>, Alberto Biondi<sup>1</sup>, Roberto Persiani<sup>1</sup>, Antonio Laurino<sup>1</sup>, Rossella Reddavid<sup>2</sup>, Maurizio De Giuliz, Federico Sicoliz, Ferdinando M. Cananzi<sup>3</sup>, Stefano De Pascale<sup>4</sup>, Uberto Fumagalli<sup>4</sup>, Laura Lorenzon<sup>1</sup>, Federica Galliz, Stefano Rauseiz, Domenico D'Ugo<sup>1</sup>

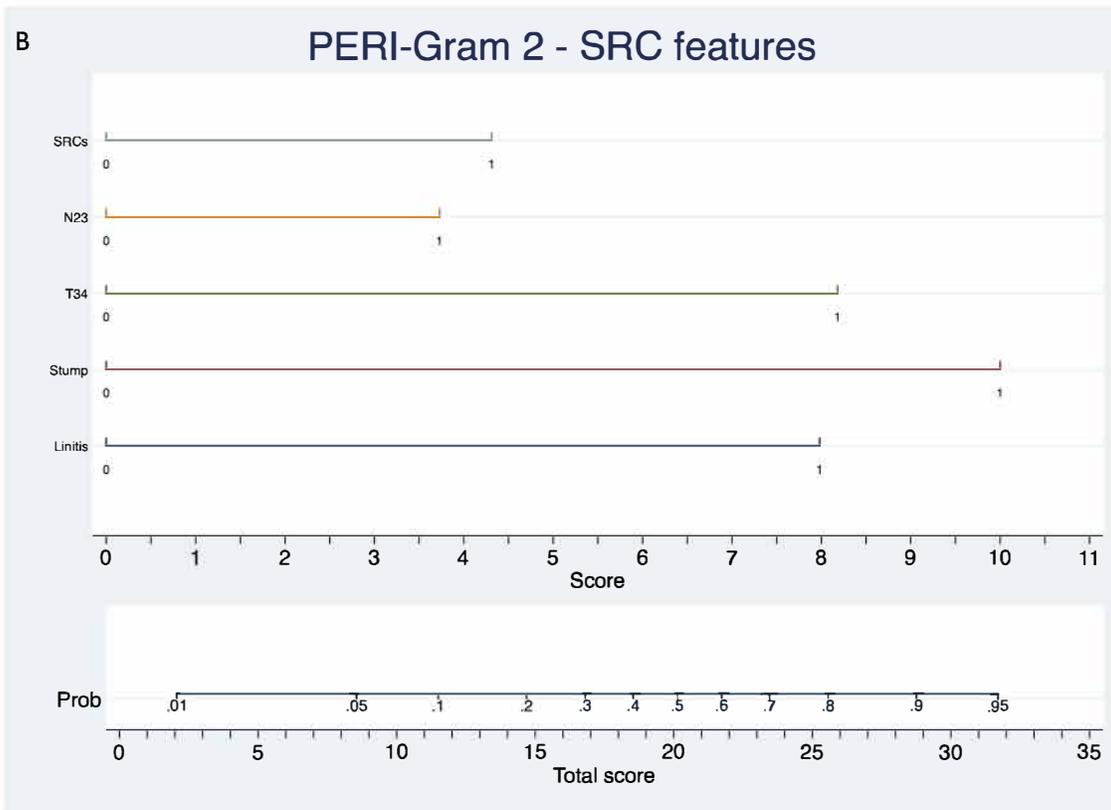
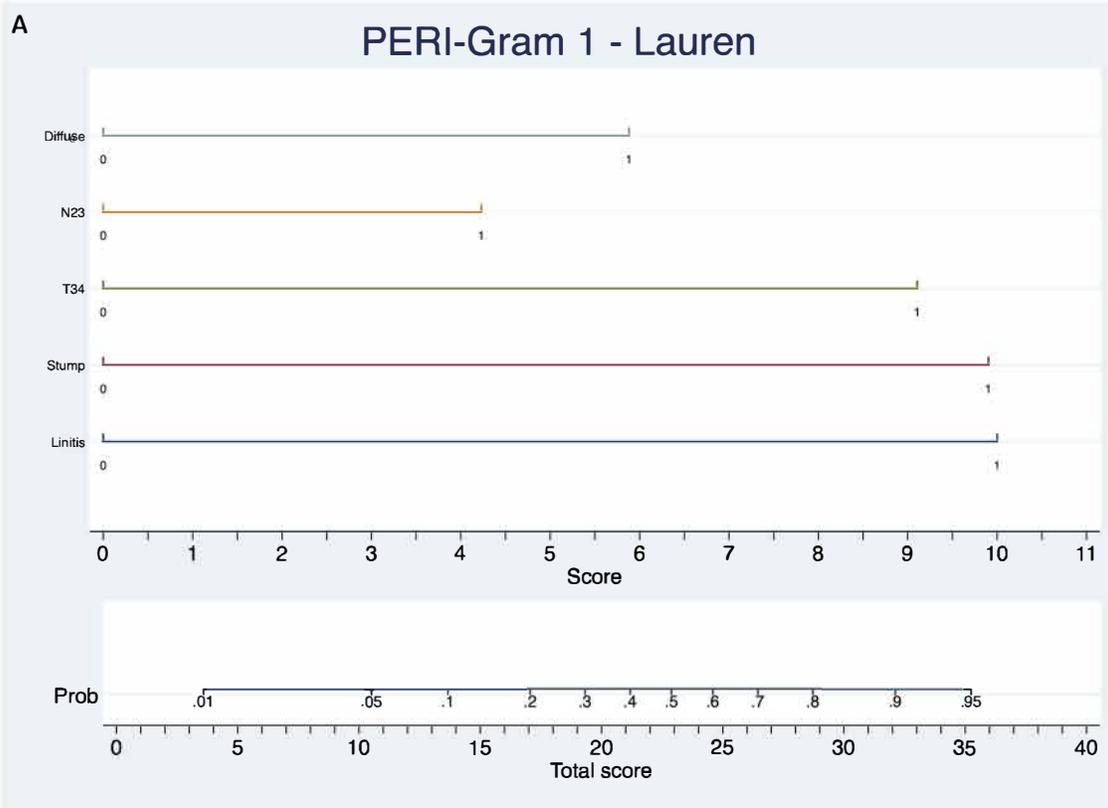
<sup>1</sup>Surgery, Fondazione Policlinico Universitario A. Gemelli IRCCS, Rome, <sup>2</sup>Surgery, San Luigi University Hospital, Orbassano, Turin, <sup>3</sup>, IRCCS Humanitas Research Hospital, Rozzano, <sup>4</sup>Digestive Surgery, European Institute of Oncology, Milan, <sup>5</sup>, ASST Sette Laghi - Presidio Ospedaliero Gallarate, Gallarate, Italy

**Objectives:** A model that quantifies the risk of peritoneal recurrence would be a useful tool for improving decision-making in patients undergoing curative-aim gastrectomy for gastric cancer (GC).

**Methods:** Five Italian centers participated in this study. Two risk scores were created according to the two most widely used pathologic classifications of GC (the Lauren classification and the presence of signet-ring-cell features). The risk scores (the PERI-Gastric 1 and 2) were based on the results of multivariable logistic regressions and presented as nomograms (the PERI-Gram 1 and 2). Discrimination was assessed with the area under the curve (AUC) of receiver operating curves. Calibration graphs were constructed by plotting the actual versus the predicted rate of peritoneal recurrence. Internal validation was performed with a bootstrap resampling method (1000 iterations).

**Results:** The models were developed based on a population of 645 patients (selected from 1580 patients treated from 1998 to 2018). In the PERI-Gastric 1, significant variables were linitis plastica, stump GC, pT3-4, pN2-3 and the Lauren diffuse histotype, while in the PERI-Gastric 2, significant variables were linitis plastica, stump GC, pT3-4, pN2-3 and the presence of signet-ring cells. The AUC was 0,828 (0,778 - 0,877) for the PERI-Gastric 1 and 0,805 (0,755 - 0,855) for the PERI-Gastric 2. After bootstrap resampling, the PERI-Gastric 1 had a mean AUC of 0.775 (0.721-0.830) and a 95%CI estimate for the calibration slope of 0.852-1.505 and the PERI-Gastric 2 a mean AUC of 0.749 (0.693-0.805) and a 95% CI estimate for the slope of 0.777- 1.351. The models are available at [www.perigastric.org](http://www.perigastric.org).

**Image:**



**Conclusions:** We developed the PERI-Gastric and the PERI-Gram as instruments to determine the risk of peritoneal recurrence after curative-aim gastrectomy. These models could direct the administration of prophylactic intraperitoneal treatments

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IGCC22-ABS-1373

**ONCOLOGIC SAFETY OF PROXIMAL GASTRECTOMY IN ADVANCED GASTRIC AND ESOPHAGOGASTRIC JUNCTIONAL CANCER**

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<sup>1</sup>Department of Surgery and Cancer Research Institute, Seoul National University College of Medicine, Seoul National University Hospital, Seoul, Korea, Republic Of

**Objectives:** The aim of this study was to investigate the oncologic safety of and identify potential candidates for proximal gastrectomy in upper third advanced gastric cancer and esophagogastric junction cancers.

**Methods:** Among 5,665 patients who underwent gastrectomy for gastric adenocarcinoma, 327 patients underwent total gastrectomy with standard lymph node dissection for upper third advanced gastric cancer and Siewert type II esophagogastric junction cancers between January 2011 and December 2017 and were enrolled. We analyzed the correlation between the metastatic rates of distal lymph nodes (No. 4d, 5, 6, 12a) around the lower part of the stomach and the clinicopathologic characteristics. We identified subgroups with no metastasis to the distal lymph nodes. **Results:** The metastatic rates of distal lymph nodes in proximal advanced gastric cancer and Siewert type II esophagogastric junction cancers were 7.0% (23 out of 327 patients). On multivariate analysis, pathological T stage (P=0.001), tumor size (P=0.043), and middle third invasion (P=0.003) were significantly associated with distal lymph node metastases. Pathological 'T2 stage' (n=88), or 'T3 stage with ≤5 cm tumor size' (n=87) showed no metastasis in distal lymph nodes, regardless of middle third invasion. Pathological T3 stage with tumor size > 5 cm (n=61) and T4 stage (n=91) had metastasis in the distal lymph nodes.

**Image:**

Station No.	Metastatic rate (N)					Station No.	Metastatic rate (%)					Station No.	Metastatic rate (%)				
	T3/B3/MTI-	T3/B3/MTI+	T3/A3/MTI-	T3/A3/MTI+	Total		T3/B3/MTI-	T3/B3/MTI+	T3/A3/MTI-	T3/A3/MTI+	Total		T4/B3/MTI-	T4/B3/MTI+	T4/A3/MTI-	T4/A3/MTI+	Total
1	19.8(16/81)	16.7(1/6)	34.0(18/52)	44.4(4/9)	20.4(39/148)	1	19.8(16/81)	16.7(1/6)	34.0(18/52)	44.4(4/9)	20.4(39/148)	1	25.9(7/27)	40.0(2/5)	29.0(9/31)	57.1(10/28)	37.4(34/91)
2	13.6(11/81)	0.0(0/6)	28.0(15/52)	0.0(0/9)	17.6(26/148)	2	13.6(11/81)	0.0(0/6)	28.0(15/52)	0.0(0/9)	17.6(26/148)	2	18.5(5/27)	0.0(0/5)	35.5(11/31)	46.4(13/28)	31.9(29/91)
3	39.5(32/81)	0.0(0/6)	42.3(22/52)	55.6(5/9)	39.9(59/148)	3	39.5(32/81)	0.0(0/6)	42.3(22/52)	55.6(5/9)	39.9(59/148)	3	33.3(9/27)	20.0(1/5)	41.9(13/31)	60.7(17/28)	44.0(40/91)
4a	1.2(1/81)	0.0(0/6)	5.8(3/52)	0.0(0/9)	2.8(4/148)	4a	1.2(1/81)	0.0(0/6)	5.8(3/52)	0.0(0/9)	2.8(4/148)	4a	3.7(1/27)	0.0(0/5)	10.4(6/31)	21.4(6/28)	14.3(13/91)
4sb	2.5(2/81)	0.0(0/6)	1.9(1/52)	0.0(0/9)	2.7(3/148)	4sb	2.5(2/81)	0.0(0/6)	1.9(1/52)	0.0(0/9)	2.7(3/148)	4sb	7.4(2/27)	20.0(1/5)	16.1(5/31)	28.0(8/28)	17.6(16/91)
4d	0.0(0/81)	0.0(0/6)	1.9(1/52)	11.1(1/9)	1.4(2/148)	4d	0.0(0/81)	0.0(0/6)	1.9(1/52)	11.1(1/9)	1.4(2/148)	4d	3.7(1/27)	20.0(1/5)	12.6(4/31)	46.4(13/28)	20.9(19/91)
5	0.0(0/81)	0.0(0/6)	1.9(1/52)	0.0(0/9)	0.7(1/148)	5	0.0(0/81)	0.0(0/6)	1.9(1/52)	0.0(0/9)	0.7(1/148)	5	0.0(0/27)	0.0(0/5)	6.5(2/31)	10.7(3/28)	5.3(5/91)
6	0.0(0/81)	0.0(0/6)	1.9(1/52)	0.0(0/9)	0.7(1/148)	6	0.0(0/81)	0.0(0/6)	1.9(1/52)	0.0(0/9)	0.7(1/148)	6	0.0(0/27)	20.0(1/5)	0.0(0/31)	10.7(3/28)	4.4(4/91)
7	19.8(16/81)	16.7(1/6)	30.6(16/52)	11.1(1/9)	29.0(34/148)	7	19.8(16/81)	16.7(1/6)	30.6(16/52)	11.1(1/9)	29.0(34/148)	7	14.8(4/27)	60.0(3/5)	45.2(14/31)	35.7(10/28)	34.1(31/91)
8a	3.7(3/81)	0.0(0/6)	5.8(3/52)	0.0(0/9)	4.1(6/148)	8a	3.7(3/81)	0.0(0/6)	5.8(3/52)	0.0(0/9)	4.1(6/148)	8a	3.7(1/27)	0.0(0/5)	16.4(6/31)	20.8(8/28)	16.5(15/91)
9	8.6(7/81)	0.0(0/6)	9.6(5/52)	0.0(0/9)	8.1(12/148)	9	8.6(7/81)	0.0(0/6)	9.6(5/52)	0.0(0/9)	8.1(12/148)	9	7.4(2/27)	0.0(0/5)	12.9(4/31)	25.0(7/28)	14.3(13/91)
10	2.5(2/81)	0.0(0/6)	7.7(4/52)	0.0(0/9)	4.1(6/148)	10	2.5(2/81)	0.0(0/6)	7.7(4/52)	0.0(0/9)	4.1(6/148)	10	7.4(2/27)	0.0(0/5)	12.9(4/31)	25.0(7/28)	14.3(13/91)
11p	0.2(0/81)	0.0(0/6)	17.3(9/52)	0.0(0/9)	9.5(14/148)	11p	0.2(0/81)	0.0(0/6)	17.3(9/52)	0.0(0/9)	9.5(14/148)	11p	11.1(3/27)	20.0(1/5)	16.1(5/31)	25.0(7/28)	17.6(16/91)
11d	0.0(0/81)	16.7(1/6)	9.6(5/52)	0.0(0/9)	4.1(6/148)	11d	0.0(0/81)	16.7(1/6)	9.6(5/52)	0.0(0/9)	4.1(6/148)	11d	3.7(1/27)	0.0(0/5)	12.9(4/31)	14.3(4/28)	9.9(9/91)
12a	0.0(0/81)	0.0(0/6)	1.9(1/52)	0.0(0/9)	0.7(1/148)	12a	0.0(0/81)	0.0(0/6)	1.9(1/52)	0.0(0/9)	0.7(1/148)	12a	3.7(1/27)	0.0(0/5)	0.0(0/31)	7.1(2/28)	3.3(3/91)

**Conclusions:** In the upper third advanced gastric cancer and Siewert type II esophagogastric junction cancer, pathological T2 and small-sized T3 stage groups are possible candidates for proximal gastrectomy in cases without distal lymph node metastasis. Further validation studies are needed for clinical application.

*Multidisciplinary treatment of localized gastric cancer*

IGCC22-ABS-1361

**NEOADJUVANT DOS CHEMOTHERAPY FOR PATIENTS WITH RESECTABLE ADENOCARCINOMA OF ESOPHAGOGASTRIC JUNCTION**

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<sup>1</sup>Department of Gastroenterological Surgery, Osaka University, Suita, Japan

**Objectives:** Since the prognosis of patients with adenocarcinoma of esophagogastric junction (AEG) are still poor, more intensive treatment including neoadjuvant chemotherapy (NAC) should be developed. The docetaxel-based triplet combination therapy has attracted much attention for locally advanced gastric cancer as neoadjuvant setting. Thus, we aimed to retrospectively analyze whether neoadjuvant docetaxel, oxaliplatin and S-1 (DOS) combination chemotherapy had the good clinical response and could improve prognosis in patients with AEG.

**Methods:** This study retrospectively reviewed 36 consecutive patients with locally advanced AEG who were treated with neoadjuvant DOS therapy in our hospital. In principle, patients underwent three cycles of docetaxel (40 mg/m<sup>2</sup>) and oxaliplatin (100 mg/m<sup>2</sup>) on day 1 plus oral S-1 (80-120 mg/body) on days 1 to 14 every three weeks.

**Results:** Neoadjuvant DOS with 3 cycles was completed in 28 (78%) patients. Grade 3-4 neutropenia, anorexia, and diarrhea were observed in 26 (72%), 7 (19%), and 4 (11%) patients, respectively. Febrile neutropenia occurred in 6 (17%) patients. There was no treatment-related death. R0 resection could be achieved in 35 (97%) patients and postoperative morbidities (Clavien-Dindo Grade III or higher) was observed in 6 (17%) patients. A pathologic complete response (pCR) decided as grade 3 response was observed in 11 (31%) out of 36 patients. Three-year relapse free and overall survival rates were 65% and 78%, respectively.

**Conclusions:** As neoadjuvant DOS chemotherapy has shown high pathological response rate, it could be a promising treatment strategy for resectable AEG.

***Multidisciplinary treatment of localized gastric cancer***

IGCC22-ABS-1175

**SURVIVAL BENEFIT OF ADJUVANT CHEMOTHERAPY FOR GASTRIC CANCER AFTER NEOADJUVANT CHEMOTHERAPY**

Yi-Hui Tang<sup>1</sup>, Jian-Xian Lin<sup>1</sup>, Jian-Wei Xie<sup>1</sup>, Ping Li<sup>1</sup>, Chao-Hui Zheng<sup>1</sup>, Changming Huang<sup>1</sup>

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**Objectives:** Neoadjuvant chemotherapy (NAC) is a standard treatment option for locally advanced gastric cancer (LAGC). However, the indications for adjuvant chemotherapy (AC) in LAGC patients who received NAC remain controversial.

**Methods:** This multicenter, international study included 353 LAGC patients undergoing curative-intent gastrectomy after NAC at two institutions in China. Additionally, 109 patients from the USA and Italy were reviewed for external validation. Patients who received AC and those who did not were propensity score-matched to evaluate the impact of AC on overall survival (OS).

**Results:** Among 353 patients from China, 262 (74.1%) received AC, whereas 91 (25.9%) did not. After propensity matching, patients who received AC demonstrated better OS than those who did not receive AC (3-year OS: 60.1% vs. 49.3%,  $P = 0.016$ ). Lymph node ratio (LNR) was significantly associated with AC benefit: AC was associated with improved OS in patients with higher ( $\geq 9\%$ ) LNR (3-year OS: 46.6% vs. 21.7%,  $P < 0.001$ ) but it did not improve OS in patients with LNR  $< 9\%$  (3-year OS: 73.9% vs. 71.3%,  $P = 0.298$ ). When stratified by AC cycles, only those patients who completed at least four AC cycles exhibited a significant survival benefit (3-year OS: 68.9% vs. 53.7%,  $P = 0.025$ ). In the external cohort, improved OS with AC administration was also found in patients with an LNR  $\geq 9\%$  (3-year OS: 53.0% vs. 26.3%,  $P = 0.038$ ).

**Conclusions:** The administration of AC after NAC and resection of LAGC was associated with improved prognosis in patients with LNRs  $\geq 9\%$ .

*Multidisciplinary treatment of localized gastric cancer*

IGCC22-ABS-1183

**PATTERNS AND RISK FACTORS OF TREATMENT FAILURE AFTER RADICAL GASTRECTOMY IN GASTRIC CANCER PATIENTS**

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**Objectives:** This study aims to explore the pattern and risk factors of postoperative treatment failure in patients with stage II-III gastric cancer.

**Methods:** A total of 875 stage II-III patients who underwent radical resection from January 2010 to December 2013 were included. Among them, 407 patients endured postoperative treatment failure (Failure group, FG) and the remaining 468 patient did not (Non-failure group, NFG). The competing risk curve and COX regression were used to analyze the risk factors of treatment failure, and the Venn diagram and kernel density curve were used to show the dynamic failure patterns.

**Results:** Compared with the NFG, significant difference were witnessed in the FG in terms of the total gastrectomy rate, preoperative CA19-9, preoperative CEA, tumor size and pathological N stage (all  $P < 0.001$ ). Multivariate analysis found that preoperative CA19-9, preoperative CEA, tumor location, pN stage and major complication were independent risk factors associated with treatment failure for patients with stage II-III gastric cancer, however, adjuvant chemotherapy was the independent protective factor. Competing risk curve showed that the 3-year cumulative hazard rate of distant recurrence, peritoneal recurrence, local recurrence, and death without recurrence in patients with stage II-III gastric cancer was 20.4%, 10.0%, 7.9%, and 5.1%, respectively. Furthermore, the dynamic hazard rate peaked at 16.7 months (peak rate=0.0143) before gradually declining, most treatment failure events occurred within 36 months after surgery. Similar trend were between local recurrence, peritoneal recurrence and death without recurrence, whereas the earliest peak time and highest hazard rate was seen in distant recurrence compared with other failure types (peak time=14.5 months; peak rate=0.0074).

**Conclusions:** Poor oncological characteristics are closely related to treatment failure in patients with stage II-III gastric cancer, while adjuvant chemotherapy is the independent protective factor.

***Multidisciplinary treatment of localized gastric cancer***

IGCC22-ABS-1188

**EFFECT OF ADJUVANT CHEMOTHERAPY ON RECURRENCE PATTERN FOR PATIENTS WITH II/III GASTRIC CANCER**

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<sup>1</sup>Department of Gastric Surgery, Fujian Medical University Union Hospital, Fuzhou, China

**Objectives:** To discuss the effect of postoperative adjuvant chemotherapy (ACT) on the recurrence pattern of patients with stage II/III gastric cancer (GC) after radical surgery.

**Methods:** From January 2010 to September 2014, the clinicopathological data of patients with GC undergoing radical surgery were retrospectively analyzed. The stabilized inverse probability of treatment weighting (IPTW) was used to balance baseline data. Kaplan-Meier curves, Cox regression analysis and hazard functions were used to evaluate the effect of ACT on the prognosis.

**Results:** A total of 1232 patients with complete clinical data were included. After IPTW adjustment, a total of 40.5% (498/1,232 cases) of the patients experienced recurrence, mostly distant recurrence. There was no significant difference in the total recurrence rate, local recurrence rate peritoneal recurrence rate or distant recurrence rate between the two groups ( $p$  all  $>0.05$ ). The Cox analysis showed that ACT was an independent protective factor for RFS and OS. Further hazard function showed that the peak value of postoperative recurrence in the no ACT group appeared earlier and higher than that of the ACT group. More importantly, the peak value of recurrence risk in the ACT group decreased smoothly after 18 months; however, the no ACT group had multiple recurrence risk peaks. The analysis of different recurrence sites and pathological stages showed similar results.

**Conclusions:** Postoperative adjuvant chemotherapy is a protective factor for RFS and OS in patients with stage II/III gastric cancer. Adjuvant chemotherapy can reduce the peak risk of recurrence and delay the peak time.

***Multidisciplinary treatment of localized gastric cancer***

IGCC22-ABS-1191

**EFFECT OF TUMOR REGRESSION GRADING ON RECURRENCE AFTER NEOADJUVANT CHEMOTHERAPY FOR GASTRIC CANCER**

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**Objectives:** This study investigated the effect of tumor regression grades on the recurrence pattern and survival of patients with gastric cancer undergoing neoadjuvant chemotherapy.

**Methods:** This multi-center study included 637 patients with advanced gastric cancer who underwent radical resection and received neoadjuvant chemotherapy. For groups A (tumor regression grades 0-1, n = 123) and B (tumor regression grades 2-3, n = 502), a 1:1 propensity score ratio was used to analyze the location, time, and recurrence pattern of the tumors, followed by analysis of survival difference.

**Results:** After matching, 121 patients in groups A and B were included. The 5-year overall survival, 5-year recurrence-free survival, and 5-year mean restricted survival time were better in group A than in group B (28.9% vs. 20.7%; 28.1% vs. 19.8%; 32.53 months vs. 28.42 months, respectively). The total number of recurrences, distant recurrences, and early recurrences were significantly lower in group A than in group B (26 vs. 40; 9 vs. 20; 18 vs. 35, respectively). Local recurrence, peritoneal recurrence, multi-site recurrence, and late recurrence were equal between the groups. Multivariate risk analysis showed that tumor regression grading 0-1 was a protective factor for recurrence. The five-year overall survival, post-recurrence survival, and restricted survival time of patients with local recurrence, distant recurrence, and early recurrence were significantly better in group A than in group B. Among patients with ypT2-4 and ypN+ tumors, the overall survival and post-recurrence survival of patients with early metastasis were lower in group A than in group B.

**Conclusions:** For patients undergoing neoadjuvant chemotherapy, tumor regression grading can aid in assessing overall survival and predicting postoperative recurrence patterns and survival. Patients with tumor regression grades 2-3 are more likely to have early and distant recurrences and worse survival after recurrence compared with patients with tumor regression grades 0-1.

**Multidisciplinary treatment of localized gastric cancer**

IGCC22-ABS-1226

**PROCALCITONIN AND CRP FOR THE DIAGNOSIS OF LEAKAGE AND COMPLICATIONS IN GASTRIC SURGERY (PEDALES)**

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1., IRCCS Humanitas Research Hospital, Rozzano, 2., Fondazione Policlinico Universitario A. Gemelli IRCCS, Rome, 3., European Institute of Oncology, Milan, Italy

**Objectives:** The aim of this study is to define whether PCT might be an earlier and more accurate predictor of anastomotic leakage (AL) than CRP after esophagogastric resection for cancer.

**Methods:** This was a prospective multicentric observational study conducted in three Italian centers, including all patients undergoing gastrectomy from May 2016 to April 2021. The endpoint was the assessment of the discrimination and accuracy achieved by the PCT and CRP values measured from POD1 to 7 in determining the occurrence of AL and MICs. Accuracy was assessed with the AUC ROC curves and Youden's statistics. Based on the mean and 95%CI for the values of CRP in patients with AL and MICs, two charts were created for risk stratification during the postoperative course.

**Results:** The significant results for the ROC curve analysis for PCT and CRP are presented in Table 1a and 1b.

**Table 1a: Performance of ProCT, PCR on POD1 to 7 to predict AL**

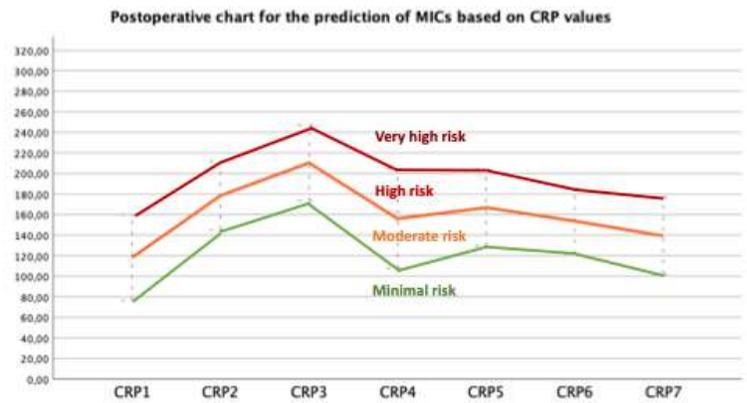
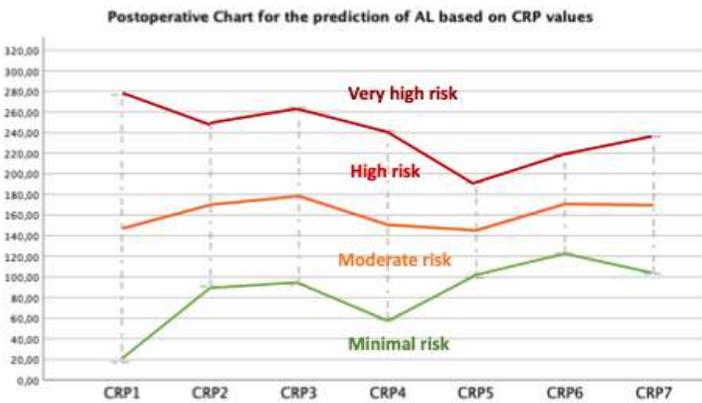
Variable	AUC	P value	Cut-off value (mg/ml)	Sp e
CRP POD4	,709	,015	156	817
CRP POD5	,688	,003	96	991
PCT POD6	,676	,039	,13	890
CRP POD6	,759	,000	104	879
PCT POD7	,763	,002	0,4	897
CRP POD7	,772	,000	94	5400

**Table 1b: Performance of ProCT, PCR on POD 1 to 7 to predict MICs**

Variable	AUC	P value	Cut-off (mg/ml)	Sp e
CRP POD1	,650	,005	68	840
PCT POD2	,643	,002	,18	808

CRP POD2	,696	,000	165	865
PCT POD3	,672	,000	,35	693
CRP POD 3	,730	,000	169	710
PCT POD4	,707	,000	,15	840
CRP POD4	,744	,000	151	750
PCT POD5	,663	,000	,17	875
CRP POD5	,780	,000	117	870
PCT POD6	,708	,000	,09	935
CRP POD6	,744	,000	93	877
PCT POD7	,688	,000	,2	802
CRP POD7	,766	,000	94	818

Image:



**Conclusions:** PCT was not superior to CRP as a predictor of AL and major infective complications after gastrectomy. CRP should be used as the reference screening postoperative marker.

## ***Multidisciplinary treatment of localized gastric cancer***

IGCC22-ABS-1232

### **"R1 LYMPH NODE DISSECTION" IS ASSOCIATED WITH WORSE PROGNOSIS AND LOCOREGIONAL RECURRENCE**

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**Objectives:** The aim of this study is to define and investigate the prognostic impact of a "R1 lymph node dissection" after gastrectomy.

**Methods:** This was a retrospective study conducted on 499 patients undergoing curative-aim gastrectomy.

We defined R1-Lymph dissection as a:

- D1 lymphadenectomy with involvement of station No. 1-7, except for station 3 involved with station 7 not involved;
- D2 lymphadenectomy with involvement of stations No. 8-12;
- involvement of lymph node stations anatomically connected with lymph node stations outside the declared level of dissection (D1 to D2+), when the subsequent node station was not removed (i.e. patients with station 5 involved when station 12 was not dissected, patients with station 7 involved when station 9 was not dissected, patients with station 6 involved when station 14v was not dissected).

The primary outcomes for the study were disease free and disease specific survival (DFS and DSS). The secondary outcomes were the locations of recurrence. The association of the R1 lymph status and other variables with the selected outcomes was assessed with multivariable backward Cox and logistic regression models.

**Results:** Among the predictors of survival, the type of gastrectomy, the pathologic tumor staging (pT) and the pathologic node staging (pN) were the factors independently associated with DFS, while the type of gastrectomy, the R1-Margin status, the R1-Lymph status, the pathologic tumor staging (pT), the pathologic node staging (pN) and adjuvant therapy were the factors independently associated with DSS. Instead, the pT and the R1-lymph status were the only factors independently associated with overall loco-regional recurrence. The R1-lymph status was not related to peritoneal or liver recurrence.

**Conclusions:** In this study, we introduce the concept of R1-Lymph node dissection, that was significantly associated with disease-specific survival and appeared to be a stronger prognostic factor for locoregional recurrence than the R1 status on the resection margin.

*Multidisciplinary treatment of localized gastric cancer*

IGCC22-ABS-1261

**SINGLE INTRATHECAL MORPHINE VS. CONTINUOUS EPIDURAL ANALGESIA ON LENGTH OF STAY AFTER GASTRECTOMY**

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**Objectives:** Single-dose intrathecal opiates (ITO) could shorten the length of hospital stay compared with thoracic epidural analgesia (TEA). This study aimed to compare TEA with TIO in terms of length of hospital stay, pain control, and parenteral opioid consumption in patients undergoing gastrectomy for cancer.

**Methods:** Patients who underwent gastrectomy for cancer in 2007-2018 at the CHU de Québec – Université Laval were included. The patients were grouped as TEA and intrathecal morphine (ITM). The primary outcome was the length of hospital stay (LOS). The secondary outcomes were numeric rating scale (NRS) for pain and parenteral opioid consumption.

**Results:** A total of 79 patients were included. There were no significant differences in baseline characteristics between the two groups. The median LOS was shorter in the ITM group than in the TEA group (median, 7.5 vs. 10 days,  $P=0.049$ ). The opioids consumption at 12, 24, and 48 h postoperatively were statistically lower in the TEA group at all time points. The NRS score for pain was lower in the TEA group than in the ITM group at all time points (all  $P<0.05$ ).

**Conclusions:** Patients with ITM analgesia undergoing gastrectomy presented shorter LOS than those with TEA. ITM had an inferior pain control that did not prove to have a clinical impact on recovery in the cohort studied. ITM seems to be a suitable alternative to TEA in gastrectomy. Given the limitations of this retrospective study, further trials are warranted.

***Multidisciplinary treatment of localized gastric cancer***

IGCC22-ABS-1280

**OVERALL SURVIVAL COMPARISON OF US REGIONALIZED GASTRIC CANCER CARE WITH INTERNATIONAL TRIALS**

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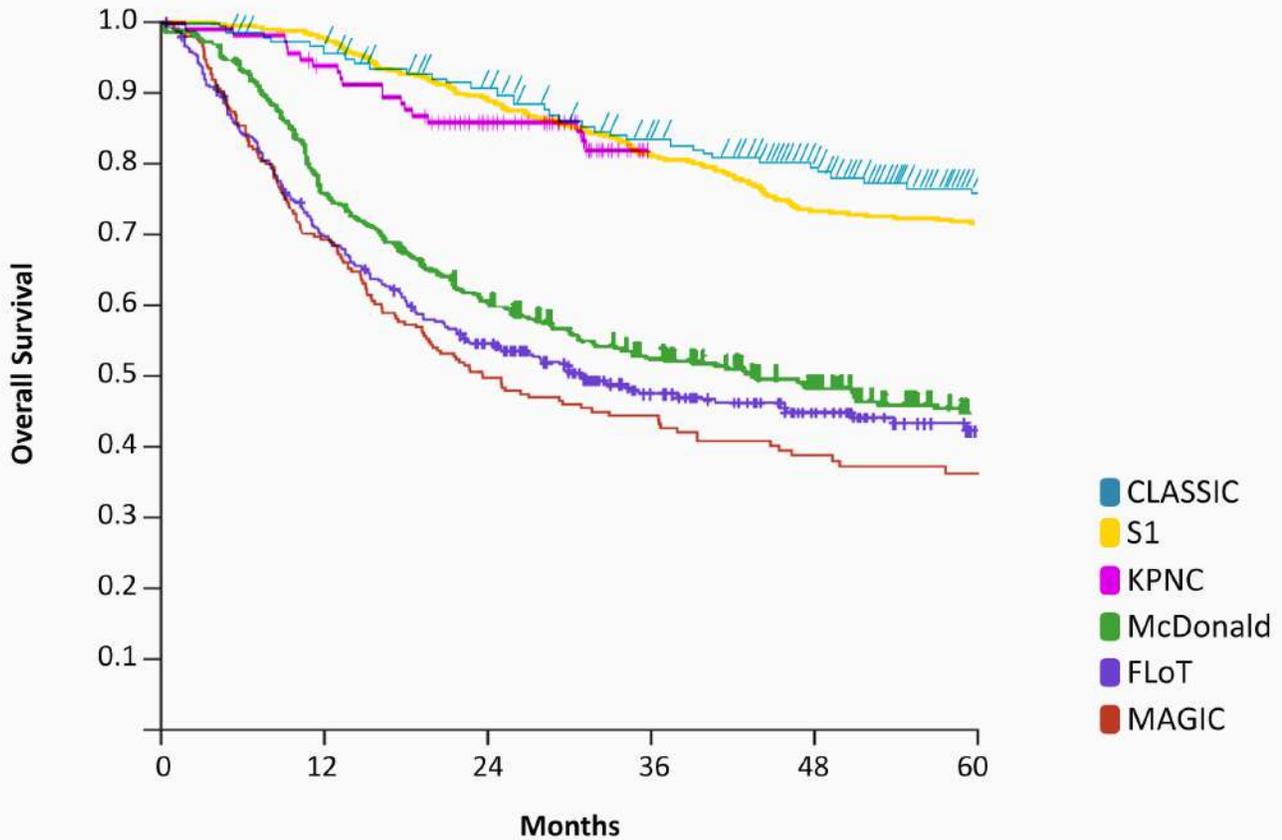
**Objectives:** Given the complexity of pathology and evolution of multimodal treatment, the Kaiser Permanente Northern California (KPNC) group has regionalized gastric cancer care to a multidisciplinary care team with standardized cancer care in effort to improve the survival rates comparable to those of international standards.

**Methods:** From January 2016 to May 2018, in a healthcare system over 4 million members, every patient with gastric cancer diagnoses were triaged and evaluated by the multidisciplinary team. Standardized staging included PET/CT, endoscopic ultrasound, and diagnostic laparoscopy for locally advanced disease. Treatment included peri-operative chemotherapy most closely following the FLOT protocol, and laparoscopic gastrectomy with D2 lymphadenectomy validated by pathology. Data collection performed via electronic medical record with surgeon adjudicated chart reviews. Overall survival was analyzed using Kaplan-Meier model with comparison to current international landmark RCT studies – McDonal trial, MAGIC trial, ACTS-GC S1 trial, CLASSIC trial and FLOT trial.

**Results:** For the study period, 487 patients were evaluated by the multidisciplinary team. Of those, 122 patients underwent curative-intent surgery. For more statistical analysis of the patient demographics with disease information were described in our previous paper (<https://ascopubs.org/doi/full/10.1200/JCO.21.00480>). The table and graph share the comparative data.

**Image:**

Title	Journal	Cohort	Tumors	Stages	Surgery	Chemo	XRT	3 year survival	5year survival
McDonald	NEJM 2001	US	GEJ+ gastric	1B-3B	Open 10% D2	Adjuvant 1Fu+Leucovorin	Yes	50%	~46% (estimated)
MAGIC	NEJM 2006	UK	GEJ + gastric	2-3B	Variable	Peri-op ECF	No	~45% (estimated)	36.3%
ACTS-GC S1	JCO 2011	Japanese	gastric	2-3B	Open D2	Oral S1 g53	no	80.1%	71.1%
CLASSIC	Lancet 2014	China, Taiwan, South Korea	gastric	2-3B	Open D2	Capecitabine+ oxalaplatin	no	83%	68%
FLOT	Lancet 2019	Germany	GEJ+ gastric	2-3B	Open D2	Peri-op FLOT	no	57%	45%
KPNC	JCO 2021	US	Gastric	1B-3B	Lap D2	Peri-op FLOT	No	<b>83%</b>	TBD



**Conclusions:** With a multidisciplinary group that provided regionalized care, US gastric cancer 3-year overall survival rates can be comparable our Eastern colleagues. Our limitation include that KPNC study is not a randomized control trial although the regionalization process allowed for a systematic approach to evaluate every patient with gastric cancer diagnosis. The 5-year survival data is to be reviewed.

***Multidisciplinary treatment of localized gastric cancer***

IGCC22-ABS-1289

**MULTIMODALITY MANAGEMENT OF GASTRIC CANCER IN THE REAL WORLD**

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**Objectives:** Show the long-term survival results of multimodal treatment for gastric cancer in a population of patients from a public hospital in a country with a high incidence.

**Methods:** Prospective database between January 2015 and May 2019, conformed by the all patients presented to the oncologic and surgical committee. Inclusion criteria: histological diagnosis of gastric adenocarcinoma and age older than 18 years. Exclusion criteria: other histological varieties of gastric cancer, tumors without histological confirmation and endoscopic resection. Variables analyzed: age, gender, stage of the disease, location, macroscopic type, histological variety and treatment received. Statistical analysis was performed according to type of variable. Kaplan-Meier method was used for survival analysis and Log-Rank Test for comparison

**Results:** In the mentioned period, 313 patients meeting the mentioned criteria have been evaluated. Mean age: 62.5, male:female gender ratio 1.6:1. Of these patients, 162 (51.8%) were treated with curative intent, and 151 (48.2%) with palliative criteria. The average survival time for curative patients was 31.9 months, while for palliative patients it was 9.8 months. Among the patients with curative intent, 78 (48.1%) received multimodal treatment. In the palliative group, 67 (44.3%) received tumor-directed therapy (chemotherapy or palliative radiotherapy). The survival of patients with palliative therapy was significantly better than those who only received medical support (14.7 months versus 7.2). The analysis further shows that a non-negligible percentage of patients do not meet the clinical conditions to receive advanced oncologic therapy

**Conclusions:** Multimodal treatment of gastric cancer is effective, demonstrated by multiple randomized studies, real-world application is not always feasible, given mainly by patient conditions. Multimodal therapy demonstrates improving survival outcomes compared to exclusive surgery

***Multidisciplinary treatment of localized gastric cancer***

IGCC22-ABS-1309

**PREOPERATIVE CHEMOTHERAPY IS A BETTER STRATEGY THAN UPFRONT SURGERY FOR STAGE CT4 GASTRIC CANCER**

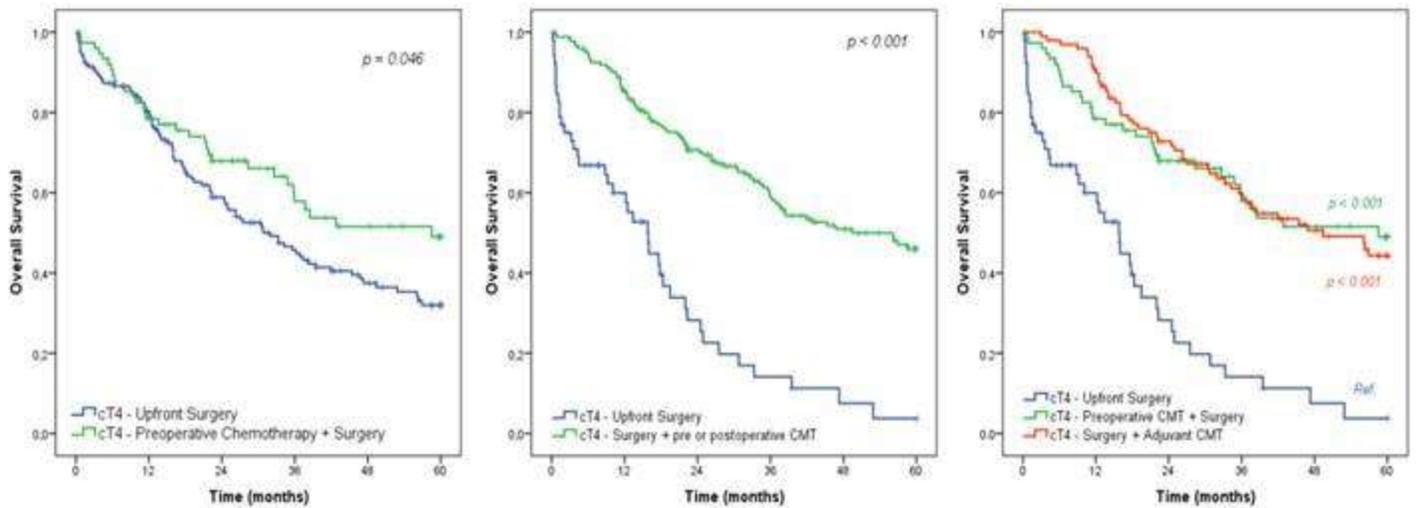
Andre R. Dias\*<sup>1</sup>, Marina A. Pereira<sup>1</sup>, Marcus F. K. P. Ramos<sup>1</sup>, Ulysses Ribeiro Jr<sup>1</sup>, Bruno Zilberstein<sup>1</sup>, Sergio C. Nahas<sup>1</sup>  
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**Objectives:** Stage T4 gastric cancer (GC) is the extreme in wall invasion, being a particularly challenging condition to manage. At this time, due to the paucity of data and its low quality, it is unknown if preoperative chemotherapy (CMT) is a better strategy than upfront surgery in T4 GC. Therefore, this study aimed to evaluate the best strategy in cT4 GC (preoperative CMT vs. upfront surgery)

**Methods:** Patients with gastric adenocarcinoma staged as cT4 and who underwent gastrectomy with curative intent were included. Patients were divided according to initial treatment: upfront surgery (SURG) or CMT+surgery (CMT+SURG). Primary outcome was overall survival (OS). Preoperative CMT was considered a dichotomous variable (received or not), regardless of the regimen received.

**Results:** Of 1,330 GC operated, 685 received curative purpose surgery. Of these, 266 were initially staged as cT4: 150 underwent SURG and 76 CMT+SURG. In the SURG group, 95 received adjuvant CMT. Both groups were similar concerning age, comorbidities, ASA, hemoglobin, albumin, gastrectomy and lymphadenectomy performed. The CMT+SURG group had fewer metastatic lymph nodes and less advanced pTNM. The 30-day mortality in SURG and CMT+SURG was 5.3% and 2.6%, respectively ( $p=0.35$ ). Median OS was 32 and 58.5 months for SURG and CMT+SURG, respectively ( $p=0.04$ ). Those who received perioperative or adjuvant CMT (n:174) had better OS compared to surgery alone (49.4 vs 15.9 months,  $p<0.001$ ). Median disease-free survival (DFS) for those with surgery alone was poor (4.5 months). OS was similar for those receiving preoperative and adjuvant CMT. Absence of CMT, pN+ and R1 resection were independent risk factors for lower OS.

**Image:**



**Figure.** Overall survival of cT4 gastric cancer according to the treatment performed: upfront surgery; preoperative chemotherapy (CMT) + surgery; surgery + pre or postoperative CMT.

**Conclusions:** Multimodal treatment (MMT) associating CMT with surgery, regardless of whether the approach is pre or postoperative, is a prognostic factor in GC cT4. As tolerance to adjuvant treatment is reduced, preoperative CMT assures that the patient receives MMT and is a better strategy for cT4 GC compared to upfront surgery.

***Multidisciplinary treatment of localized gastric cancer***

IGCC22-ABS-1316

**MULTIMODAL THERAPY IN GASTRIC CANCER: EXPERIENCE OF 10 YEARS**

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**Objectives:** Our objective is to analyze the results, in terms of impact on survival, of multimodal management in gastric cancer. Results are compared between patients with exclusive surgery, neoadjuvant and postoperative adjuvant. We can hypothesize that the results of multimodal therapy are generally better than exclusive surgery

**Methods:** We analyzed the survival results of all patients managed in a public hospital in a country with a high prevalence of gastric cancer. Study period: September 2010- May 2019. Inclusion criteria: gastric or gastroesophageal junction adenocarcinoma. Treatment with curative intent. Absence of neoplastic disease previously treated with radiotherapy and / or chemotherapy. Exclusion criteria: Early gastric cancer (initial diagnosis), initial non-curative treatment intention. Statistical analysis: demographic, clinical, pathological, treatment and survival variables. For survival analysis, the Kaplan-Meier method is used and the comparison of curves with the Log-rank test

**Results:** In this period of time, 367 patients have been treated consecutively who meet the aforementioned criteria. Of these, a total of 108 (29.4%) received perioperative therapy (preoperative chemotherapy + surgery with / without postoperative chemotherapy), adjuvant therapy (surgery + chemotherapy and / or postoperative radiotherapy) 58 patients (15.8%) and, exclusive surgery 201 patients (54.7%). Survival rates at 5 years were: 50.9 months for the perioperative group, 43.7 months for the adjuvant therapy group, and 37.8 months for the exclusive surgery group

**Conclusions:** Multimodal management in advanced gastric cancer shows superior results than exclusive surgery. It is not possible to use multimodal management in all cases. It is important to discuss all cases in a multidisciplinary oncology committee to obtain the best long-term survival results

## ***Multidisciplinary treatment of localized gastric cancer***

IGCC22-ABS-1378

### **THE INDICATION OF ADJUVANT CHEMOTHERAPY WITH GASTRIC CANCER TREATED WITH NEOADJUVANT CHEMOTHERAPY**

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**Objectives:** Neoadjuvant chemotherapy (NAC) is performed mainly for patients with stage III or higher advanced gastric cancer with the aim of enhancing the therapeutic effect in our hospital. However, there is no consensus on whether adjuvant chemotherapy (AC) should be administered to patients who underwent radical gastrectomy after NAC. Therefore, We aimed to examine the indications for postoperative AC.

**Methods:** We analyzed the prognostic factors for recurrence-free survival (RFS) and disease-specific survival (DSS) in 127 patients with gastric cancer who underwent R0 gastrectomy after NAC from 2009 to 2020 in our hospital, and investigated the indication for AC.

**Results:** Median age was 68 years, and 91 patients were male. NAC was performed in triplet (n=104) and doublet (n=23) regimen. After surgery ypStage I/II/III/IV was 14/16/37/54/6, and AC was performed in doublet (n=11) and singlet (n=82) regimen, and 34 patients did not receive AC. In the univariate analysis for RFS, Borrmann type4 ( $p=0.010$ ), NAC doublet ( $p=0.027$ ), ypT3-4 ( $p=0.0006$ ), and ypN (+) ( $p<0.0001$ ) were significant poor prognostic factors, and in the multivariate analysis, NAC doublet (HR=1.99,  $p=0.036$ ), postoperative complications grade II or higher (HR=1.78,  $p=0.032$ ), and ypN (+) (HR=5.80,  $p<0.0001$ ) were independent poor prognostic factors. ypN (-) patients with and without AC had similar prognosis, while ypN (+) patients with AC had significantly better prognosis than those without AC in both RFS and DSS. There was no significant difference in the prognosis between singlet and doublet regimen of AC in ypN (+) patients, and there was no significant difference in RFS between patients who completed AC for six months and those who did not.

**Conclusions:** AC might be omitted in ypN (-) patients after NAC of gastric cancer. Though ypN (+) after NAC is supposed to be the good indication for AC, further investigation is needed for the type of regimen or the duration of AC for gastric cancer patients with NAC.

## ***Multidisciplinary treatment of localized gastric cancer***

IGCC22-ABS-1307

### **CEA TARGETED MONOCLONAL ANTIBODY WITH NIR FLUOROCHROME FOR GASTRIC CANCER SPECIFIC IMAGING**

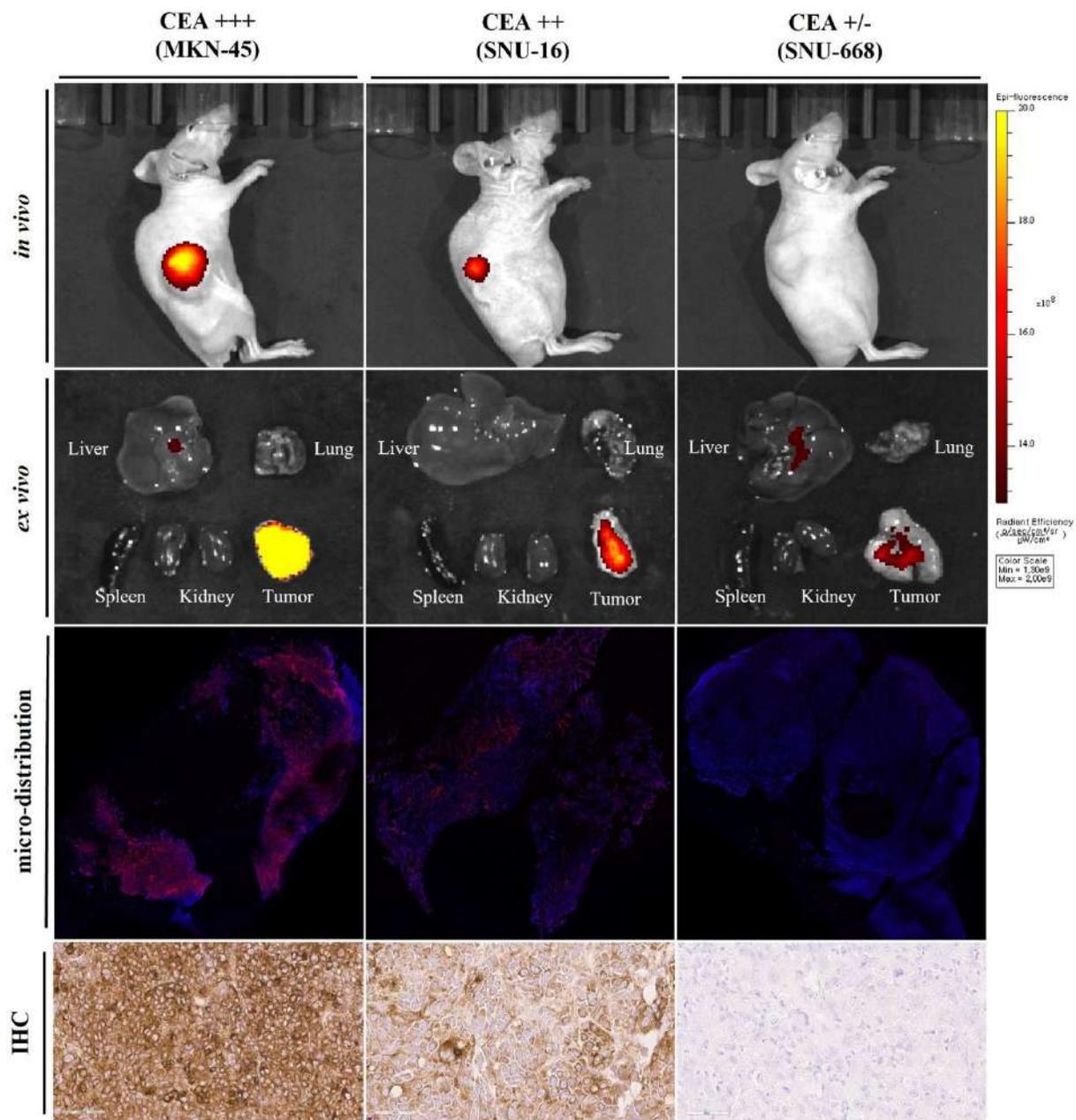
Eunhee Koo\*<sup>1</sup>, Kyungyun Jeong<sup>1</sup>, Jaeun Yoo<sup>1</sup>, Ji-yeon Shin<sup>1</sup>, Leena Lim<sup>1</sup>, Hyun Myong Kim<sup>1</sup>, Ji Yong Park<sup>2</sup>, Yun-Sang Lee<sup>2</sup>, Yoon-Jin Kwak<sup>3</sup>, Bérénice Framery<sup>4</sup>, Karen Dumas<sup>4</sup>, Françoise Cailler<sup>4</sup>, André Pèlegrin<sup>5</sup>, Do-Joong Park<sup>1, 6</sup>, Han-Kwang Yang<sup>1, 6</sup>, Seong-Ho Kong<sup>6</sup>, Hyuk-Joon Lee<sup>1, 6</sup>

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**Objectives:** Carcinoembryonic antigen (CEA) is one of the most clearly expressed biomarkers in gastric cancer. We utilized a Near Infrared (NIR) fluorochrome labeled chimeric monoclonal antibody against CEA to gastric cancer for tumor specific imaging of fluorescence image-guided surgery.

**Methods:** RNA sequencing data were screened and validated by qPCR and western blotting. Flow cytometry and confocal were performed for fluorescence intensity. SGM-101(n=5) and Isotype-101(n=2) was injected to mouse xenografts which has different expression level of CEA. In addition, peritoneal carcinomatosis model was performed by bioluminescence/ fluorescence imaging. H&E and Immunohistochemistry were processed for histologic evaluations. **Results:** RNA and protein expression of CEA in gastric cell lines was measured by RNA sequencing, qPCR, and western blot. Both FACS quantification and fluorescence intensity evaluation of CEA expression revealed similar patterns of expression, and immunocytochemistry confirmed membrane localization of CEA. In subcutaneously implanted models, fluorescence intensity of each group shows that the accumulation of SGM-101 induces a significantly higher fluorescence signal in the high (MKN-45) and medium (SNU-16) CEA expressing groups while no fluorescence signal was observed in the CEA negative group (SNU-668) via IVIS Spectrum. Biodistribution of SGM-101 indicates that the maximum peak accumulation occurred 48 hours after tail vein injection. Frozen tissue which was extracted at peak detection time shows micro-distribution of SGM-101 and expression of CEA in extracted tissue was validated with IHC by pathological analysis. In the peritoneal carcinomatosis model, the imaging of fluorescence detection patterns corresponds with bioluminescence imaging and histological evaluation.

**Image:**



**Conclusions:** CEA expression corresponded with a tumor area accumulation in gastric cancer xenografts. This study indicates that NIR tumor specific imaging with SGM-101 can be a feasible tool for image-guided surgery.

## Multidisciplinary treatment of localized gastric cancer

IGCC22-ABS-1434

### THE ROLE OF NEOADJUVANT CHEMOTHERAPY IN THE MANAGEMENT OF GASTRIC CANCER: A COHORT STUDY

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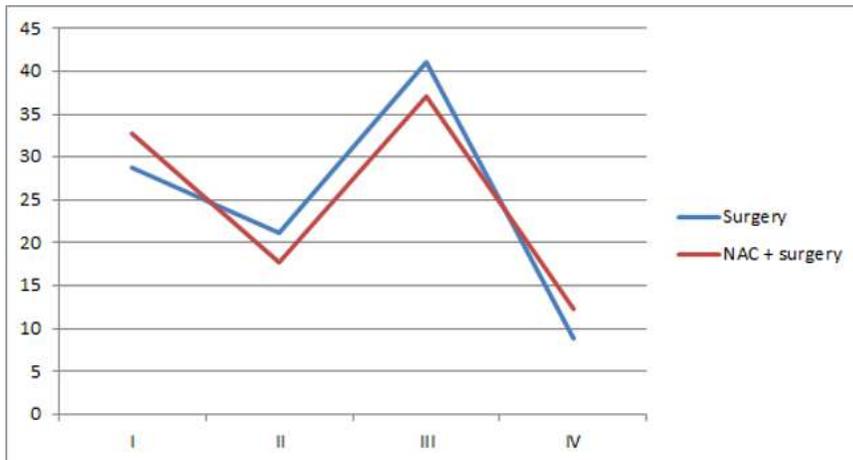
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**Objectives:** In western countries neoadjuvant chemotherapy (NAC) is widely used in the treatment of patients with gastric cancer. However, substantial data have been published showing inconsistent results regarding its benefits. The objective is to evaluate post-operative staging between the two groups of patients submitted to NAC or not.

**Methods:** This retrospective observational study compares the influence in staging of combined use of NAC and surgery and surgery alone for gastric cancer. We included in this study patients diagnosed with gastric cancer between December 2011 and May 2021. Our primary outcome was data on post-operative staging between the two groups according to the 7th UICC TNM staging system.

**Results:** : Of 489 patients, 416 (38% females, 62% males) were submitted to surgery alone and 73 (38% females, 62% males) underwent NAC with surgery. In the surgery-only group the mean age was  $62,7 \pm 1,2$  years and in the NAC + surgery group of  $57.5 \pm 2.4$ . Comparing the groups, we found that the most prevalent post-operative staging for surgery-only patients was stage III (41.1%), followed by stage I (28.8%), stage II (21.2%) and finally stage IV (8.9%). Similar findings were observed the NAC group, with stage III being the most prevalent (37.0%), then stage I (32.9%), stage II (17.8%) and stage IV (12.3%). In Figure 1, a graphic shows the percentages' distribution for both groups. Pearson's chi-squared test comparing both groups' stages was found to have a p-value of 0.63, showing no significant difference.

**Image:**



**Conclusions:** The findings of our study suggest that NAC did not change the staging in gastric cancer patients. We intend to reexamine the matter with a larger number of patients in the NAC group

*Multidisciplinary treatment of localized gastric cancer*

IGCC22-ABS-1056

**THE EVALUATION OF 5 TO 6 CYCLES OF S-1 PLUS OXALIPLATIN NEOADJUVANT CHEMOTHERAPY FOR GASTRIC CANCER**

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**Objectives:** S-1 combined with oxaliplatin (SOX) as neoadjuvant chemotherapy for locally advanced gastric cancer has been regarded as safe and effective in consequence of positive results on survival of several randomized controlled studies. However, there is insufficient evidence to recommend the optimal duration of neoadjuvant chemotherapy. This study evaluated the efficacy and safety of 5 to 6 cycles of SOX neoadjuvant chemotherapy comparing to 3 cycles.

**Methods:** The present study retrospectively collected the clinical data of 30 patients with locally advanced resectable gastric cancer. Ten patients received five cycles of SOX neoadjuvant chemotherapy (extended group), and the remaining 20 patients received three cycles of SOX preoperatively (short group). Then they all underwent D2 gastrectomy. Two groups were compared in terms of surgery, response, and postoperative complications.

**Results:** For the response, ten patients in the short group and six patients in the extended group achieved partial response (PR). One patient in the extended group developed into progressive disease (PD). The rest patients in the two groups achieved stable disease (SD) ( $P=0.228$ ). For the tumor regression, seven patients in the short group and four patients in the extended group showed tumor regression grade 0-2 ( $P=0.733$ ). The R0 resection rate of the short group and the extended group were 95% and 100%, respectively ( $P=1.000$ ). The recorded postoperative complications included pancreatic fistula, postoperative hemorrhage, incision infection, anastomotic leakage, and lung infection in one case each. No significant difference between the two groups was identified in terms of postoperative complication rate, operation time, and blood loss.

**Conclusions:** Extending the duration of SOX neoadjuvant chemotherapy showed safety and had the potential for better tumor regression. However, large-scale prospective randomized controlled studies are still needed for further evaluation.

***Multidisciplinary treatment of localized gastric cancer***

IGCC22-ABS-1057

**EXPERIENCE OF THE MOHAMED VI CENTER IN THE MANAGEMENT OF LOCALIZED GASTRIC CANCER**

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**Objectives:** The objective of the study is to describe our experience at the Mohamed VI Center and to evaluate the effectiveness of the MacDonald protocol in our population

**Methods:** This is a retrospective study of 22 cases followed for gastric adenocarcinoma, between January 2017 and December 2019. Data collection was done using a duly completed form from the patients' records.

**Results:** The mean age of our patients was 58 years with extremes ranging from 39 to 75 years.

All cases underwent surgery. The operative procedure consisted of subtotal gastrectomy in 81.8% of the cases. Lymph node dissection was insufficient ( $\leq 12$  nodes removed) in 31.8% of cases, D1 type dissection was performed in 27.2% of cases, extensive D3 type dissection ( $\geq 34$  nodes removed) was performed in 22.7% of cases, and finally D1.5 type dissection was performed in 18.2% of cases.

The extension workup and the anatomopathological study of the surgical specimen allowed us to classify our patients as stage IIIA in 36.4% of cases, stage IIB in 18.2% of cases, and stage IIIB in 13.6% of cases. However, 31.8% of the cases could not be staged due to insufficient lymph node dissection. In addition, 50% of the patients had a non-carcinological resection (R1).

All patients were treated according to the MacDonald protocol, but not respected in terms of the number of concomitant pre-radiotherapy cycles, which reached 3 cycles or more in 81.8% of cases.

68.2% of patients received conformal radiotherapy on the tumor bed and lymph node areas with doses ranging from 41.4 to 50 Gy, compared to 31.8% of cases treated with VMAT radiotherapy 45 Gy in 25 sessions of 1.8 Gy.

After a mean follow-up of 21 months, four cases of recurrence were noted, five cases were lost to follow-up, and 50% of patients were alive in complete remission.

**Conclusions:** Gastric cancers spread rapidly. Hence the interest of an aggressive multimodal treatment by Surgery associated with an extended curage followed by a radiochemotherapy according to the MacDonald protocol.

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IGCC22-ABS-1124

**TREATMENT OF LOCALLY ADVANCED GASTRIC CANCER: LAPAROSCOPIC GASTRECTOMY WITH PROPHYLACTIC HIPEC**

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<sup>1</sup>Department of Oncology, <sup>2</sup>Department of Surgery, Lithuanian University of Health Sciences, Kaunas, Lithuania

**Objectives:** The purpose of this study was to review the results of a single-center experience with the HIPEC use in treatment of advanced gastric cancer

**Methods:** This is a review of the clinical data from the first consecutive series of patients who underwent surgery with curative intent and HIPEC for the locally advanced gastric cancer with/without peritoneal dissemination. Closed technique was used after open and laparoscopic procedures: 60-90 min, temperature of 41.5-42.5 C, cisplatin/doxorubicin/mitomycin C. Data reflecting main characteristics, stage, type of surgery and perioperative outcomes within first 60 days was prospectively collected for the analysis. Significant morbidity was classified as Clavien-Dindo  $\geq$  Grade 3.

**Results:** 14 patients were subjected to this regimen, 1 patient had repeated palliative HIPEC. Median age was 47 (26-69), 62% male, ECOG 0. The median PCI was 3 (range 0-11). Eight (57%) out of 14 patients had laparoscopic surgery. Primary surgery in 13 cases (91%), for total of 15 procedures: 53% prophylactic, 33% curative, 14 % palliative HIPEC. In 45% cases extended surgery with multivisceral resections was performed. TNM stages: T 3-4a in 92 % of the cases with N 1-3, and ascites in 21%. Median OR time 5.7 h, LOS 10 days, ICU 0 patients, no significant morbidity. No delayed initiation of adjuvant therapy. The 30-day mortality was at 0%. Mean DFS is 7 months with 8 patients (57 %) and 4 patients (30 %) in the follow-up with no signs of recurrences within 14 months (12-17 months), 2 patients excluded due to short time after surgery. Median OS (6 deceased) in the groups with prophylactic, curative and palliative was – 12 months, 9 months, 10 months.

**Conclusions:** Laparoscopic and open gastrectomy with HIPEC is feasible in management of locally advanced gastric cancer and is not associated with significant morbidity or changes to the established treatment pathways with possible survival benefits.

***Multidisciplinary treatment of localized gastric cancer***

IGCC22-ABS-1137

**WHAT IS THE BEST TREATMENT OPTION IN PATIENTS WITH POSITIVE DISTAL MARGIN?: A CASE REPORT**

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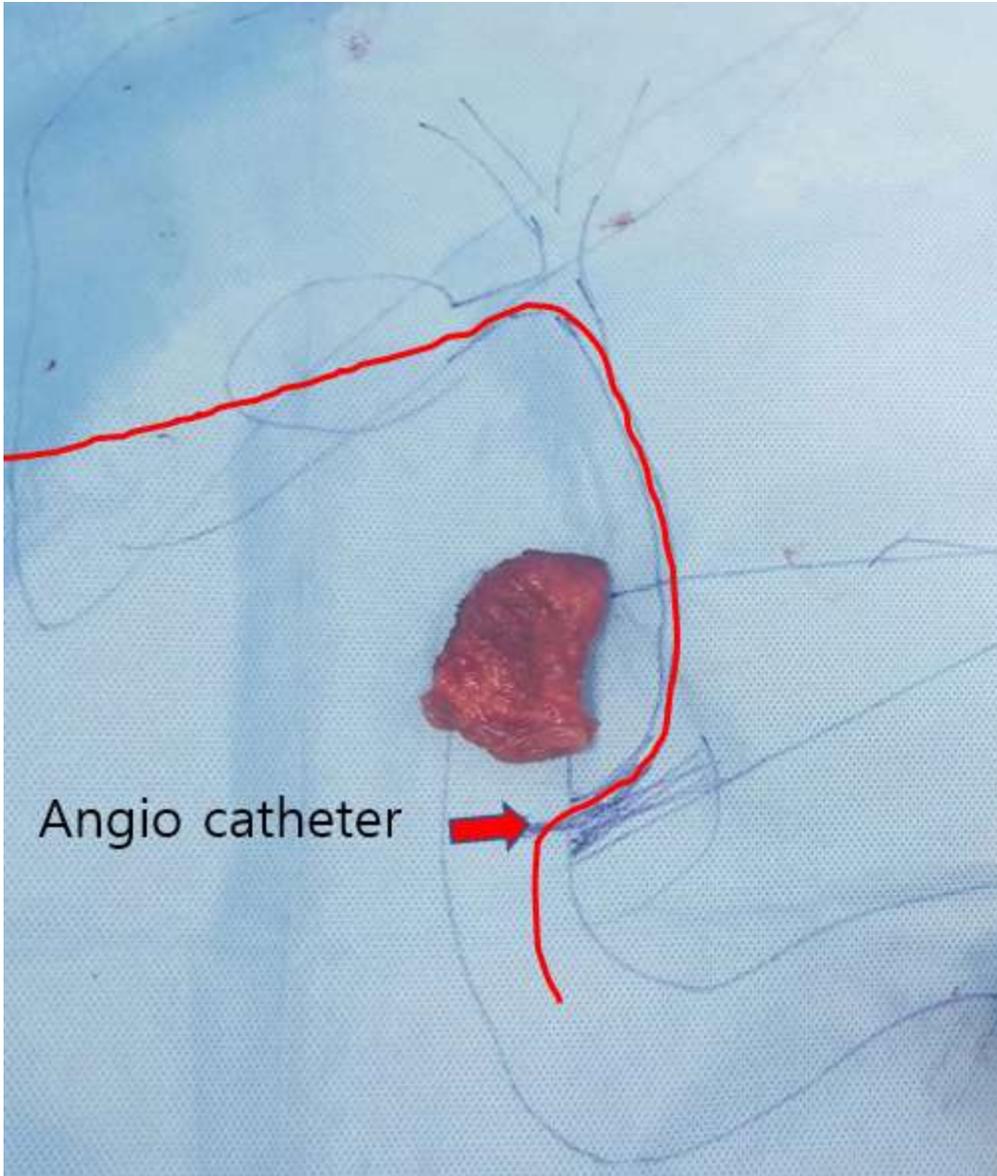
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**Objectives:** Reoperation in patients with positive resection margin on final pathology after curative resection for gastric cancer is a tremendous burden to the operator. This study is the first report which described surgical procedure and perioperative management performed in patients with positive distal margin after curative resection for gastric cancer.

**Methods:** A 56-year-old female patient received neoadjuvant chemotherapy of 3 cycles with FLOT regimen in another hospital up to 1 month ago. Laparoscopic distal gastrectomy with extracorporeal Billroth II reconstruction was performed. Frozen biopsy reported negative resection margin on both ends. Subsequent final pathology was ypT3N2M0. It revealed that specimen was Borrmann type IV cancer involving near whole stomach and some of scattered single cells were seen on immunohistochemical stain for cytokeratin in proximal and distal resection margins. Two weeks after previous surgery, remnant total gastrectomy and supra-ampullary duodenal resection were performed. Before reoperation, PTGBD and angiocatheter placement outside AoV via cystic duct were conducted to avoid pancreaticoduodenectomy and obtain maximal distal margin.

**Results:** Duodenal transection was performed 1cm above AoV following kocherization and detachment from pancreas without vessel ligation. Stump invagination followed duodenal transection. The length of the resected duodenum was 4cm. Final pathology reported negative resection margin on both ends and there was free of carcinoma in resected duodenum. She had no postoperative complication. She completed adjuvant CTx of 5 cycles with FLOT regimen as scheduled from 1month after reoperation.

**Image:**



**Conclusions:** Supra-ampullary duodenal resection, with preoperative percutaneous catheter placement in duodenum outside AoV via cystic duct, can be considered as the best treatment option in medically-fit patients with positive distal margin after curative resection for gastric cancer.

***Multidisciplinary treatment of localized gastric cancer***

IGCC22-ABS-1228

**PROTOCOL FOR THE DEVELOPMENT OF THE GASTRECTOMY PATHWAY PATIENT EDUCATION TOOL**

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<sup>1</sup>Clinical Evaluative Sciences, Sunnybrook Research Institute, <sup>2</sup>Department of General Surgery, University of Toronto, <sup>3</sup> Perioperative Interactive Education, University Health Network, <sup>4</sup>Odette Cancer Centre, Sunnybrook Health Sciences, Toronto, Canada

**Objectives:** Gastric cancer (GC) patients frequently report feeling overwhelmed with their prognosis and treatment options following diagnosis. Existing patient information resources regarding GC care are inadequate, despite the understanding that knowledge translation practices are essential contributors to shared decision making and improved outcomes. This project developed a digital, educational resource for patients undergoing gastrectomy surgery for GC. **Methods:** A detailed overview of the gastrectomy procedure, as well as pre- and postoperative practices, was written in layperson language for accessibility. A dedicated team of medical illustrators developed accompanying graphics. The content development was informed by an interdisciplinary team of clinicians, as well as patient advocates. A formal impact study is being conducted to assess the effectiveness of the Pathway. Outcomes will include scores derived from the Patient Education Materials Assessment Tool and feedback from qualitative interviews with stakeholders.

**Results:** The primary goal of this project is to increase patient understanding of GC and improve the accessibility of treatment-related resources. The Gastrectomy Pathway will be made freely available on the Internet to allow patients to access high-quality, evidence-based healthcare information using a computer or smartphone.

**Conclusions:** Existing patient education resources for GC are suboptimal. This ongoing work to design, publish, and evaluate an interactive web-based resource called the Gastrectomy Pathway will help patients and their families better understand their surgery and improve their holistic cancer care.

***Multidisciplinary treatment of localized gastric cancer***

IGCC22-ABS-1319

**THE "DARK SIDE" OF NEOADJUVANT TREATMENT OF GASTRIC CANCER**

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<sup>1</sup>Digestive Surgery, San Borja Arriam Clinic Hospital, <sup>2</sup>General Surgery, Universidad de Chile - San Borja Arriam Clinic Hospital, Santiago, Chile

**Objectives:** To analyze a series of cases of patients treated with neoadjuvant chemotherapy and in whom disease progression was evidenced during the course of preoperative chemotherapy

**Methods:** Prospective database of gastric cancer, including patients with clinical and histological demonstration of disease progression during chemotherapy. Inclusion criteria: gastric and gastro-esophageal junction adenocarcinoma, all patients initiating neoadjuvant therapy. Exclusion criteria: candidates for neoadjuvant therapy who do not initiate pharmacological therapy for any reason. Demographic, clinical and survival data are analyzed, and the curves are compared between those with complete perioperative treatment versus those with neoadjuvant treatment and progression. Kaplan-Meier method for survival analysis and Log-Rank Test for comparison

**Results:** In the period from January 2015 to May 2019, 313 patients with a diagnosis of gastric adenocarcinoma were evaluated, in which it was determined, the best therapy according to the stage and condition of the patient. Of these 122 started neoadjuvant treatment, of which in 14 of them (11.4%), disease progression was demonstrated either by clinical/imaging study or by the findings at reintervention. The average survival of patients who completed perioperative treatment (pre- or post-operative chemotherapy + surgery) versus patients with neoadjuvant treatment and disease progression is statistically superior (average survival 50.9 months versus 13.5,  $p > 0.0001$ ). If we compare the median survival, of patients receiving palliative chemotherapy at entry versus patients with neoadjuvant and progression, there was no statistically significant difference (14.7 months versus 13.5 months  $p = 0.23$ )

**Conclusions:** Disease progression during neoadjuvant in gastric cancer is a certain possibility of this therapy, however, and despite this, survival outcomes are similar to patients in whom palliative chemotherapy is performed, and obviously inferior to those obtained with complete neoadjuvant

**Multidisciplinary treatment of localized gastric cancer**

IGCC22-ABS-1428

**IMPACT OF NEOADJUVANCE ON THE STAGING OF LOCALLY ADVANCED GASTRIC CANCER**

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<sup>1</sup>General surgery, Hospital Universitario Principe de Asturias, Madrid, Spain

**Objectives:** The objective of this study is to present our experience in the management of locally advanced gastric cancer (LAGC) and the impact of neoadjuvant treatment, comparing staging at diagnosis versus definitive staging after surgery.

**Methods:** A retrospective observational study was carried out which included patients diagnosed with LAGC who received neoadjuvant treatment in our center from January 2011 to October 2021. Age and sex variables, tumor staging at diagnosis, neoadjuvant treatment, surgical intervention, pathological analysis and definitive staging were analyzed. Patients with peritoneal metastases at diagnosis were excluded.

**Results:** 63 patients diagnosed with CGLA who received neoadjuvant treatment were reviewed. 40% were women, 60% men, and the mean age was 64.5 years. The most used chemotherapy regimen was the Epirubicin-Capecitabine-Xeloda regimen (61%) followed by Cisplatin-Xeloda (8%) and Folfox/Xelox (8%); less frequent regimens were used in the remaining 23%. Definitive pathological staging, compared to staging by imaging test at diagnosis, 49% cases improved the staging, 17% remained the same, and 34% worsened (Table 1).

**Image:**

		STAGING AT DIAGNOSIS					
		IB	IIA	IIB	IIIA	IIIB	IIIC
DEFINITIVE STAGING AFTER SURGERY	IA	0	3	5	0	1	0
	IB	1	1	2	1	0	1
	IIA	0	3	3	3	3	1
	IIB	0	0	4	3	2	0
	IIIA	0	0	4	1	1	0
	IIIB	0	0	1	0	1	1
	IIIC	0	0	1	0	2	1
	IV	0	1	1	2	5	4

**Conclusions:** The prognosis of gastric cancer remains poor despite surgery, for this reason many groups associate neoadjuvant treatment with the aim of converting those initially unresectable tumors into resectable ones, increasing the rates of complete tumor resection and reducing the incidence of metastases. In this way, it is intended to improve the

evolution of the disease. In our work, we observed an improvement in staging in almost half of the cases, although it is true that up to a third of the patients worsened their stage. Currently, the use of neoadjuvant chemotherapy is recommended in tumors larger than T2 and/or with pathological nodes. It is important to carry out a strict preoperative staging and to study the individual factors that can condition the response to treatment. In this way, we will be able to correctly select those patients who can benefit from neoadjuvant treatment.

*Multidisciplinary treatment of localized gastric cancer*

IGCC22-ABS-1387

**PROGRAMMED CYTOSOLIC TRANSFER OF SIRNA DYNAMICALLY RESPONSIVE TO SEQUENTIAL MICROENVIRONMENTS**

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**Objectives:** Cytoplasmic transportation of therapeutic nucleic acids is deemed as an onerous task with aim of targeted gene knockdown towards aberrant proteins.

**Methods:** Pertaining to the programmed functionalities of virus in circumventing the biological barriers, we tailored multifaceted chemistries into manufacture of synthetic siRNA delivery vehicles in resembling the functionalities of viral vectors to dynamically tackle with a sequential of biological obstacles encountered in the journey of systemic anti-tumor RNAi therapy.

**Results:** Once harnessing ligands with RGD motif for specific internalization into subcellular endosomal compartments of the tumor cells, the architecture of the proposed delivery vehicles was subjected to facile transformation responsive to pH stimuli in acidic endosomal compartments. The external biocompatible PEGylation palisade was consequently detached, unveiling the cytomembrane-lytic cationic components to commit disruptive potencies to the anionic endosomal membranes for translocation of siRNA conjugates into cytosol. Eventually, liberation of active siRNA could be accomplished due to its responsiveness to the strikingly high level of glutathione in cytosol, thereby contributing to potent RNAi.

**Conclusions:** Hence, our elaborated virus-mimicking platform has demonstrated potent anti-tumor efficacy through systemic administration of anti-angiogenic RNAi payloads, which inspired prosperous potentials in a variety of therapeutic applications.

## ***Treatment and surgery for GEJ tumors***

IGCC22-ABS-1283

### **ADJUVANT CHEMOTHERAPY IS SUPERIOR TO CHEMORADIATION IN THE CRITICS TRIAL**

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**Objectives:** The Intention-to-treat analysis in the CRITICS trial of post-operative CT or postoperative CRT did not show a survival difference. The current study reports on the per-protocol (PP) analysis of the CRITICS trial

**Methods:** The CRITICS trial was a randomized, controlled trial in which 788 patients with stage Ib-Iva resectable gastric or esophagogastric adenocarcinoma were included. Before start of preoperative CT, patients from the Netherlands, Sweden and Denmark were randomly assigned to receive post-operative CT or CRT. For the current analysis, only patients who started their allocated post-operative treatment were included. Since it is uncertain that the two treatment arms are balanced in such PP analysis, adjusted proportional hazards regression analysis and inverse probability weighted analysis were used to minimize the risk of selection bias and to estimate and compare overall and event-free survival.

**Results:** Of the 788 patients, 478 started post-operative treatment according to protocol, 233 (59%) patients in the CT group and 245 (62%) patients in the CRT group. Patient and tumor characteristics between the groups before start of the post-operative treatment were not different. After a median follow-up of 6.7 years since the start of post-operative treatment, the 5-year overall survival was 57.9% (95% confidence interval: 51.4% to 64.3%) in the CT group versus 45.5% (95% confidence interval: 39.2% to 51.8%) in the CRT group (adjusted hazard ratio CRT versus CT: 1.62 (1.24-2.12), P  $\frac{1}{4}$  0.0004). Inverse probability weighted analysis resulted in similar hazard ratios.

**Conclusions:** After adjustment for all known confounding factors, the PP analysis of patients who started the allocated post-operative treatment in the CRITICS trial showed that the CT group had a significantly better 5-year overall survival than the CRT group.

### **Treatment and surgery for GEJ tumors**

IGCC22-ABS-1214

## **INHIBITION OF RAAS SYSTEM IMPROVES SURVIVAL IN PATIENTS WITH UPPER GASTROINTESTINAL ADENOCARCINOMA**

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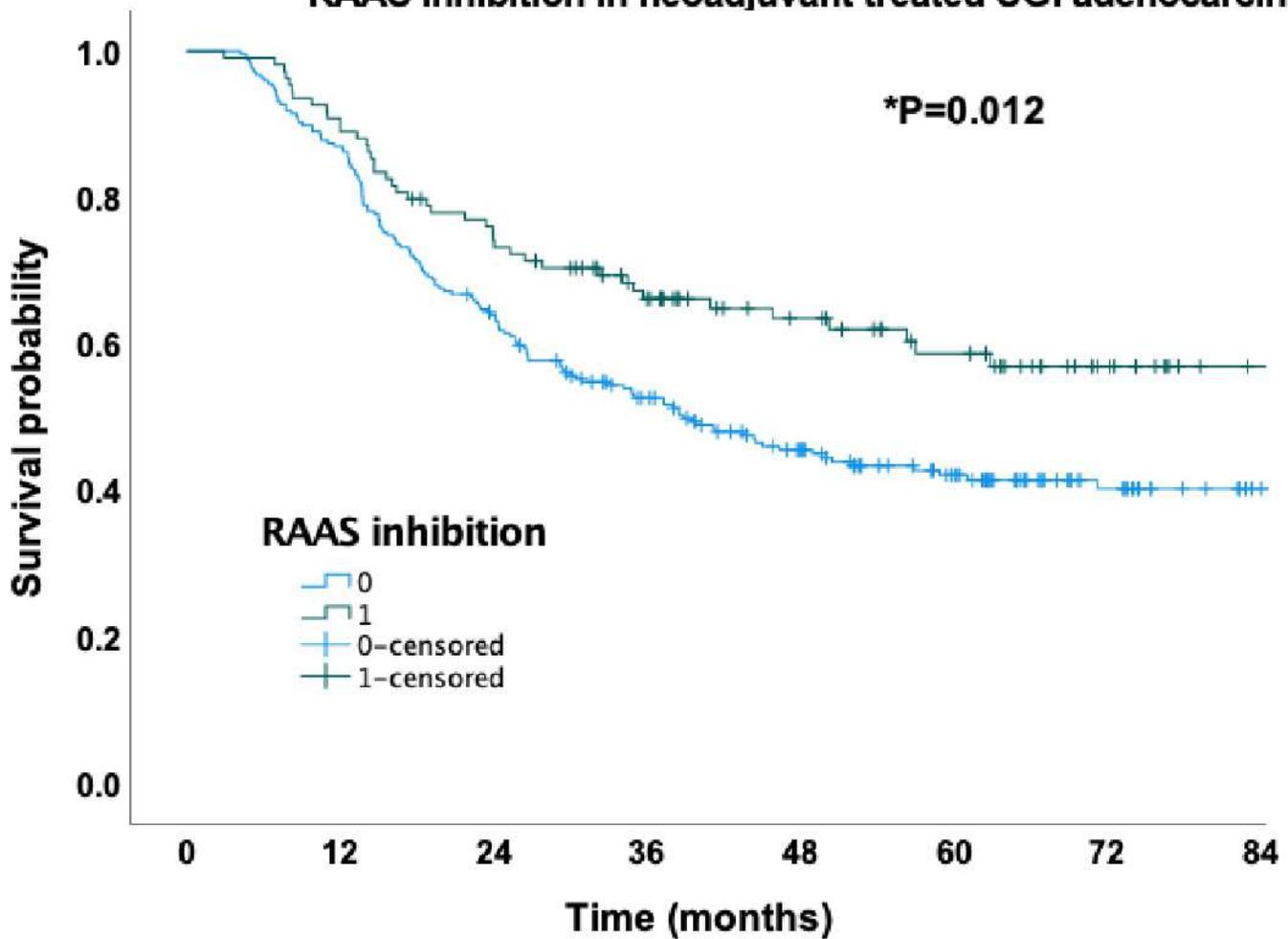
**Objectives:** Chemotherapy with resection has become the standard of care in US and EU for locally advanced upper gastrointestinal (UGI) adenocarcinoma. Renin-angiotensin (RAAS) inhibitors were shown to modulate the tumor microenvironment (TME) leading to a reduction of tumor stiffness in colorectal cancer (CRC). As such changes can mediate response to chemotherapy, we aimed to elucidate if RAAS inhibition could improve overall survival (OS) in UGI cancer.

**Methods:** August 2010 to April 2018 356 patients fulfilled inclusion criteria (cT<sub>3-4</sub>/N<sub>any</sub>/M<sub>any</sub> stage at diagnosis and neoadjuvant chemotherapy). The last follow up was March 2021. 109 (30,62%) of patients were treated with a RAAS inhibitor and chemotherapy. X<sup>2</sup>-test was used for comparison of frequencies. Survival curves were estimated according to the Kaplan–Meier method. The log rank test was used for comparison of survival curves. Multivariate analysis was done stepwise by Cox regression analysis.

**Results:** Overall 192 (46,06%) of the patients presented with hypertension, of which 109 (56,77%) patients received treatment with RAAS inhibitors. Patient characteristics in the two groups with (n=109) and without (n=247) treatment did not differ in ASA classification, cTNM, Lauren classification or sex (p>0,05). The group with RAAS inhibitor (n=109) and chemotherapy showed a longer OS (mOS 87 (95%CI 64-110) months vs 39 (95%CI 28-50) months, p=0,012). Patients with hypertension treated with betablockers (p=0,98) or calcium antagonists (p=0,66) did not show a survival benefit. In multivariate analyses, RAAS inhibitor was an independent factor associated with better OS (p=0,028) as well as pN category (p<0,001) and pM category (p<0,001).

**Image:**

## RAAS inhibition in neoadjuvant treated UGI adenocarcinoma



**Conclusions:** Publications showed a better OS for metastasized CRC under RAAS inhibitors by modulation of the TME. In UGI adenocarcinomas this could be improving the outcome of perioperative chemotherapy. This needs further preclinical and clinical investigations to optimize patient treatment by increased chemotherapy efficacy.

*Treatment and surgery for GEJ tumors*

IGCC22-ABS-1205

**TUNNEL ANASTOMOSIS AS A NOVEL ANTIREFLUX TECHNIQUE IN ESOPHAGOGASTROSTOMY AFTER PROXIMAL GASTRECTOMY**

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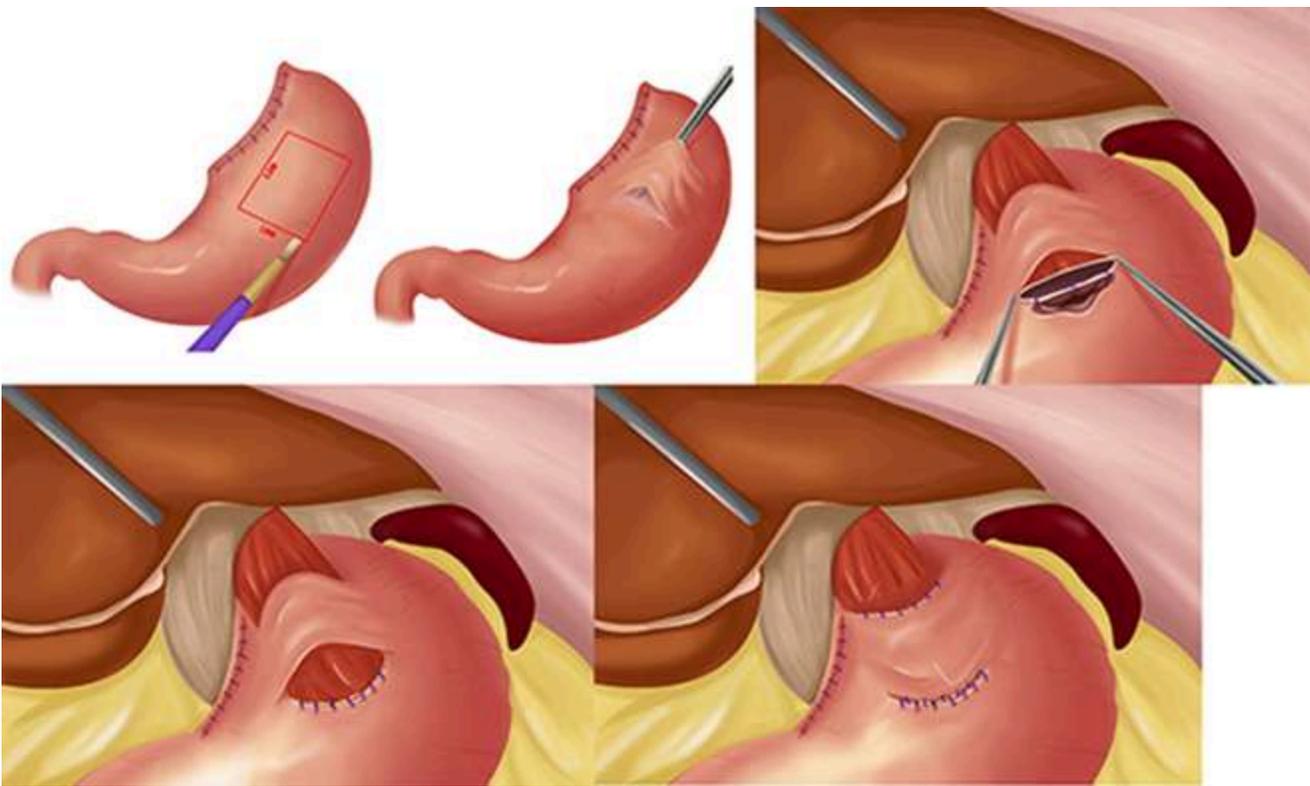
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**Objectives:** Esophagogastrostomy (EG), as the most classical reconstruction technique after proximal gastrectomy (PG) for patients with proximal gastric cancer (PGC), has been widely used by surgeons for years. However, postoperative reflux esophagitis after conventional EG was a major problem that haunts the surgeons. We performed a novel anti-reflux technique called tunnel anastomosis in EG after PG

**Methods:** We selected patients with PGC to perform tunnel anastomosis. Surgical procedures for tunnel anastomosis were as follows:1.Free the lower end of the esophagus about 5 cm and transect the esophagus;2.A rectangular seromuscular flap(3.0 x 3.5 cm)is marked on the anterior wall of the gastric remnant, which is 3 to 4 cm from the top;3.Make the tunnel seromuscular flap: inject normal saline between the submucosa and the muscular layer carefully, dissect and separate the seromuscular flap, taking care to avoid damaging the submucosal blood vessels and mucosa;4.Open the gastric mucosal window at the lower edge of the seromuscular flap to prepare for anastomosis. The width of the incision is equivalent to the width of the esophagus;5.Fix the esophagus 5 cm from the stump of the esophagus;6.Posterior wall anastomosis : from the entire esophagus to continuous suture of the gastric mucosa and submucosa;7.Anterior wall anastomosis: continuous suture of the entire anterior wall of the esophagus and the entire thickness of the stomach;8.Close the lower edge of the seromuscular flap: suture the lower edge of the seromuscular flap and the seromuscular layer of the remnant stomach

**Results:** We performed tunnel anastomosis in 13 patients. The median Follow-up period were 9.9 months. Visick score of 12 patients were I. One patient's visick score was II. The modified Los Angeles classification of all patients were N or M level. No A-D level was observed. No patient had food residue in the remnant stomach.

**Image:**



**Conclusions:** Tunnel anastomosis is a technique with good anti-reflux effect, which could be performed in suitable patients

## *Treatment and surgery for GEJ tumors*

IGCC22-ABS-1050

### **A PREDICTIVE NOMOGRAM FOR SIEWERT TYPE ? ADENOCARCINOMA OF THE ESOPHAGOGASTRIC JUNCTION**

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<sup>1</sup>General surgery, PAL General hospital, <sup>2</sup>Medical Big Data Research Center, Medical Innovation Research Division of Chinese People's Liberation Army General Hospital, <sup>3</sup>General surgery, Chinese PLA General Hospital, <sup>4</sup>General Surgery, Chinese PLA General Hospital, Beijing, China

**Objectives:** Predictive models for prognosis of patients who underwent resection of Siewert type II adenocarcinoma of the esophagogastric junction (AEG) are scarce. The purpose of this study was to develop and validate a nomogram to predict overall survival of these patients.

**Methods:** The Patients of discovery cohort and internal validation cohort were identified using the Surveillance, Epidemiology, and End Results (SEER) database Results(from2004-2015). An external validation cohort were retrospectively collected from January 2014 to April 2019 at the First Medical Center of PLA General Hospital in China. Cox regression analysis was performed to assess the prognostic factors. A nomogram integrating independent prognostic factors was established and comprehensively evaluated by C-indexes, calibration curves, and decision curve analysis.

**Results:** Based on the SEER database, 3278 eligible patients were reviewed. The patients were randomly divided into discovery cohort and internal validation cohort (7:3 ratio). A total of 442 patients in our medical center constitute an external verification cohort. Age, grade, T stage, log odds of positive lymph nodes (LODDS) and marital status were identified as independent prognostic factors and integrated to construct the nomogram. Compared with the 8th American Joint Committee on Cancer (AJCC) TNM staging system, the novel nomogram performed superior discrimination ability (Harrell's C-index, 0.707 vs 0.658, P<0.001, respectively). The calibration plots demonstrated that there was an optimum between nomogram prediction and actual observation. Moreover, the nomogram also showed higher clinical utility compared with the 8<sup>th</sup> TNM staging system in the DCA analysis.

**Conclusions:** We developed and validated a more accurate nomogram compared with the 8<sup>th</sup> TNM staging system to predict individual prognosis for patients who underwent resection of Siewert type II AEG.

### ***Treatment and surgery for GEJ tumors***

IGCC22-ABS-1123

#### **WHAT IS THE OPTIMAL SURGICAL MANAGEMENT OF GEJ ADENOCARCINOMAS?**

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<sup>1</sup>Surgery, <sup>2</sup>Medical Oncology, <sup>3</sup>Radiation Oncology, <sup>4</sup>Medicine, City of Hope National Medical Center, Duarte, United States

**Objectives:** No standardized surgical approach for locally advanced gastroesophageal junction (GEJ) adenocarcinomas exist and optimal management remains controversial. D2 lymphadenectomy (LND) improves disease-specific survival for gastric cancer patients, but the role of abdominal LND in GEJ cancer remains undefined. Herein, we aim to determine the impact of surgical extent and LND for GEJ cancer.

**Methods:** We conducted a single-institution, retrospective cohort study of patients with Siewert type II/III GEJ adenocarcinoma (2010-2020). Patients were included if they received either radical esophagogastrectomy (EG) or total gastrectomy (TG) following neoadjuvant therapy. We compared EG versus TG with or without abdominal LND (clearance of LN#s 7,8a,9,12a,11p/d) for 30-day postop complications, recurrence-free survival (RFS), and overall survival (OS). Median follow-up was 26 months. We utilized chi-squared test for categorical variables and Wilcoxon test for continuous variables.

**Results:** Total of 43 patients underwent TG (12, 28%) and EG (31, 72%). Abdominal LND was performed for all TG and 32.3% of EG patients. Total LN yield was significantly higher with abdominal LND compared to without (average 38.4 LNs vs 27.1; p=0.002). ypN+ is associated with worse OS compared to ypN0 (median OS 29.5 vs 52.5 mos; p=0.036). RFS and OS did not differ between those with or without LND. LOS was shorter for TG than EG (median 6 vs 9 days; average 7.9±4.1 vs 14.3±10.9 days; p=0.055). Postoperative 30-day complication rate is lower for TG than EG (25% vs 55%; p=0.078) with 25.8% of EG patients requiring return to OR vs 8.3% of TG patients (p=0.206) and no death in either group.

**Image:**

**Table 1: Comparison of TG to EG**

<i>Variable</i>	<sup>a</sup> TG (n= 12)	<sup>b</sup> EG (n= 31)	<i>P-value</i>
Age [years, median (range)]	64 (33-72)	63 (45-88)	0.219
Female gender, n (%)	4 (33.3)	6 (19.4)	0.330
Stage, n (%)			0.11
IIA/IIIB	1 (8.3)	2 (6.5)	
III	11 (91.7)	23 (74.2)	
IVA	0 (0)	6 (19.4)	
Neoadjuvant Therapy, n (%)			
Chemoradiation	3 (25)	24 (77.4)	*0.001
Chemotherapy	12 (100)	13 (41.9)	*0.001
<sup>c</sup> LND performed, n (%)	12 (100)	10 (32.3)	*<0.001
Lymph nodes			
Positive status, n (%)	8 (66.7)	16 (51.6)	0.373
Number harvested [median, (IQR)]	41 (32-50)	29 (19-47)	*0.010
Length of hospital stay [days, median (IQR)]	6 (6-8)	9 (7-28)	0.055
<sup>d</sup> Postoperative complications, n (%)			
Any	3 (25)	17 (54.8)	0.078
Grade I/II	0 (0)	6 (19.4)	
Grade IIIa	2 (16.7)	3 (9.7)	
<i>Abscess drainage</i>	2 (16.7)	1 (3.2)	
Grade IIIb	1 (8.3)	8 (25.8)	
<i>Bowel ischemia/perforation</i>	1 (8.3)	2 (6.5)	
<i>Anastomotic leak/stricture</i>	0 (0)	2 (6.5)	
<i>Chylothorax</i>	0 (0)	1 (3.2)	
<i>Bronchopleural fistula</i>	0 (0)	1 (3.2)	
Grade IVa	1 (8.3)	5 (16.1)	
<i>Respiratory failure</i>	1 (8.3)	4 (12.9)	
<sup>e</sup> Requiring return to ●R, n (%)	1 (8.3)	8 (25.8)	0.206

<sup>a</sup>TG, Total Gastrectomy

<sup>b</sup>EG, Esophagogastrectomy

<sup>c</sup>Extended abdominal lymph node dissection including celiac axis N2 nodal basins

<sup>d</sup>Postoperative complications within 30 days of surgery based upon Clavien-Dindo classification

<sup>e</sup>Return to operating room for endoscopic or surgical intervention

\*Statistically significant ( $P < 0.05$ )

**Conclusions:** Nodal status after neoadjuvant therapy is a strong predictor of OS for radically resected GEJ adenocarcinoma. TG or EG with or without abdominal LND have similar long-term oncologic outcomes. However, TG has a trend towards shorter LOS and fewer major complications requiring return to the OR.

## **Treatment and surgery for GEJ tumors**

IGCC22-ABS-1414

### **HIGH RATES OF INOPERABILITY IN CARDIA, COMPARED WITH ANTRAL ADENOCARCINOMAS**

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<sup>1</sup>Surgery, <sup>2</sup>Pathology, <sup>3</sup>Clinical Oncology, Santa Casa Medical School, So Paulo, Brazil

**What is your preferred presentation method?:** Oral/Poster

**Do you want to apply for travel grants?:** No

**Objectives:** A comparative analysis of the clinical behavior of proximal and distal adenocarcinomas

**Methods:** Retrospective analysis from 1997 to 2015. The epidemiological, histological, clinical, surgical and oncological data of proximal and distal tumors were analyzed. Siewert type I, tumors in other gastric locations, *linitis plastica* lesions and stump cancer were excluded. The variables analyzed were age, gender, location of the lesions, histological type by Laum's classification, TNM staging by the 7<sup>th</sup> UICC edition, operability, mortality (operable cases) and survival.

Concerning the operability, patients were divided in two groups: inoperable such as irresectability, carcinomatosis, metastatic disease, poor general condition, or patient refusal; and operable, with patients submitted to some type of resection.

**Results:** From a total of 401 patients, 76 have proximal cancer and 325, antral lesions. In the proximal group: the median age was 61.7 years (SD = 13.1); 72.37% were male; 56.62% were diffuse histological type; 52.63% were inoperable ( $p < 0.001$ ); 72.38% were stage III - IV (Stage IV = 44.74%) ( $p = 0.009$ ); the mean overall survival 24.3 months (median = 10 / SD = 36.53) ( $p < 0.001$ ); and concerning the 5-year survival rate, 14.47% survived more than 5 years ( $p < 0.001$ ). In the distal group: the median age was 61.3 years (SD = 12.7); 59.69% were male; 55.76% were diffuse histological type; 22.15% were inoperable ( $p < 0.001$ ); 30.77% were stage IA-IB ( $p = 0.009$ ); the mean overall survival were 52.56 months (median = 33 / SD = 53.43) ( $p < 0.001$ ); and concerning the 5-year survival rate, 37.54% survived more than 5 years ( $p < 0.001$ ). When only operable cases were analyzed and compared, no significant statistically differences were found concerning age, gender, histological type, staging, overall survival and 5-year survival rate.

**Conclusions:** Cardia adenocarcinomas presented higher rates of inoperability due to more advanced stages at the moment of diagnosis higher and worse overall survival in operated cases.

*Treatment and surgery for GEJ tumors*

IGCC22-ABS-1265

**SHORT-TERM CLINICAL EFFECTS OF LAPAROSCOPY PROXIMAL GASTRECTOMY WITH DOUBLE FLAP ESOPHAGOGASTROSTOMY**

cheng ming<sup>1</sup>, chen qiang<sup>1</sup>, wu Y. you\*<sup>1</sup>

<sup>1</sup> General Surgery, The Second Affiliated Hospital of Soochow University, Suzhou, China

**Objectives:** Proximal gastrectomy is recognized as a function-preserving surgical procedure for early proximal gastric cancer, and double flap esophagogastronomy technique was developed to prevent reflux after proximal gastrectomy. The main endpoints considered in this study were the feasibility, safety and short-term clinical efficacy.

**Methods:** A cohort of consecutive patients received laparoscopy-assisted proximal gastrectomy with double flap esophagogastronomy in our institute between March 2020 and November 2020 were evaluated retrospectively.

**Results:** All the 15 patients were diagnosed as early proximal gastric cancer preoperationally. R0 resection achieved in all patients without perioperative mortality and serious morbidity. The mean operative time was  $286.1 \pm 43.2$ min, the mean blood loss was  $56.2 \pm 10.6$ ml, the first flatus time was  $2.3 \pm 0.6$  days, the time of oral intake was  $3.2 \pm 0.7$  days, and the postoperative hospital stay was  $10.8 \pm 1.9$  days. The average number of lymph nodes harvested was  $19.7 \pm 5.2$ . During 3-month of follow-up ( $7.4 \pm 2.3$  months), there was no death, relapse, severe anemia or hypoproteinemia was found. 3 cases experienced postoperative anastomotic stenosis and were relieved after endoscopic balloon dilation treatment. No severe postoperative esophageal reflux and residual food was found during postoperative upper gastrointestinal radiography and clinical visit.

**Conclusions:** Laparoscopy-assisted proximal gastrectomy with double flap esophagogastronomy is technically feasible and safe when conducted by experienced surgeon, and short-term anti-reflux effect is obvious, Larger, comparative studies are warranted.

## ***Treatment and surgery for GEJ tumors***

IGCC22-ABS-1407

### **DOES EXTENSIVE LYMPHADENECTOMY IMPROVE SURVIVAL IN NODE NEGATIVE GASTRO-ESOPHAGEAL CANCER?**

Steven R. Paredes<sup>1, 2</sup>, Oleksandr Khoma<sup>1</sup>, Gregory L. Falk<sup>1</sup>

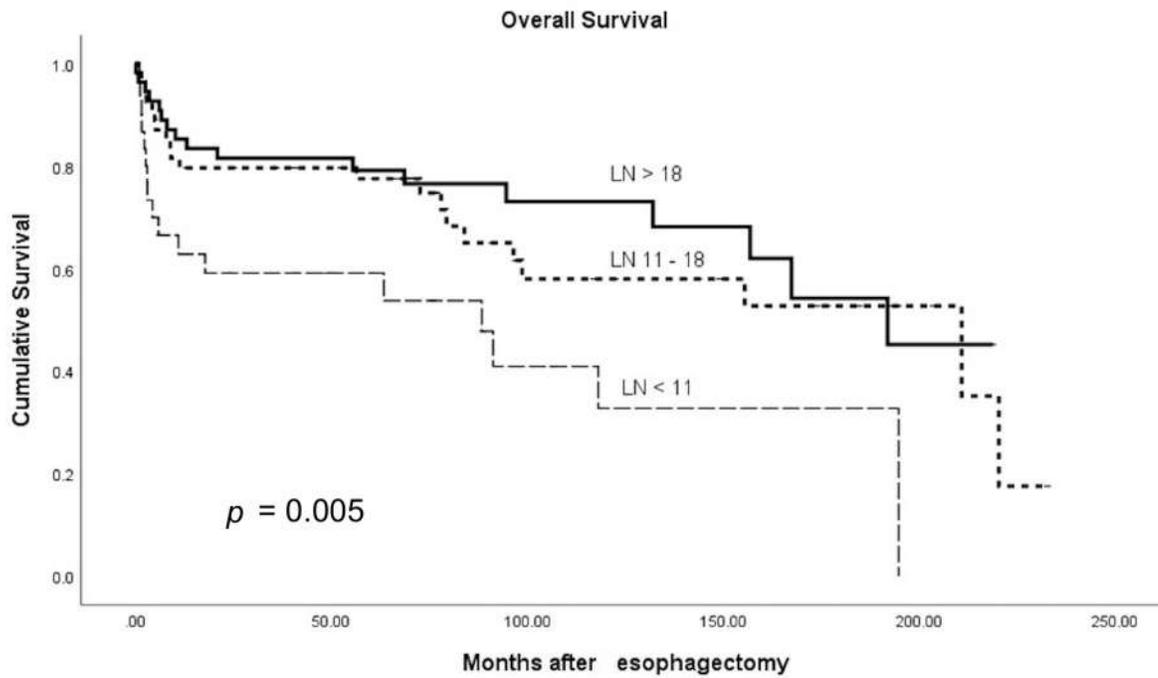
<sup>1</sup>Upper GI Surgery, Concord Repatriation General Hospital, <sup>2</sup>Surgery, University of Sydney, Sydney, Australia

**Objectives:** Lymph node metastasis is a major prognostic factor for survival of patients with esophageal and gastro-esophageal cancer. A greater number of lymph nodes removed during esophagectomy has been previously proven to be associated with improved survival. However, it is unclear whether resected lymph node count predicts survival in the subset of patients without lymph node metastasis. Therefore, the aim of this study was to examine the effect of lymph node number on survival in pathologically node-negative (pN0) patients with esophageal and gastro-esophageal cancer.

**Methods:** Data were extracted from a prospectively populated single-surgeon database of esophageal resections for cancer. All consecutive patients with pN0 esophageal (upper, middle and lower thirds) and gastro-esophageal cancer were included. Using the Kaplan-Meier method, patient-specific risk adjusted analysis of overall and disease-free survival was performed for < 11, 11 to 18 and > 18 nodes removed.

**Results:** Inclusion criteria were met by 139 patients (50 squamous cell carcinoma [SCC] and 89 adenocarcinoma [AC]). The median number of lymph nodes resected was 17 (IQR 12 – 25). There were 30 (21.6%), 54 (38.8%) and 55 (39.6%) patients with < 11, 11-18 and > 18 nodes resected respectively. The median overall survival in patients with < 11, 11-18 and > 18 nodes resected was 7.4 years, 17.5 years and 16.0 years. Adjusted for cancer stage, tumor (histological type, degree of differentiation, lympho-vascular invasion, neo-adjuvant therapy) and patient related factors (age, sex), increased lymph node number was associated with significant improvement in overall (Log Rank  $p = 0.005$ ) and disease free (Log Rank  $p = 0.006$ ) survival. Subgroup analysis of SCC and AC revealed improvement in survival in both groups with increased lymph node number, however this was only significant in patients with SCC.

**Image:**



**Conclusions:** In this cohort of patients with pathologically node-negative esophageal and gastro-esophageal cancer, increased lymph node count was associated with improved survival.

***Treatment and surgery for GEJ tumors***

IGCC22-ABS-1402

**APPLICATION VALUE OF OGT IN ASSISTING OVERLAP ESOPHAGOJEJUNOSTOMY ANASTOMOSIS IN LTG FOR G/GEJ TUMOR**

Xinhua Chen<sup>\*</sup> 1, Guoxin Li<sup>1</sup>, Jiang Yu<sup>1</sup>

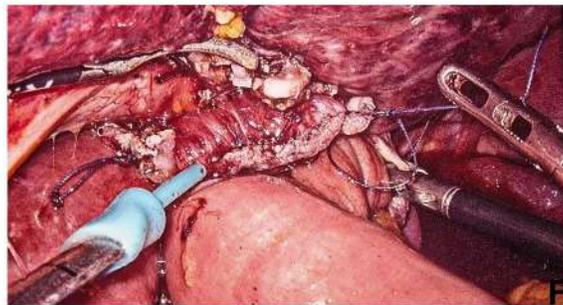
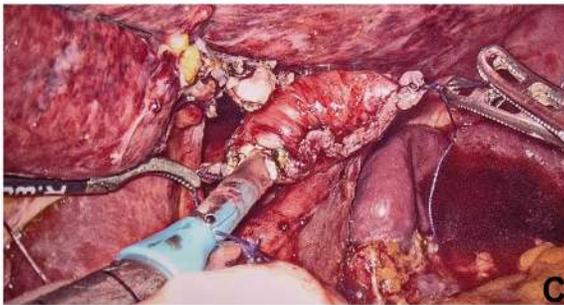
<sup>1</sup>Department of General Surgery, Nanfang Hospital, Guangzhou, China

**Objectives:** The Overlap guide tube(OGT), which was designed for assisting the Overlap esophagojejunostomy anastomosis by our team, potentially could break through the technical bottleneck of esophagojejunostomy. However, the use of OGT was firstly explored in our team and has not been reported yet. Thus, we conducted this study to explore the application value of OGT in Overlap anastomosis in laparoscopic total gastrectomy (LTG) for gastric/gastroesophageal junction (G/GEJ) tumors.

**Methods:** Patients with G/GEJ tumors underwent LTG with OGT-assisted Overlap (n=35) or conventional overlap method(n=77) were included in our study. Intraoperative and perioperative outcomes were compared.

**Results:** The percentage of GEJ tumors and neoadjuvant therapy is significantly higher in OGT group. While other baseline variables were balanced between two groups. The overall esophagojejunal-related complications rate was 4.46%. There was no significant difference between the two groups in terms of intraoperative complications, postoperative complications. The fork of the linear stapler that connected with OGT was successfully put into the expected position of esophageal lumen with inserting operation once in 31 cases(88.6%) in OGT group. All patients in OGT group achieved R0 resection margin and not any case converted to other esophagojejunostomy anastomosis or converted to open laparotomy. Esophagojejunostomy anastomosis time (22.6±5.1min vs. 34.7±20.0min, p=0.001 ) was significantly enhanced in OGT group. The time to liquid diet ( 4.3±1.4 days vs. 5.3±2.0, p = 0.012) and the length of postoperative hospital stay( 9.5±2.7 days vs. 11.5±7.3, p = 0.035) was significantly shortened in OGT group, whereas the other postoperative recovery parameters were similar.

**Image:**



**Conclusions:** OGT-assisted Overlap esophagojejunostomy anastomosis in LTG for G/GEJ tumors could simplify the operation, shorten anastomosis time and enhance postoperative recovery with good safety. Thus, it is worth conducting prospective randomized controlled trials.

### ***Treatment and surgery for GEJ tumors***

IGCC22-ABS-1463

### **THORACOPHRENOLAPAROMY FOR SURGICAL TREATMENT OF GASTRO ESOPHAGEAL JUNCTION CANCER**

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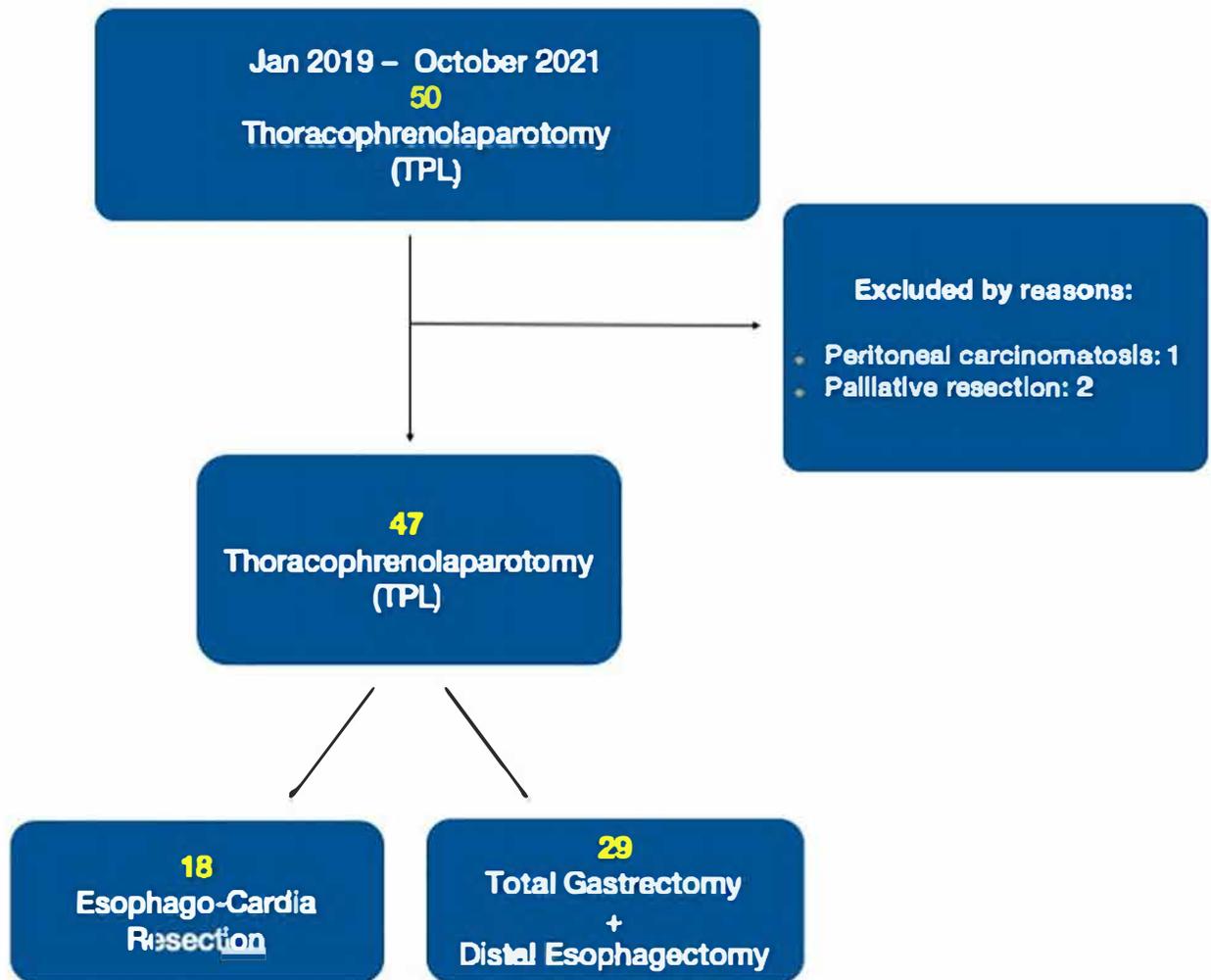
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**Objectives:** There is still a lack of consensus about the optimal surgical management of gastroesophageal junction (GEJ) tumors. Besides a transthoracic esophagectomy (TTE) and a transhiatal extended gastrectomy, a thoracophrenolaparotomy (TPL) is a valuable surgical approach, even during the spread of minimally invasive surgery. A TPL allows to combine the advantages of TTE (higher R0 rate and more extensive mediastinal lymphadenectomy) with the intraoperative possibility of performing both esophago-gastric and esophago-jejunal anastomoses. The aim of this study is to describe results of TPL for the treatment of GEJ cancer in a high-volume center for upper gastrointestinal surgery.

**Methods:** A retrospective analysis of all TPL performed for GEJ cancer at the Amsterdam UMC from January 2019 to October 2021 was conducted. The primary endpoint was the evaluation of R1 resections. Secondary endpoints were morbidity and pathological outcomes.

**Results:** Forty-seven patients were included for the analysis. 18 patients underwent an esophago-cardia resection with gastric conduit reconstruction and 29 patients a total gastrectomy with distal esophagectomy and Roux-en-Y jejunal reconstruction. The main indications for TPL were cT3 (74.5%) and cN+(55.3%) tumors. Most of the patients (91.5%) received neoadjuvant treatment. Postoperative pneumonia occurred in 4(8.5%) patients and anastomotic leakage in 2(4.3%) patients. The mean hospital stay was 9.8(±6.1) days. The mean tumor size was 42.3(±32.8) mm and the mean proximal margin 31.0(±20.7) mm. Two (4.3%) patients had a R1 resection: 1 positive proximal margin and 1 at pancreatic resection side. (y)pT3 (44.7%) and (y)pN+ (61.7%) were the most common resected tumors, with a mean number of retrieved lymph nodes of 31.6 (±9.9).

**Image:**



**Conclusions:** TPL for selected patients with EGJ cancer is associated with high R0 resection rate, low pneumonia and anastomotic leakage incidence, together with a short hospital stay. TPL should be considered a reliable surgical option, even in the era of minimally invasive surgery.

*Treatment and surgery for GEJ tumors*

IGCC22-ABS-1217

**INTRACORPOREAL ESOPHAGOGASTROSTOMY CIRCULAR STAPLING IN LAPAROSCOPIC PROXIMAL GASTRECTOMY**

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**Objectives:** For Siewert type II esophagogastric junction tumors, radical proximal gastrectomy can be selected on the premise of compliance with principle of oncological safety.

As for the reconstruction of alimentary tract, although some linear stapler methods such as overlap or modified version was reported, circular-stapled anastomosis remain the mainstay mainstream as a standardized and reproducible, We advocated a novel esophagus stump- narrow gastric conduit using a simple circular-stapled anastomosis using hemi-double stapling technique.

**Methods:** After lymphadenectomy of the perigastric and lower mediastinal zone, adequate mobilization of the ventral esophagus was attained. The esophagus was transected at a safe distance from the tumor for "clear" proximal resection margin, and a narrow gastric conduit was made according to the standard. The anvil of the circular stapler was inserted into the esophagus; Fixing the remnant stomach and the body of the circular stapler with surgical loops. Docking the anvil and the body of the circular stapler.

**Results:** 11 patients with Siewert type II tumors underwent this procedure, the total mean  $\pm$  SD operative time for this procedure were was  $246.7 \pm 32.8$  minutes. This procedure was completed without open conversion, and no anastomosis-related complications was revealed. Esophagogastric reflux was considered to be mild, on follow-up esophagogastroscope 1-year postoperatively.

**Conclusions:** Laparoscopic hemi-double stapling technique is a safe and feasible method, that is a good option for intracorporeal esophago-gastric conduit reconstruction after proximal gastrectomy.

**Treatment and surgery for GEJ tumors**

IGCC22-ABS-1408

**DIFFERENCES IN PATHOLOGY BETWEEN ADENOCARCINOMA OF LOWER ESOPHAGUS AND GASTRO-ESOPHAGEAL JUNCTION**

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**Objectives:** The incidence of adenocarcinoma of the lower esophagus and gastro-esophageal junction are increasing. It is controversial if two distinct disease processes exist. This study aimed to assess clinicopathological and survival differences between patients with lower esophageal and gastro-esophageal junction adenocarcinomas.

**Methods:** Data were extracted from a prospective single surgeon database of consecutive patients undergoing an esophagectomy for lower esophageal or gastro-esophageal junction adenocarcinoma. Differences in clinicopathological characteristics and survival were evaluated and prognostic factors examined using univariate and multivariate survival analyses.

**Results:** The data were available of 234 patients who underwent an esophagectomy between 1992 and 2019. Lower esophageal tumours had higher rates of Barrett's esophagus ( $P < 0.001$ ), presented with lower tumor stage ( $P = 0.02$ ) and more likely to be associated with fewer lymph nodes resected ( $P = 0.003$ ), than gastro-esophageal junction tumors. Median overall survival for lower esophageal tumors was 29.2 months, whilst gastro-esophageal tumors was 38.6 months, although not statistically significant ( $P = 0.08$ ). However, when adjusted for potential cofounders, gastro-esophageal junction tumors were associated with a reduced adjusted hazard of death (adjusted HR 0.58, 95% CI 0.36 – 0.92,  $P = 0.022$ ) compared to lower esophageal tumors.

**Image:**

**Table 1** Patient characteristics in lower esophageal and gastro-esophageal junction adenocarcinoma

Characteristic	Tumor location			P-value
	Total (n = 234)	Lower esophagus (n = 95)	Gastro-esophageal Junction (n = 138)	
<b>Age</b>				
< 75 years	191 (81.6%)	75 (78.1%)	116 (84.1%)	0.25
≥ 75 years	43 (18.4%)	21 (21.9%)	22 (15.9%)	
<b>Sex</b>				
Female	39 (16.7%)	13 (13.5%)	26 (18.8%)	0.29
Male	195 (83.3%)	83 (86.5%)	112 (81.2%)	
<b>Barrett's esophagus</b>				
Absent	134 (57.3%)	36 (37.5%)	98 (71.0%)	<b>&lt;0.001</b>
Present	100 (42.7%)	60 (62.5%)	40 (29.0%)	
<b>Histological grade</b>				
G1 (well differentiated)	16 (6.8%)	6 (6.3%)	10 (7.2%)	0.29
G2 (moderately differentiated)	105 (44.9%)	49 (51.0%)	56 (40.6%)	
G3 (poorly differentiated)	113 (48.3%)	41 (42.7%)	72 (52.5%)	
<b>Lymphovascular invasion</b>				
Absent	132 (56.4%)	61 (63.5%)	71 (51.4%)	0.07
Present	102 (43.6%)	35 (36.5%)	67 (48.6%)	

<b>Tumor stage (AJCC 8<sup>th</sup> Edition)</b>				
0 and I	53 (22.6%)	29 (30.2%)	24 (17.4%)	<b>0.02</b>
II	49 (20.9%)	16 (16.7%)	33 (23.9%)	
III	122 (52.1%)	50 (52.1%)	72 (52.2%)	
IV	10 (4.3%)	1 (1.0%)	9 (6.5%)	
<b>Number of lymph nodes resected</b>				
< 15 nodes	53 (22.6%)	31 (32.5%)	22 (15.9%)	<b>0.003</b>
≥ 15 nodes	181 (77.4%)	65 (67.7%)	116 (84.1%)	
<b>Pathologically node negative (pN0)</b>				
No	148 (63.2%)	54 (56.3%)	94 (68.1%)	0.06
Yes	86 (36.8%)	42 (43.8%)	44 (31.9%)	
<b>Neoadjuvant radiotherapy</b>				
No	223 (95.3%)	93 (96.9%)	130 (94.2%)	0.53
Yes	11 (4.7%)	3 (3.1%)	8 (5.8%)	
<b>Neoadjuvant chemotherapy</b>				
No	156 (66.7%)	66 (68.8%)	90 (65.2%)	0.57
Yes	78 (33.3%)	30 (31.3%)	48 (34.8%)	
<b>Adjuvant chemotherapy</b>				
No	179 (76.5%)	74 (77.1%)	105 (76.1%)	0.86
Yes	55 (23.5%)	22 (22.9%)	33 (23.9%)	
<b>Median overall survival in months</b>				
		29.2	38.6	0.08

**Conclusions:** This study suggests that gastro-esophageal junction cancers have different clinicopathological characteristics and improved survival compared to lower esophageal tumors.

*Treatment and surgery for GEJ tumors*

IGCC22-ABS-1086

**PATHOLOGICAL ANALYSIS FOR RECURRENCE OF THE PATIENTS WITH ESOPHAGOGASTRIC JUNCTION ADENOCARCINOMA**

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**Objectives:** In recent years, the number of esophagogastric junction adenocarcinoma has been increasing all over the world, including Asia. In advanced cases, recurrence is often observed after curative resection, and it is important to predict the risk of recurrence. In this study, we investigated the pathological factors associated with postoperative recurrence of advanced esophagogastric junction adenocarcinoma.

**Methods:** Eighty-seven cases of cStage II and III esophagogastric junction adenocarcinoma which underwent curative resection in our department from January 2005 to December 2020 were enrolled. We retrospectively analyzed for the association between pathological factors and recurrence.

**Results:** The median age was 68.5 years (35-88), gender was male: female = 77:10, Siewert Type I: II: III= 25: 45:17, cT2: cT3: cT4= 5: 64:18, cN0: cN1: cN2: cN3= 37: 30: 15: 5, cStage II: III= 43:44. Neoadjuvant chemotherapy (NAC) was administered to patients with cT3 or deeper or cN positive, and 17 patients received S-1 plus oxaliplatin as NAC. Postoperative adjuvant therapy was administered to 30 patients. pT1: pT2: pT3: pT4=8: 9: 59: 11, pN positive: negative= 57: 30, histological type = differentiated: undifferentiated= 53: 34, Infiltrative growth pattern (INF) a: b: c=4: 55: 28, Lymphatic invasion (Ly) positive: negative= 45: 42, Venous invasion (V) positive: negative= 67: 20. Recurrence is observed in 43 cases (49.4%). Recurrence pattern varies depending on tumor location. In multivariate analysis, pN positive ( $p=0.005$ ) was significantly correlated with postoperative recurrence. On the other hand, the histopathological criteria for the response to NAC treatment of the primary tumor were 0: 1: 2 = 1: 12: 4, which did not correlate significantly with recurrence.

**Conclusions:** Pathological lymph node metastasis is associated with recurrence in the patients with or without NAC, which may be an optimal indicator for adjuvant chemotherapy.

## Treatment and surgery for GEJ tumors

IGCC22-ABS-1144

### APPLICATION OF MODIFIED KAMIKAWA ANASTOMOSIS IN PROXIMAL GASTRECTOMY

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**Objectives:** 传统的川胃病在消化道重建后，近胃切除术可以大大减少麻醉相关并发症，减少反流食道炎的发病率，但其复杂性限制了广泛的应用。为了降低川氏肌瘤的复杂性，山西长治医学院长治人民医院的外科团队运用新颖的观念改进了这一技术，减少了外科手术。本研究旨在评估近胃切除术后胃肠道重建中改性川氏疾病的疗效和安全性。

**Methods:** 进行了描述性队列研究。病例登记标准：（1）上胃癌或食道结癌无远距离转移术前胃镜活检和成像检查确认；（2）肿瘤直径小于4厘米；（3）术前临床分期为 cT1 = 3N1M0。排除标准：（1）患者接受术前新化疗；（2）患者患有严重的心肺疾病或营养状况不佳，因此不能容忍手术。追溯收集了2019年4月至2020年12月间在河池医院和长治人民医院（17例）消化道重建中接受改良的25名上胃癌或食道结癌患者的临床数据。在25名患者中，21名男性和4名女性，平均年龄为63.0岁（49至78岁：3人接受了开放性手术，22人接受了腹腔镜手术。修改后的川氏肌瘤如下：（1）应用食道胃结共剖的新概念，以方便淋巴结的彻底切除，方便手缝麻醉和嵌入；（2）根据食管树桩的直径（2.5至3.5厘米）选择麻醉性气孔的直径，以减少麻醉狭窄的发生；（3）使用超声波手术刀切开食管树桩，不仅可以防止食管树桩出血，还可以密切密封食管粘膜、肌肉层和血清，防止食管粘膜缩回；（4）用带刺缝线缝合残余胃支架和食道，以修复胃支架，以减少小空间内繁琐而困难的间歇性缝合；（5）使用两条带刺的缝合线连续缝合骨膜瘤的前后壁，并完成肌肉皮瓣的缝合和固定。分析了手术安全、术后并发症（使用克拉维安@Dindo分类）、食管反流症状和食道炎发生（使用洛杉矶分类）的相关指标。胃食管反流病（GERD）评分、胃镜检查、术后随访期间的多姿势消化道放射成像用于评估剩余胃动性和抗反回流功效。

**Results:** 在近胃切除术后，在消化道重建中对Kamikawa麻醉术进行了改造，在25名患者中成功进行了治疗。手术时间为 $5.8 \pm 1.8$ 小时，术中失血为 $89.2 \pm 11.8$ 毫升，平均住院时间为 $13.8 \pm 2.9$ 天。三例（12.0%）发展术后麻醉狭窄作为克拉维恩-丁多三级，并在内窥镜扩散治疗后愈合。术后上胃肠道放射学显示1例（4.0%）有反流症状，为克拉维恩-丁多I级胃镜检查没有出现反流食道炎的迹象，其洛杉矶分类为A级。所有患者均未发现麻醉出血、局部感染和死亡。在术后6+月的跟随上升，GERD分数显示没有显著的差异相比，术前操作（ $2.7 \pm 0.6$ 对 $2.4 \pm 1.0$ ， $t = -1.495$ ， $P = 0.148$ ）。

**Conclusions:** 近胃切除术后消化道重建中经过改良的卡米卡瓦麻醉是安全和可行的，具有良好的反反回流功效。

***Management of stage IV gastric cancer, peritoneal targeted therapy***

IGCC22-ABS-1082

**SENESCENT-CAFS IN MALIGNANT ASCITES ENHANCE PERITONEAL TUMOR FORMATION**

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**Objectives:** In the tumor microenvironment, senescent non-malignant cells, including cancer-associated fibroblasts (CAFs), exhibit a secretory profile under stress conditions; this senescence-associated secretory phenotype (SASP) leads to cancer progression. Here, we investigated the role of senescent CAFs in metastatic lesions and the molecular mechanism of inflammation-mediated SASP induction.

**Methods:** We isolated normal fibroblasts (NFs) and CAFs from more than 150 resected gastric cancer (GC) tissues. The molecular profile and senescence status were examined in these isolated fibroblasts treated with proinflammatory cytokines. A peritoneal dissemination mouse model was applied to examine the role of SASP-CAFs and the effect of JAK inhibitor treatment on peritoneal tumor formation. We performed single-cell mass cytometry (CyTOF) using ascites from 5 GC patients with peritoneal dissemination.

**Results:** We showed that proinflammatory cytokine-driven EZH2 downregulation maintains the SASP by demethylating H3K27me3 marks in CAFs. Forced expression of EZH2 diminished SASP maintenance in CAFs treated with proinflammatory cytokines. SASP-CAFs enhanced GC cell viability and peritoneal tumor formation through JAK/STAT3 signaling in the mouse model. The JAK inhibitor significantly blocked the enhancement of GC cell viability by senescent CAFs and peritoneal tumor formation. We then showed that fibroblasts are present in ascites from GC patients with peritoneal dissemination, and the fibroblast population showed high levels of p16 expression and SASP factors.

**Conclusions:** Inflammation-driven EZH2 downregulation maintains the SASP in CAFs and enhances peritoneal tumor formation. These findings provide insights into the epigenetic regulation of inflammation-related SASP induction and the importance of senescent CAFs in GC peritoneal dissemination.

***Management of stage IV gastric cancer, peritoneal targeted therapy***

IGCC22-ABS-1111

**EFFICACY OF CONVERSION SURGERY FOR STAGE IV GASTRIC CANCER**

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**Objectives:** The prognosis of stage IV gastric cancer with distant metastases and peritoneal dissemination is extremely poor. In recent years, the introduction of new anticancer agents and molecular target agents has increased the number of cases in which non-curative factors disappear or shrink, and conversion surgery (CS) becomes possible. While some patients have long term prognosis by CS, others stain shot term prognosis. The efficacy of CS is unknown. In this study, we examined the usefulness of CS for stage IV gastric cancer.

**Methods:** We retrospectively reviewed 186 stage IV GC patients received with systemic chemotherapy as initial treatment from April 2007 to August 2021 at our institute. Thirty-eight (20.4%) of them were able to undergo CS after the distant metastases disappeared.

**Results:** The median age was 61 years (35-80). There were 25 males and 13 females. The factors for Stage IV were peritoneal dissemination in 22 cases, liver metastasis in 6 cases, and distant lymph node metastasis in 10 cases. The regimens we used were SP in 10 cases, SOX in 9 cases, Trastuzumab + in 7 cases, DS in 7 cases, and others in 5 cases. The average period from the introduction of chemotherapy to surgery was 6.5 courses (1-26). Twenty-nine patients underwent total gastrectomy, 8 patients did distal gastrectomy, and one patient did proximal gastrectomy. The median survival time was 39.1 months in CS group and 12.7 months in chemotherapy group ( $p < 0.001$ ). The MST for patients who received chemotherapy for 150 days or more was 40 months, and the MST for patients with a duration of less than 150 days was 25 months. The prognosis was good for patients with long treatment periods before surgery ( $p = 0.04$ ).

**Conclusions:** CS was considered to be an effective treatment for stage IV gastric cancer.

***Management of stage IV gastric cancer, peritoneal targeted therapy***

IGCC22-ABS-1315

**PROGNOSTIC ROLE OF NUTRITIONAL CHARACTERISTICS IN STAGE IV GASTRIC CANCER WITH CONVERSION SURGERY**

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**Objectives:** [Introduction] Conversion surgery has become one of the treatment options to obtain better prognosis chemotherapy for Stage IV gastric cancer. However, it is difficult to predict the efficacy of gastrectomy in those patients. [Aim] We evaluated whether the preoperative nutritional characteristic could be a predictor before the gastrectomy after chemotherapy.

**Methods:** This study was conducted retrospectively and a single-center review. We evaluated the correlation between preoperative nutritional characteristics and postoperative prognosis (OS, PFS) in patients who underwent gastrectomy after chemotherapy from 2007 to 2020 in our hospital. We adopted Onodera's prognostic nutritional index(O-PNI) and Glasgow prognostic SCORE(GPS) as nutritional characteristics.

**Results:** 119 patients were enrolled who were diagnosed with stage IV and underwent chemotherapy before the operation. Patients' characteristics were as below. Gender male/female=81/38, age(median)=65y.o. (25-84), a median interval of 1st chemotherapy to operation(median)= 98days. 110 out of 119(92.4%) patients underwent operation followed by 1st line chemotherapy. Clinical findings were cT1-3/4=33/86, cN0-1/2-3=56/63, and cM0/1=0/119, respectively. In this analysis, we made 46 as the cut-off value of O-PNI and divided it into two groups ( $\geq 46$ : High/ $< 46$ : Low). Moreover, we divided them into two groups according to GPS 0(negative: N) or 1-2(positive: P). The results of survival analysis (Log-rank test) showed that PFS 8mo(O-PNI Low) VS 21mo (O-PNI High)( $p = 0.000641$ ); PFS 6mo(GPS-N) VS 17(GPS-P) (  $p = 0.0233$  ) , respectively. The results of OS were 24mo (O-PNI LOW) VS 35mo (O-PNI High) ( $p=0.0139$ ); OS 22mo (GPS-N) VS 35mo (GPS-P). Multivariate analysis using the Cox Proportional Hazards model showed O-PNI became one of the independent prognostic factors for OS and PFS.

**Conclusions:** In the preoperative setting, O-PNI as nutritional characteristics might become the preoperative prognostic factor in Stage IV gastric cancer followed by chemotherapy.

## Management of stage IV gastric cancer, peritoneal targeted therapy

IGCC22-ABS-1324

### SURGICAL AND ONCOLOGICAL OUTCOMES OF GASTRIC CANCER WITH PERITONEAL CARCINOMATOSIS

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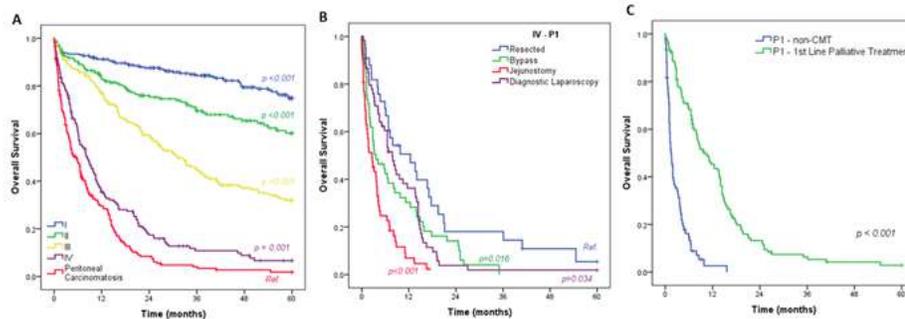
**Objectives:** Gastric cancer (GC) who develops peritoneal carcinomatosis (PC) had a particularly unfavorable prognosis. Both surgical resection and conventional systemic therapies are little effective at treating patients with PC, and others multi-modal approaches are still under investigation. Thus, this study aimed to analyze the surgical and oncological outcomes of GC patients with PC who underwent surgical procedures without curative intent in a real-world setting.

**Methods:** A cohort of GC stage IV was retrospectively analyzed according to the development of PC. Kaplan-Meier analysis was used to evaluate outcomes after tumor resection, bypass, jejunostomy, and diagnostic laparoscopy.

Patients who underwent gastrectomy with curative intent and stage IV GC without PC served as comparison group.

**Results:** Among 363 GC stage IV who performed surgical procedures, 199 (54.8%) had PC. Compared to curative surgery (n:680), PC patients had less advanced age ( $p<0.001$ ), less comorbidities ( $p=0.002$ ), ASA I/II ( $p<0.001$ ), lower hemoglobin and albumin levels ( $p<0.001$ ), and high neutrophil-lymphocyte ratio (NLR) ( $p<0.001$ ). Also, PC cases were younger ( $p=0.009$ ), had lower ASA classification ( $p=0.037$ ), performed less resection and bypass ( $p<0.001$ ), and had higher 90-d mortality rate ( $p=0.025$ ) when compared to stage IV GC without PC. The overall survival (OS) for PC was worse than stage IV without PC (8.4 vs 5.7 mo,  $p=0.001$ ). Regarding surgical procedures performed in PC, resected patients had better OS compared to the others procedures (median: 12.4). Also, PC patients who receive additional palliative chemotherapy (CMT) had better OS than non-CMT (9.8 vs 1.5 mo,  $p<0.001$ ). In multivariate analysis, low-NLR, surgical resection and CMT were independent factors associated with better survival in PC cases.

**Image:**



**Figure:** Overall survival curves according to (A) cTNM stage and peritoneal carcinomatosis (PC) gastric cancer patients; (B) GC with PC according to surgical procedure and; (C) GC with PC who received palliative chemotherapy (CMT) and without CMT.

**Conclusions:** GC with PC had a poor prognosis and corresponds to 54.8% of stage IV cases received for surgical treatment. PC patients underwent surgical resection and who received CMT may achieve long-term survival results.

***Management of stage IV gastric cancer, peritoneal targeted therapy***

IGCC22-ABS-1208

**3-YEAR OUTCOMES OF THE SEIPLUS TRIAL OF EXTENSIVE INTRAOPERATIVE PERITONEAL LAVAGE FOR ADVANCED GC**

Jing Guo<sup>1</sup>, Dazhi Xu<sup>1</sup>

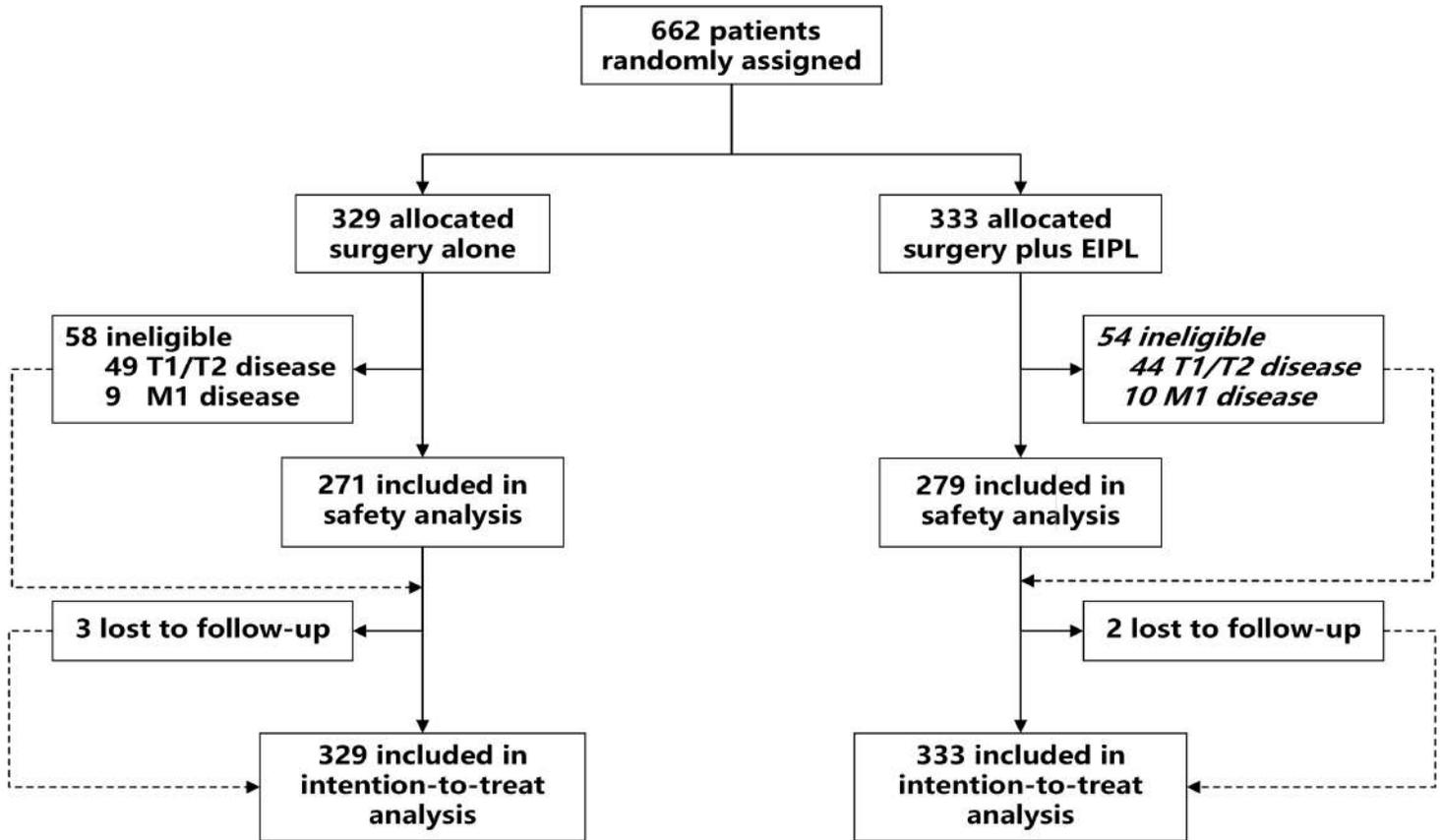
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**Objectives:** Whether extensive intraoperative peritoneal lavage (EIPL) after gastrectomy is beneficial to patients with locally advanced gastric cancer (AGC) is not clear. The purpose of this study was to evaluate the 3-year survival and disease relapse data between the surgery plus EIPL group and the surgery alone group through a large multicenter randomized controlled trial.

**Methods:** This phase 3, multicenter, parallel-group, prospective randomized study recruited patients between April 2016 and November 2017 from 11 hospitals from China. Eligible patients aged 18-80 years who had been histologically proven AGC with T3/4NxM0 stage were randomly assigned (1:1) to either surgery alone or surgery plus EIPL. The primary endpoint was 3-year overall survival (OS). The secondary endpoints included 3-year disease free survival (DFS), 3-year peritoneal recurrence-free survival and 30-day postoperative complication and mortality. Outcomes were analyzed between the 2 groups in the intent-to-treat population. The trial meets pre-specified endpoints.

**Results:** Estimated 3-year OS rates are 68.5% in the surgery alone group and 70.6% in the surgery plus EIPL group (log-rank  $p=0.77$ ). 3-year DFS rates are 61.2% in the surgery alone group and 66.0% in the surgery plus EIPL group (log-rank  $p=0.24$ ). The pattern of disease recurrence is similar in the two groups.

**Image:**



**Conclusions:** In conclusion, EIPL does not improve the 3-year survival rate in AGC patients.

***Management of stage IV gastric cancer, peritoneal targeted therapy***

IGCC22-ABS-1332

**DEFINITIONS AND TREATMENT OF OLIGOMETASTATIC ESOPHAGOGASTRIC CANCER ACCORDING TO TUMOR BOARDS**

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**Objectives:** Consensus about the definition and treatment of oligometastatic esophagogastric cancer is lacking. This study aimed to assess the definition and treatment of oligometastatic esophagogastric cancer across multidisciplinary tumor boards (MDTs) in Europe.

**Methods:** European expert centers (n=49) were requested to discuss 15 real-life cases in their MDT with at least a medical, surgical, and radiation oncologist present. The cases varied in terms of location and number of metastases, histology, timing of detection (i.e. synchronous versus metachronous), primary tumor treatment status, and response to systemic therapy. The primary outcome was the agreement in the definition of oligometastatic disease at diagnosis and after systemic therapy. The secondary outcome was the agreement in treatment strategies. Treatment strategies for oligometastatic disease were categorized into upfront local treatment (i.e. metastasectomy or stereotactic radiotherapy), systemic therapy followed by restaging to consider local treatment, or systemic therapy alone. The agreement across MDTs was scored to be either absent/poor (<50%), fair (50%-75%), or consensus (≥75%).

**Results:** A total of 47 MDTs across 16 countries fully discussed the cases (96%). Oligometastatic disease was considered in patients with 1-2 metastases in either the liver, lung, retroperitoneal lymph nodes, adrenal gland, soft tissue, or bone (consensus). At follow-up, oligometastatic disease was considered after median 18 weeks of systemic therapy when no progression or progression in size only of the oligometastatic lesion(s) was seen (consensus). If at restaging after systemic therapy the number of lesions progressed, this was considered not oligometastatic disease (fair agreement). There was no consensus on treatment strategies for oligometastatic disease.

**Conclusions:** A broad consensus on definitions of oligometastatic esophagogastric cancer was found among MDTs of esophagogastric cancer expert centers in Europe. However, high practice variability in treatment strategies exists.

*Management of stage IV gastric cancer, peritoneal targeted therapy*

IGCC22-ABS-1149

**TREATMENT TRENDS OF LONG-TERM SURVIVORS WITH ADVANCED GASTRIC CANCERS DURING PAST DECADE**

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**Objectives:** In the past decade, several successful clinical trials provided new therapeutic agents approved for inoperable or recurrent advanced gastric cancer (AGC). We investigated the impact of these practice-changing results on the long-term survivors.

**Methods:** We retrospectively reviewed medical records of treatment-naive AGC patients who received combination chemotherapy with FU plus platinum between 2007 and 2018 and divided them into three groups: Groups A (2007–10), B (2011–14), and C (2015–18) respectively. We defined a long-term survivor as the patient who was alive for more than 3 years from the start of the initial systemic chemotherapy. We compared the treatment details and clinical outcome among the three groups

**Results:** A total of 1,004 patients (A; n=254, B; n=300, and C; n=450) were enrolled to this study. The median follow-up time of the surviving patients was 42.0 months. Median overall survival (OS) at 3-year were 17.8%, 19.3% and 20.7% (Groups A, B, and C, respectively). There were no statistically significant differences in OS between any two groups. As of 1,004 patients, 164 patients (A; n=45, B; n=52, and C; n=67) met the definition of long-term survivors. The proportions of patients with primary tumors increased along the study period (A: 20.0%; B: 34.6%; and C: 41.8%). The number of conversion surgery was similar among study periods (A: n=9, B: n=7, and C: n=12). At the cut-off date, due to disease progression, 69 patients (A; n=23, B; n=24, and C; n=22) discontinued systemic chemotherapy. The proportion of patients received the fourth and more line of chemotherapy increased (A: n=1, B: n=10, and C: n=13). Although no patient received immune oncology (IO) therapy in Group A, the number of patients treated with IO therapy went up from 10 (Group B) to 40 (Group C).

**Conclusions:** The increasing of the treatment options enabled the continuum of chemotherapies, which contribute to achieved the long-term surviving of AGC patients.

*Management of stage IV gastric cancer, peritoneal targeted therapy*

IGCC22-ABS-1236

**SIMULTANEOUS IP CISPLATIN CHEMOTHERAPY MAY BE CONSIDERED AS A TREATMENT FOR ADVANCED GASTRIC CANCER**

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**Objectives:** Peritoneal seeding is the most common type of recurrence and cause of death for gastric cancer. Nevertheless, there is no established consensus for advanced gastric cancer with peritoneal seeding. This study aimed to analyze the effect of intraperitoneal (IP) cisplatin chemotherapy on the survival rate and oncological results of advanced gastric cancer patients who have undergone surgery.

**Methods:** Patients who underwent laparoscopic surgery including radical section, palliative surgery and intraperitoneal chemotherapy for primary gastric adenocarcinoma in our institution were retrospectively reviewed. In intraperitoneal chemotherapy group, 100mg of cisplatin was administered intraperitoneally. The groups were propensity score matched in 1:1 ratio. Primary endpoint was survival rate and incidence of early postoperative complication.

**Results:** From January 2014 to December 2018, a total of 1373 patients underwent laparoscopic surgery, of which 50 were treated with intraperitoneal cisplatin chemotherapy. Because there were differences in the baseline characteristics between conventional group and the IP chemotherapy group, propensity score matching (PSM) was performed. After PSM, each group comprised of 32 patients. There was no significant difference in the early postoperative complications between the two groups (conventional group 12.3%, IP chemotherapy group 10%,  $p=0.786$ ). There was no statistical difference in overall survival between the conventional group and IP chemotherapy group ( $p=0.75$ ). In subgroup analysis, median survival was  $15.7 \pm 12.8$  months in the conventional group and  $18.6 \pm 12.2$  months in the IP chemotherapy group in stage IV gastric cancer.

**Conclusions:** This study showed that simultaneous IP cisplatin chemotherapy seemed to be considered treatment option for advanced gastric cancer.

***Management of stage IV gastric cancer, peritoneal targeted therapy***

IGCC22-ABS-1157

**SAFETY OF FOLFOX PLUS INTRAPERITONEAL PACLITAXEL FOR GASTRIC CANCER WITH PERITONEAL METASTASIS**

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**Objectives:** Peritoneal metastasis (PM) still remains a major obstacle in the treatment of stage IV gastric cancer. This study was designed as a dose-escalation study of intraperitoneal (IP) paclitaxel combined with intravenous (IV) fluorouracil, leucovorin, and oxaliplatin (FOLFOX) to determine the recommended phase II dose in gastric cancer patients.

**Methods:** Patients with gastric adenocarcinoma with PM without other distant metastasis were enrolled. Peritoneal cancer index (PCI) score was evaluated, and IP + IV chemoport insertion was done before chemotherapy. The initial dose of IP paclitaxel every 2 weeks was 40mg/m<sup>2</sup>, then stepped up to 60 then 80mg/m<sup>2</sup>. Target dose was 100mg/m<sup>2</sup>. IV FOLFOX was administered on the same day (oxaliplatin 100mg/m<sup>2</sup>day 1, leucovorin 100mg/m<sup>2</sup> day 1, fluorouracil 2400mg/m<sup>2</sup> over 46 hours day1), and both IP and IV were repeated every 2 weeks. Dose limiting toxicity (DLT) was defined as neutropenia  $\geq$  grade 4, thrombocytopenia  $\geq$  grade 3, febrile neutropenia  $\geq$  grade 3, and other nonhematologic toxicity  $\geq$  grade 3.

**Results:** Fifteen patients were enrolled, and two patients were dropped due to patient consent withdrawal. There was no DLT at 40 and 60mg/m<sup>2</sup> doses. Two patients had grade 3 febrile neutropenia at dose 80mg/m<sup>2</sup>, and thus the final recommended phase II dose was 60mg/m<sup>2</sup>. Other patients underwent IP paclitaxel and mFOLFOX6 without serious adverse events. Seven patients underwent second-look diagnostic laparoscopy, and the average change in PCI score was  $-5.6 \pm 9.3$ . Four patients received gastrectomy, and the ascites conversion rate was 4/5 (80%). Median survival was 16.6 months.

**Conclusions:** The biweekly regimen of IP paclitaxel and FOLFOX is safe and the recommended dose for a phase II trial is 60mg/m<sup>2</sup>.

***Management of stage IV gastric cancer, peritoneal targeted therapy***

IGCC22-ABS-1249

**PRESSURIZED INTRAPERITONEAL AEROSOL CHEMOTHERAPY (PIPAC) FOR GASTRIC CANCER PERITONEAL METASTASES**

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**Objectives:** Pressurized intraperitoneal aerosol chemotherapy (PIPAC) is an innovative intraperitoneal chemotherapy delivery technique that aims to improve drug distribution and tissue penetration. Intravenous Nivolumab is an approved treatment modality for progressive gastric cancer. PIPAC-oxaliplatin in combination with Nivolumab as an immune checkpoint inhibitor may improve immune activation in patients with gastric cancer peritoneal metastasis (GCPM). This first-in-human study aims to establish the safety of this combined therapy.

**Methods:** This is a prospective phase I trial involving GCPM patients after failure of at least first-line chemotherapy. Patients were treated with either PIPAC-oxaliplatin alone (Cohort-1) or in combination with Nivolumab (Cohort-2). Safety was evaluated in terms of adverse events and discontinuation of treatment due to toxicity. Clinical and pathological response was also analyzed secondarily.

**Results:** A total of 14 patients were recruited, 8 and 6 in Cohort-1 and Cohort-2 respectively. Median age was 57 (Cohort-1) and 65 (Cohort-2). Median PCI score was 15 for both cohorts. In Cohort-1, there were no dose limiting toxicities and the highest dose group (120mg/m<sup>2</sup>) tolerated PIPAC well. Three patients underwent a second PIPAC cycle. One patient had marked improvement in PCI from 30 to 12, while the remaining two patients had stable PCI and PRGS scores. There was also improvement in ascites volume for all three patients seen at the second PIPAC. On the basis of RECIST, 62.5% and 66.7% had stable disease after one and two PIPAC procedures respectively. In Cohort-2, patients underwent combination therapy with Oxaliplatin 90mg/m<sup>2</sup>. No serious adverse events secondary to the treatment were recorded thus far. The results of the treatment response are currently being evaluated.

**Conclusions:** PIPAC-oxaliplatin (90mg/m<sup>2</sup>) in combination with IV Nivolumab can be safely administered to GCPM patients. Further analyses and studies are required to delineate its efficacy in GCPM treatment.

***Management of stage IV gastric cancer, peritoneal targeted therapy***

IGCC22-ABS-1267

**LAPAROSCOPIC CONVERSION GASTRECTOMY : TREATMENT FOR INITIALLY UNRESECTABLE GASTRIC CANCER**

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**Objectives:** Conversion surgery(CS) is a treatment aiming at R0 resection after chemotherapy in initially unresectable tumors. The effect of CS in gastric cancer is not well known. The aim of the study is, to provide a cornerstone of basic conversion surgery, especially those done in laparoscopic method, for stomach cancer by a case series of conversion surgery conducted in our center.

**Methods:** We reviewed the medical records from 2003.6.23. to 2020.10.27, and 40 cases were selected in which CS for stomach cancer was conducted.

**Results:** Among 40 patients, 37 (92.5%) patients underwent R0 resection. 21 (52.5%) patients underwent laparoscopic gastrectomy.

The most common pathologic ypTNM stage was stage IV, meaning pathologic M1 even after the chemotherapy, though those metastatic lesions were resected through R0 resection in most cases. In 5 cases, there were no residual tumor, or pathologically complete response.

Of the 40 cases, 23 cases recurred since now. The most common recurrence site was distant lymph node (9 cases, 22.5%), followed by the peritoneal seeding (7 cases, 17.5%). The median recur-free survival (RFS) was 14.8 months with median follow-up period of 12.3 (0.9 – 106.0) months.

There were 9 (22.5%) cases with early complication, of which 5 (12.5%) cases were those with complications of Grade IIIA or higher in the Clavien-dindo classification.

There was no significant difference of complication rate (P=1.000) or RFS (P=0.573) between open, laparoscopic, and open conversion CS. Also, laparoscopic surgery was not a negative prognostic factor for complication rate (hazard ratio[HR] 1.042; 95% confidence interval[CI] 0.203-5.343; P=0.961) nor RFS (HR 0.442; 95% CI 0.175-1.115; P=0.084). Multivariable analysis showed that ypT stage (HR 12.361; 95% CI 1.533-99.699; P=0.018) is the only independent and meaningful prognostic factor for RFS.

**Conclusions:** The laparoscopic conversion surgery after chemotherapy may be the safe and effective method of curation for initially unresectable stomach cancer.

## Management of stage IV gastric cancer, peritoneal targeted therapy

IGCC22-ABS-1058

### CHRONOLOGICAL IMPROVEMENT IN THE SURVIVAL OF ADVANCED GASTRIC CANCER PATIENTS IN THE PAST 15 YEARS

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**Objectives:** The objective of this study was to evaluate the clinicopathological features and survival of patients (pts) with advanced gastric cancer (AGC) over the past 15 years.

**Methods:** We retrospectively collected data on AGC pts (number) who received 1<sup>st</sup> chemotherapy (CTx) between 2005 and 2019 and stratified pts as follows: Jan 2005–Dec 2007 (A); –Feb 2011 (B; after the establishment of fluoropyrimidines plus cisplatin as standard CTx); –May 2015 (C; after the approval of trastuzumab); –Aug 2017 (D1; after the approval of ramucirumab [Ram]); and –Mar 2019 (D2; after the approval of nivolumab [Nivo]).

**Results:** The median follow-up was 13.1 months [mo]. Baseline characteristics of pts in each period were not different, except for the proportion of those with prior gastrectomy (49%/39%/38%/37%/29%). The rate of receiving 3<sup>rd</sup> CTx (38%/52%/44%/54%/63%) increased over the five periods. The rate of exposure to irinotecan (39%/49%/39%/33%/15%) decreased, whereas that of Ram (0%/4%/10%/60%/71%) and Nivo (0%/<1%/8%/38%/52%) increased. Overall survival (OS) improved over time. The OS of pts with liver metastasis (LM) remarkably improved in D2 compared with that of pts in C (hazard ratio [HR], 0.49; p=0.011), while the OS of pts with peritoneal metastasis (PM) slightly improved in D2 compared with that in C (HR, 0.87; p=0.324).

Periods	A (n=312)	B (n=333)	C (n=393)	D1 (n=195)	D2 (n=122)
mOS	12.4	12.7	13.8	15.0	16.6
aHR (95%CI)	-	0.89 (0.76-1.04)	0.77 (0.66-0.91)	0.67 (0.55-0.82)	0.57 (0.44-0.74)
mOS of pts with LM	12.4	11.0	14.3	14.3	22.6
aHR (95%CI)	-	0.98 (0.72-1.33)	0.71 (0.53-0.97)	0.52 (0.35-0.79)	0.33 (0.19-0.59)
mOS of pts with PM	11.0	11.4	12.1	12.2	14.7
aHR (95%CI)	-	0.94 (0.77-1.16)	0.79 (0.64-0.97)	0.82 (0.64-1.05)	0.70 (0.51-0.96)

**Conclusions:** A change in clinical strategy may be associated with improved OS in AGC pts. The prognosis for pts with LM remarkably improved in D2, while that for pts with PM slightly improved, suggesting the need for new treatments for PM.

## ***Management of stage IV gastric cancer, peritoneal targeted therapy***

IGCC22-ABS-1099

### **CHEMOTHERAPY FOR ADVANCED GASTRIC CANCER ASSOCIATED WITH DISSEMINATED INTRAVASCULAR COAGULATION**

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**Objectives:** It is known that untreated advanced gastric cancer (AGC) is complicated with disseminated intravascular coagulation (DIC). Although the 2021 edition of the Gastric Cancer Treatment Guidelines weakly recommends the institution of chemotherapy, there are few reports of fluoropyrimidine (FU) and platinum chemotherapy, which is the current standard therapy for AGC.

**Methods:** We evaluated the outcomes of first-line chemotherapy in patients who started first-line chemotherapy for AGC complicated with DIC between January 2012 and December 2017 at the participating institutions. DIC was defined as a score of 7 or more on the Japanese criteria issued in 1988, and DIC was improved if the score was 5 or less after the start of treatment.

**Results:** 21 patients were enrolled from 4 institutions. The main patient backgrounds were: median age 62 years, 71% male, 48% ECOG PS 2 or higher, 91% histological por/sig, 10% HER2 positive, 43% recurrence, and 91% bone metastasis. The chemotherapy regimens were FU plus platinum in 62%, methotrexate plus FU (MF) in 24%, and FU alone in 10%. 85.7% were discontinued due to progression disease. The improvement rate of DIC was 52.4%, median progression-free survival (PFS) was 1.8 (95% CI: 0.92-3.7) months, and median overall survival (OS) was 3.4 (95% CI: 1.8-5.2) months. FU plus platinum arm achieved a 76.9% improvement for DIC, median PFS of 3.7 (95% CI: 1.1-5.0) months, and median OS of 4.9 (95% CI: 2.2-6.4) months. The major adverse events of Grade 3 or higher were neutropenia in 38.1%, anemia in 57.1%, thrombocytopenia in 66.7%, and febrile neutropenia in 4.8%. The major adverse events of grade 3 or higher in FU + platinum arm were neutropenia in 30.8%, anemia in 61.5%, and thrombocytopenia in 61.5%. Platelet transfusions were done in 43% during first-line chemotherapy. Second-line chemotherapy was instituted in 42.9%, and the improvement rate of DIC during second-line chemotherapy was 22.2%.

**Conclusions:** The efficacy and safety of FU plus platinum chemotherapy for AGC complicated with DIC have been suggested.

*Management of stage IV gastric cancer, peritoneal targeted therapy*

IGCC22-ABS-1279

**RISK FACTORS AND PROGNOSIS FOR BRAIN METASTASIS FROM GASTRIC CANCER: A LARGE POPULATION-BASED STUDY**

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**Objectives:** Brain metastasis (BM) is rare in gastric adenocarcinoma (GaC). This large cohort study aimed to explore factors associated with BM in GaC and investigate cumulative mortalities and prognostic factors in GaC patients with BM at the population level.

**Methods:** Data on patients with GaC diagnosed in 2010-2016 were obtained from a large population-based database. Factors associated with BM were explored using multivariable logistic model. Time-dependent cancer-specific mortalities in GaC patients with BM were calculated using cumulative incidence function. Factors associated with mortality were assessed using multivariable Fine-Gray subdistribution hazard model.

**Results:** Together 28,736 eligible patients were enrolled, which included 231 (1%) cases with BM and which encompassed 39,168 person-years of follow-up. BM was more frequently detected in younger patients, in cases with gastric cardia cancers, those with signet-ring cell carcinoma, and those with positive lymph nodes; it was less often observed in black patients. The median survival of cases with BM was 3 months; the 6-month and 1-year cancer-specific cumulative mortalities were 57% and 71%, respectively. Cases with cardia cancers, undergoing resection, or receiving chemotherapy had lower mortality hazards, while younger cases or cases with positive lymph nodes had higher mortality risks.

**Image:**

**Table.** Fine-Gray subdistribution hazard ratios for cancer-specific mortality among patients with gastric adenocarcinoma and brain metastasis, in overall patients and those treated with chemotherapy or radiotherapy<sup>1</sup>

Variable	Category	Overall			Chemotherapy			Radiotherapy		
		HR (95% CI)	<i>P</i>	<i>P<sub>trend</sub></i>	HR (95% CI)	<i>P</i>	<i>P<sub>trend</sub></i>	HR (95% CI)	<i>P</i>	<i>P<sub>trend</sub></i>
Period of diagnosis	2010-2013	1.00 (reference)			1.00 (reference)			1.00 (reference)		
	2014-2016	0.77 (0.58-1.03)	0.080		0.69 (0.46-1.04)	0.076		0.83 (0.55-1.24)	0.360	
Sex	Male	1.00 (reference)			1.00 (reference)			1.00 (reference)		
	Female	0.96 (0.67-1.37)	0.803		0.93 (0.60-1.44)	0.750		1.04 (0.63-1.69)	0.891	
Age group	< 50 years	1.29 (0.85-1.96)	0.237	0.192	1.18 (0.64-2.18)	0.598	0.072	2.03 (1.14-3.62)	<b>0.016</b>	<b>0.039</b>
	50-59 years	0.87 (0.60-1.24)	0.428		0.92 (0.55-1.55)	0.765		1.02 (0.60-1.73)	0.943	
	60-69 years	1.00 (reference)			1.00 (reference)			1.00 (reference)		
	70-79 years	0.75 (0.45-1.24)	0.264		0.39 (0.18-0.83)	<b>0.015</b>		1.48 (0.78-2.80)	0.226	
	≥ 80 years	1.37 (0.79-2.38)	0.268		0.84 (0.37-1.92)	0.685		2.07 (0.85-5.03)	0.109	
Tumor location	Gastric cardia	1.00 (reference)		0.489	1.00 (reference)		0.630	1.00 (reference)		<b>&lt;0.001</b>
	Gastric fundus/body	1.28 (0.85-1.93)	0.231		1.27 (0.71-2.26)	0.426		1.48 (0.81-2.69)	0.204	
	Gastric antrum/pylorus	1.17 (0.56-2.42)	0.680		0.81 (0.28-2.36)	0.692		4.63 (2.70-7.96)	<b>&lt;0.001</b>	
	Other <sup>2</sup>	0.91 (0.61-1.31)	0.604		0.88 (0.51-1.51)	0.643		1.04 (0.62-1.77)	0.878	
Signet ring cell carcinoma	No	1.00 (reference)			1.00 (reference)			1.00 (reference)		
	Yes	1.23 (0.80-1.89)	0.355		1.60 (0.92-2.79)	0.097		0.98 (0.52-1.85)	0.944	
Differentiation	Intermediate	0.89 (0.59-1.35)	0.585		0.67 (0.35-1.26)	0.611		0.99 (0.54-1.82)	0.962	
	Poor/undifferentiated	1.00 (reference)			1.00 (reference)			1.00 (reference)		
Adjacent structure invasion	No	1.00 (reference)			1.00 (reference)			1.00 (reference)		
	Yes	0.70 (0.35-1.40)	0.309		0.68 (0.22-2.12)	0.503		0.40 (0.11-1.47)	0.167	
Positive lymph node	No	1.00 (reference)			1.00 (reference)			1.00 (reference)		
	Yes	1.38 (0.95-1.99)	0.088		1.27 (0.76-2.10)	0.366		1.77 (1.07-2.93)	<b>0.027</b>	
Bone metastasis	No	1.00 (reference)			1.00 (reference)			1.00 (reference)		
	Yes	1.12 (0.82-1.53)	0.473		1.53 (0.98-2.38)	0.062		1.06 (0.68-1.65)	0.786	
Liver metastasis	No	1.00 (reference)			1.00 (reference)			1.00 (reference)		
	Yes	1.25 (0.88-1.76)	0.217		1.55 (0.91-2.65)	0.108		1.15 (0.71-1.85)	0.572	
Lung metastasis	No	1.00 (reference)			1.00 (reference)			1.00 (reference)		
	Yes	1.01 (0.73-1.40)	0.941		1.19 (0.76-1.86)	0.456		1.07 (0.69-1.66)	0.765	
Resection	No	1.00 (reference)			1.00 (reference)			1.00 (reference)		
	Yes	0.48 (0.26-0.88)	<b>0.018</b>		0.35 (0.18-0.68)	<b>0.002</b>		0.41 (0.19-0.89)	<b>0.023</b>	

<sup>1</sup>Hazard ratios and 95% confidence intervals for the variables listed in the first column except tumor differentiation were calculated using the Fine-Gray subdistribution hazard model mutually adjusted for these variables. For tumor differentiation, adjacent structure invasion, and positive lymph node with missing values, the association was assessed by additionally including these variables one by one into the above multivariable-adjusted model. Statistically significant *P* values are highlighted in bold.

<sup>2</sup>Lesser curvature, greater curvature, overlapping lesion of stomach, and stomach (not otherwise specified).

HR, hazard ratio; CI, confidence interval; NE, not estimable due to small case number.

**Conclusions:** In GaC patients BM was associated with age, ethnicity, tumor location, histology, and node metastasis. Patients with BM had dismal prognosis which was associated with age, tumor location, node involvement, and treatment.

***Management of stage IV gastric cancer, peritoneal targeted therapy***

IGCC22-ABS-1467

**CONVERSION SURGERY FOR GASTRIC CANCER WITH PERITONEAL METASTASIS DURING IP-PTX COMBINED WITH SOX**

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**Objectives:** Intraperitoneal (IP) administration of Paclitaxel (PTX) has a great pharmacokinetic advantage to control peritoneal lesions and can be combined with various systemic chemotherapies. Here, we evaluated the efficacy and tolerability of combination of IP-PTX and systemic S-1/oxaliplatin (SOX) for induction chemotherapy for patients with peritoneal metastases (PM) from gastric cancer (GC).

**Methods:** Patients with GC who were diagnosed as macroscopic PM (P1) or positive peritoneal cytology (CY1) by staging laparoscopy between 2016 and 2021 were enrolled. PTX was IP administered at 40 mg/m<sup>2</sup> on days 1 and 8. Oxaliplatin was IV administered at 100 mg/m<sup>2</sup> on day 1, and S-1 was administered at 80 mg/m<sup>2</sup>/day for 14 consecutive days, repeated every 21 days. The survival time and toxicities were retrospectively explored.

**Results:** A total of 69 patients received SOX+ IP-PTX with a median course of 16 (range 1-48), although oxaliplatin was suspended due to the hematotoxicity or intolerable peripheral neuropathy in many patients. The 1-year overall survival (OS) rate was 67% with median survival time (MST) of 24.0 mo. Gastrectomy was performed in 31 patients who showed macroscopic shrinkage of PM with a 1-year OS rate of 97%. Grades 2 and 3 histological responses were achieved in 6 (20%) and 2 (6%) patients. There were no treatment-related deaths.

**Conclusions:** Combination chemotherapy using SOX + IP-PTX regimen is highly effective and recommended as induction chemotherapy for patients with PM from GC.

***Management of stage IV gastric cancer, peritoneal targeted therapy***

IGCC22-ABS-1335

**LOCAL TREATMENT FOR OLIGOMETASTATIC ESOPHAGOGASTRIC CANCER: A NATIONWIDE POPULATION-BASED STUDY**

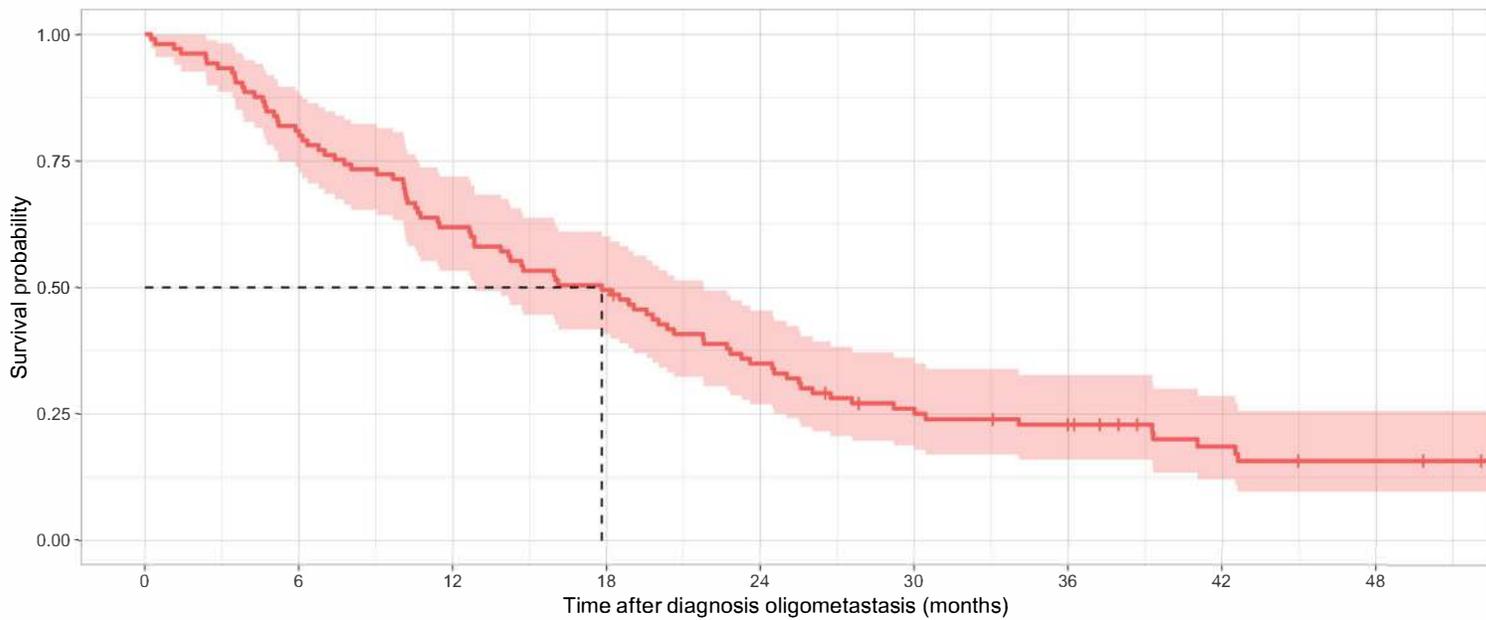
Tiuri E. Kroese<sup>1</sup>, Nikita K. Jorritsma<sup>1</sup>, Hanneke W. van Laarhoven<sup>2</sup>, Rob H. Verhoeven<sup>2</sup>, Stella Mook<sup>3</sup>, Nadia Haj Mohammad<sup>4</sup>, Jelle P. Ruurda<sup>1</sup>, Peter S. van Rossum<sup>3</sup>, Richard van Hillegersberg<sup>1</sup>  
<sup>1</sup>Surgery, UMC Utrecht, Utrecht, <sup>2</sup>Medical Oncology, Amsterdam UMC, Amsterdam, <sup>3</sup>Radiation Oncology, <sup>4</sup>Medical Oncology, UMC Utrecht, Utrecht, Netherlands

**Objectives:** This nation-wide population-based study analyzed the outcome of local treatment for oligometastatic esophagogastric cancer in The Netherlands.

**Methods:** Patients with synchronous or metachronous distant metastases from esophagogastric cancer who were registered in the Netherlands Cancer Registry between 2015 and 2016 were eligible for inclusion. Patients who underwent local treatment (i.e. metastasectomy or stereotactic radiation therapy [SRT]) for oligometastases (i.e. distant metastases in 1 organ or 1 extra-regional lymph node region) were included. The overall survival (OS) since the diagnosis of oligometastases was determined. Independent prognostic factors for OS were analyzed using a multivariable Cox proportional hazard model.

**Results:** Out of 4,265 patients with distant metastases from esophagogastric cancer, 105 patients (2%) were included in this study. Included patients were predominantly diagnosed with esophageal cancer (85%) with adenocarcinoma histology (80%) and with metachronous oligometastases (59%). The oligometastases were located in a distant organ (79%), an extra-regional lymph node region (12%), or the peritoneum (9%). Treatment for oligometastases included metastasectomy (45%), SRT (40%), or both (15%). Systemic therapy was administered in 21% of patients. Median OS was 17.9 months (95% confidence interval [CI]: 13.9-22.7). OS rate at 2-year was 36% and at 3-year 23%. Better OS was independently associated with systemic therapy combined with local treatment as compared with local treatment for oligometastases alone (hazard ratio [HR] 0.47, 95% CI: 0.23-0.96) and better performance status (HR 0.55, 95% CI: 0.29-0.92).

**Image:**



**Conclusions:** Local treatment for oligometastases was associated with a median OS of 18 months. Systemic therapy combined with local treatment for oligometastases was associated with better OS.

***Management of stage IV gastric cancer, peritoneal targeted therapy***

IGCC22-ABS-1424

**CONVERSION SURGERY OF STAGE IV GASTRIC CANCER**

Jong-Ho Choi<sup>1,2</sup>, Felix Berth<sup>2</sup>, Ji-Hyeon Park<sup>2</sup>, Shin-Hoo Park<sup>2</sup>, Yun-Suhk Suh<sup>2</sup>, Dong Seok Han<sup>3</sup>, Seong-Ho Kong<sup>2</sup>, Do Joong Park<sup>2</sup>, Hyuk-Joon Lee<sup>2</sup>, Jae Seok Bae<sup>4</sup>, Se Hyung Kim<sup>4</sup>, Tae-Yong Kim<sup>5</sup>, Do-Youn Oh<sup>5</sup>, Han-Kwang Yang<sup>2</sup>  
<sup>1</sup>Surgery, Eulji Hospital, <sup>2</sup>Surgery, Seoul National University Hospital, <sup>3</sup>Surgery, SMG-SNU Boramae Medical Center, <sup>4</sup>Radiology, <sup>5</sup>Internal Medicine, Seoul National University Hospital, Seoul, Korea, Republic Of

**Objectives:** Conversion surgery could be performed when palliative chemotherapy improves the gastric cancer to a level capable of curative treatment. We reviewed the conversion surgery of gastric cancer in stage IV which was performed in a single institute.

**Methods:** We collected the cases of stage IV gastric cancer which was diagnosed from November 2013 to December 2017 and treated with conversion surgery after chemotherapy. The cases were reviewed for 3 years from the initial chemotherapy. The overall survival time was analyzed according to clinical parameters.

**Results:** We collected 23 cases of conversion surgery. The overall survival time of these cases was  $49.1 \pm 9.4$  months (mean  $\pm$  95% CI) and the overall survival rate was 73.9%. By chemotherapy, the status of disease was changed from unresectable to resectable during  $4.3 \pm 0.8$  months (mean  $\pm$  95% CI) based on the initial chemotherapy. It took  $10.6 \pm 3.6$  months (mean  $\pm$  95% CI) from the initial chemotherapy to surgery. Univariate analysis showed that pathologic T stage, pathologic N stage, and the duration from the initial chemotherapy to surgery were significantly related to the survival time. Patients who underwent surgery after 6 months from initial chemotherapy showed higher survival rate than patients who underwent surgery within 6 months from initial chemotherapy ( $p=0.004$ ).

**Conclusions:** In the stage IV gastric cancer, conversion surgery may support a survival benefit when systemic chemotherapy was treated with sufficient duration.

*Management of stage IV gastric cancer, peritoneal targeted therapy*

IGCC22-ABS-1242

**GASTROJEJUNOSTOMY VS GASTRIC PARTITIONING FOR OBSTRUCTIVE DISTAL GASTRIC TUMORS: A RANDOMIZED TRIAL**

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**Objectives:** Gastric cancer (GC) is still often diagnosed at clinical stage IV and patients commonly present obstructive distal tumors that cannot be resected. In these cases, palliative bypass surgery such as gastrojejunostomy (GJ) is the main surgical technique performed. Unfortunately, its unsatisfactory results led to the search for alternatives, including gastric partitioning (GP). Thus, this study aimed to compare GJ with GP concerning oral diet acceptance, in addition to surgical and oncological outcomes.

**Methods:** Patients with obstructive distal unresectable GC were randomly allocated to undergo GJ (control group) or GP (intervention group) prospectively. The primary outcome was the assessment of postoperative acceptance of oral diet using the Gastric outlet obstruction scoring system (GOOSS) scale.

**Results:** Over 7 years, 90 patients were initially randomized. Thirty-eight were excluded leaving 52 patients for analysis. Of these, 25 patients were included in the GJ group and 27 in the GP group. Both groups were similar for initial clinical characteristics and the GOOSS scale. No difference was observed concerning the surgery duration, length of hospital stay, postoperative complications (POC), and mortality rate. GOOSS 3 was more frequently reached by patients in the GP group (96.3% vs. 72%;  $p=0.022$ ). In the multivariate analysis, the performance of GP was the only independent factor associated with the chance of achieving GOOSS 3 values. During follow-up, maintenance of oral intake, weight, blood transfusions, and CMT were similar between groups. Median survival was 5.3 and 12.4 months for GJ and GP groups, respectively ( $p=0.277$ ). Not receive CMT ( $p=0.001$ ) and a final GOOSS<3 ( $p=0.011$ ) were independent factors associated with worse survival.

**Image:**

**Table.** Characteristics of gastric cancer patients included in the study (n=52)

<b>Variables</b>	<b>Gastrojejunostomy n =25 (%)</b>	<b>Gastric Partitioning n =27 (%)</b>	<b>p</b>
<b>Sex</b>			0.087
Female	4 (16)	10 (37)	
Male	21 (84)	17 (63)	
<b>Age (years)</b>			0.101
Mean (SD)	61.4 (11.7)	66.1 (8.1)	
<b>Body Mass Index (Kg/m<sup>2</sup>) - Initial</b>			0.56
Mean (SD)	20.7 (4.0)	21.3 (3.4)	
<b>Eastern Cooperative Oncology Group (EGOC)</b>			0.219
ECOG 1	18 (72)	15 (55.6)	
ECOG 2	7 (28)	12 (44.4)	
<b>Gastric Outlet Obstruction Score (GOOS) - Initial</b>			0.916
GOOS 0	7 (28)	6 (22.2)	
GOOS 1	15 (60)	18 (66.7)	
GOOS 2	3 (12)	3 (11.1)	
<b>Gastric Outlet Obstruction Score (GOOS) - Final</b>			0.022
GOOS 0 - 2	7 (28)	1 (3.7)	
GOOS 3	18 (72)	26 (96.3)	
<b>Duration of GOOS ≥2 (days)</b>			0.68
Mean (SD)	220.3 (406.6)	320.6 (238.7)	
<b>30-day mortality</b>			0.314
No	22 (88)	26 (96.3)	
Yes	3 (12)	1 (3.7)	
<b>90-day mortality</b>			0.262
No	17 (68)	22 (81.5)	
Yes	8 (32)	5 (18.5)	
<b>Death rate</b>			
No	2 (8)	2 (7.4)	
Yes	23 (92)	25 (92.6)	
<b>Overall Survival</b>			0.277*
Median (months)	5.3	12.4	

\* log-rank test

**Conclusions:** Gastric partitioning demonstrated a better result in the return of food intake after the procedure. There was no difference between the groups regarding the rate of POC, maintenance of food intake, weight during the follow-up, and long-term survival.

***Management of stage IV gastric cancer, peritoneal targeted therapy***

IGCC22-ABS-1297

**TREATMENT & SURVIVAL FOR GASTRIC AND JUNCTIONAL ADENOCARCINOMAS WITH PERITONEAL METASTASES IN THE UK**

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**Objectives:** In order to measure the efficacy of emerging modes of treatment for peritoneal disease, it is essential to describe the treatments patients currently receive and the impact of these on survival – data for which is lacking in the United Kingdom (UK) setting.

**Methods:** This was a single hospital-based retrospective cohort study covering the period from March 2012 to January 2020. 50 patients were identified from multidisciplinary team (MDT) meeting records receiving a diagnosis of gastric adenocarcinoma with isolated peritoneal disease. 31 patients were identified receiving a diagnosis of Siewert II or III junctional adenocarcinoma with isolated peritoneal disease. We calculated median survival time for all patients and also by treatment modality.

**Results:**

Mean age of patients with gastric adenocarcinoma and isolated peritoneal disease was 71 years (range 44-90). Overall median survival was 6.6 months (IQR 2.4-19.3). Median survival was 11.2 months (IQR 3.7-21.5) for patients receiving systemic chemotherapy (n=26) and 2.4 months (IQR 1.2-5.1) for patients receiving best supportive care alone (n=15). Mean age of patients with junctional adenocarcinomas and isolated peritoneal disease was 70 years (range 37-89). Overall median survival was 7 months (IQR 3-19). Median survival was 10.5 months (IQR 6.5-20.5) for patients receiving systemic chemotherapy (n=20) and 3.5 months (IQR 2-6) for patients receiving best supportive care alone (n=6).

**Conclusions:** Our results demonstrate the poor prognosis of both gastric and oesophagogastric cancer patients with isolated peritoneal disease. Prognosis figures are comparable between the two cancer types. Findings are in line with previous studies performed outside the UK which have shown that available treatments extend survival by no more than 3-9 months, highlighting the need for new treatment modalities.

***Management of stage IV gastric cancer, peritoneal targeted therapy***

IGCC22-ABS-1444

**SINGLE CENTERED SURGERY RESULTS OF 40 PERITONEAL CARCINOMATOSIS PATIENTS DUE TO GASTRIC CANCER**

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<sup>1</sup>General Surgery, Health Sciences University İstanbul Ümraniye Training and Research Hospital, <sup>2</sup>General Surgery, Health Sciences University İstanbul Kanuni Sultan Süleyman Training and Research Hospital, İstanbul, <sup>3</sup>Surgical Oncology, Health Sciences University İstanbul Ümraniye Training and Research Hospital, İstanbul, Turkey

**Objectives:** Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy has been a light of hope in patients with last stage gastric cancer presenting with peritoneal carcinomatosis. In this study we aimed to present the 5 year late term results of our cases.

**Methods:** In this study, 40 patients were included. Cytoreductive surgery was performed to all of these 40 cases due to gastric cancer between years 2016 and 2021. The datas were prospectively collected and retrospectively analyzed. The cases were analyzed on the basis of their demographic data, hyperthermic chemotherapy protocols, perop datas, additional organ resections, post op complications and 5 year morbidity and mortality rates.

**Results:** The mean age was 60.5 ( 30-71). The mean age for 24 (60%) male patients was 66.2 (30-71) and mean age for 16 (40%) female patients were 55.6 (36-69). The number of patients with neoadjuvant chemotherapy was 23 (57%) and 13 of these patients were operated in other centers. The median peritoneal carcinomatosis index score was 10. The mean duration of operation was 8 hours (4-10). Completeness of cytoreduction score of 0 was achieved in 34 (85%) patients whereas 6 patients had completeness of cytoreduction score of 1. 75 mg cisplatin and 15 mg doxorubicin was applied in 43 degrees for 30 minutes as the chemotherapy protocol. Clavien-Dindo grade 3-4 complication was reported in 7 (17.5%) patients. Catheter was applied to 3 cases (7.5%) by the interventional radiology, stent was applied to 2 (5%) of the cases due to esophagojejunostomy anastomosis leakage and 2 cases (5%) wer econsidered exitus within 30 days post operatively. Disease free 5-year survival was reported to be 8 months and median overall survival rate was reported to be 11.3 months.

**Conclusions:** Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy can be performed in experienced centers to selected patients analyzed in multidisciplinary councils. Nevertheless, multicentered and high volumed randomized studies are further needed.

***Management of stage IV gastric cancer, peritoneal targeted therapy***

IGCC22-ABS-1455

**PIPAC FOR UNRESECTABLE PM FROM GASTRIC CANCER OUTSTANDING RESULT FROM MULTICENTER COHORT STUDY**

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**Objectives:** PIPAC is a recent approach for intraperitoneal chemotherapy with promising results for patients with peritoneal metastasis (PM). It is a safe and well-tolerated treatment. Our aim was to report oncological outcomes after PIPAC for gastric PM.

**Methods:** International retrospective cohort study of consecutive patients with gastric PM. Outcome measures were overall survival (OS), radiological response (RECIST), histological response by use of *Peritoneal regression grading system* (PRGS) and cytology, *peritoneal cancer index* (PCI) and symptoms.

**Results:** 586 non-selected patients with a median age of 56 (47-64) years , 54% of them were female and underwent a total of 1566 PIPAC procedures. 37% of patients were treated with 2 or more lines of IV chemotherapy, median PCI at first PIPAC was 14 (7-24) and 63% of them were with signet ring adenocarcinoma. Grade III-IV morbidity was 5.1 % and 1.9% died within 30 days from PIPAC procedure. Median OS was 15.4 months from diagnosis and 20.1 months for patient with more than 3 PIPAC.

263/586 patients (44.9%) had  $\geq 3$  procedures (*pp: per protocol*) with the following outcomes: RECIST: 4.3% complete response 11% partial remission, 44% stable; PRGS1 39% at PIPAC3 and negative cytology at PIPAC3 in 16% of patient. In multivariate analysis, 3 PIPAC or more HR 0.3 (95% CI 0.27-0.51) , 2<sup>nd</sup> and 3<sup>rd</sup> line of chemotherapy HR 0.48 (95% CI 0.25-0.92) and CRS&HIPEC after PIPAC HR 0.3 (95% CI 0.18-0.51) were predictors for survival .

**Conclusions:** Based on this large multicentre cohort study, PIPAC could be considered as an option for the treatment of PM from gastric cancer. More prospective study will validate this indication in the near future

*Management of stage IV gastric cancer, peritoneal targeted therapy*

IGCC22-ABS-1270

**CT -BASED PERITONEAL METASTASIS SCORE IN THE PREDICTION OF OS IN PATIENTS WITH GASTRIC CANCER**

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**Objectives:** To develop a CT characteristics-based peritoneal metastasis score (CT-PMS) to hierarchize patients with peritoneal metastasis (PM) positive gastric cancer according to the life expectancy.

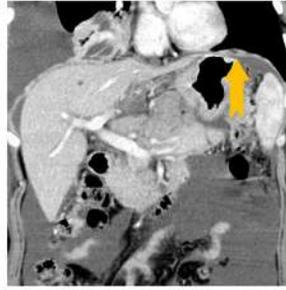
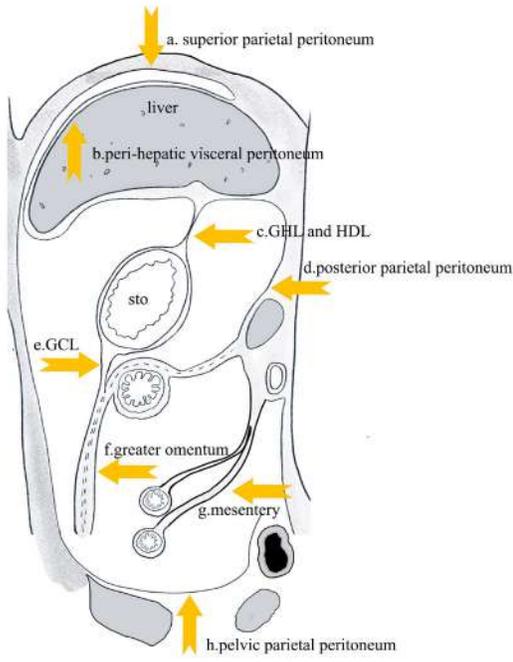
**Methods:** This retrospective study enrolled 66 consecutive patients newly diagnosed with gastric cancer and synchronous PM. The following regions were assessed by the radiologists on CT: (1) gastrosplenic ligament (GSL); (2) gastrohepatic and hepatoduodenal ligaments (GHL and HDL); (3) gastrocolic ligament (GCL); (4) perihepatic visceral peritoneum; (5) mesentery; (6) greater omentum; (7) superior parietal peritoneum; (8) posterior parietal peritoneum; (9) anterior parietal peritoneum; and (10) pelvic parietal peritoneum. Based on the number of peritoneal regions involved, CT-PMS were acquired in the range of 0–10. The dilation of the ureter, biliary tract, and intestine, namely triple tract dilatation sign, were also recorded. Cox regression analysis was used to compare the clinicopathological and radiological variables and the prognosis of patients with PM positive gastric cancer.

**Results:** The median overall survival (OS) was 319 days in all patients (range, 40–1440 days). Significant differences in OS were obtained between patients with CT-PMS  $\geq 3$  and those with CT-PMS  $< 3$  ( $P = 0.006$ , log-rank test).

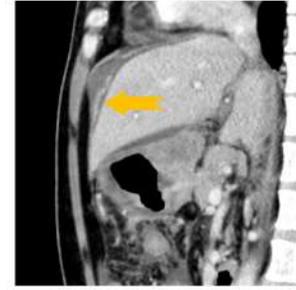
Furthermore, when the triple tract dilatation sign was combined with the PM status of greater omentum and GCL to build a combined score, there is a significant differences in OS between patients with a combined score = 3 and those with a combined score  $\leq 2$  ( $P = 0.005$ , log-rank test). Univariate and multivariate analyses showed that CT-PMS and the combined score were the independent risk factors, respectively.

**Image:**

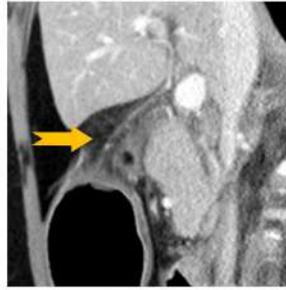
CT-PMS:



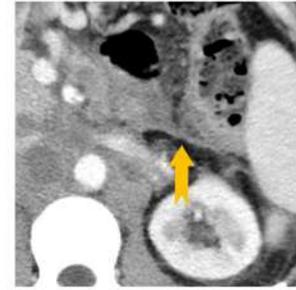
a. superior parietal peritoneum



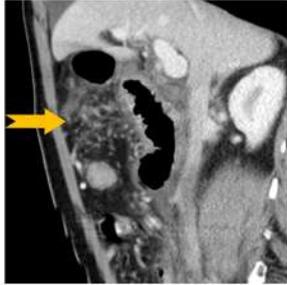
b. peri-hepatic visceral peritoneum



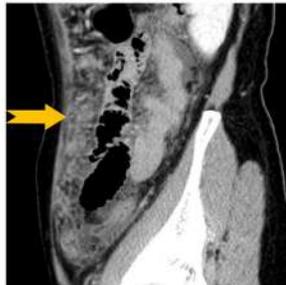
c. GHL and HDL



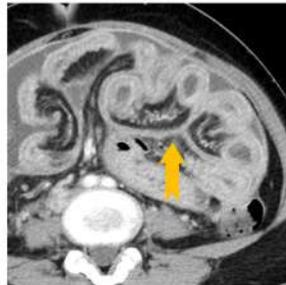
d. posterior parietal peritoneum



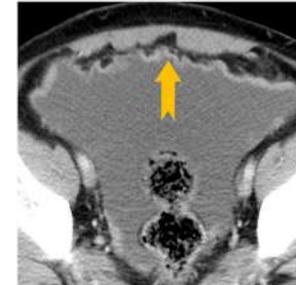
e. GCL



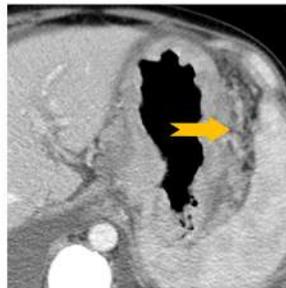
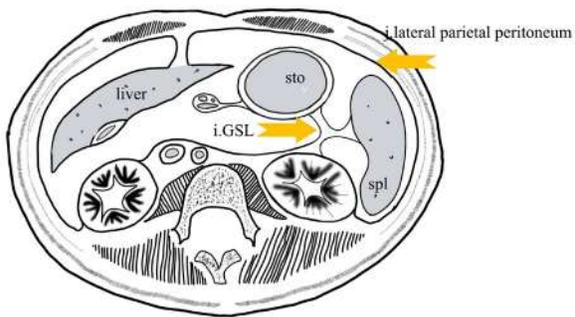
f. greater omentum



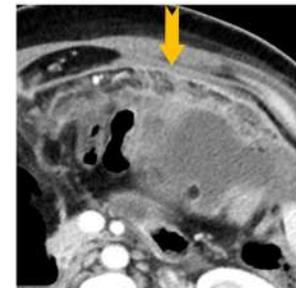
g. mesentery



h. pelvic parietal peritoneum

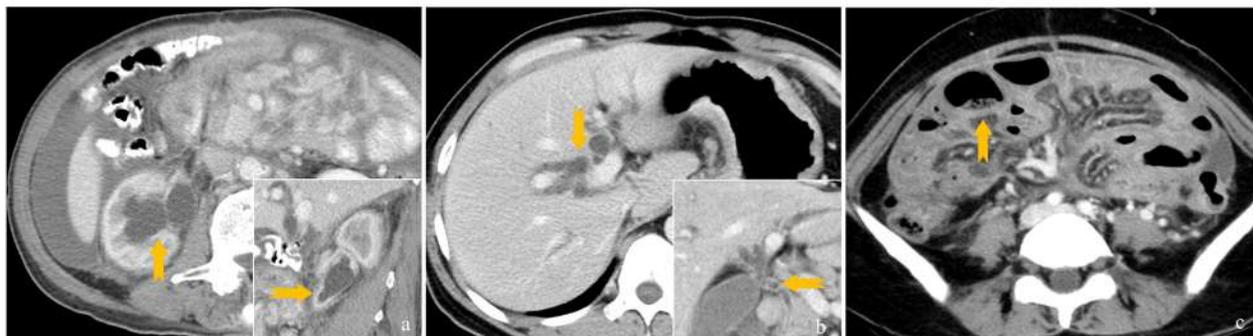


i. PM of GSL



j. lateral parietal peritoneum

Triple tract dilatation sign:



**Conclusions:** The prognosis of patients with PM positive gastric cancer depends on the extent of PM dissemination, hence, CT-PMS and the combined score has correlation with the OS and has the potential in customizing treatment strategies.

***Management of stage IV gastric cancer, peritoneal targeted therapy***

IGCC22-ABS-1281

**HIPEC AND PIPAC IN THE TREATMENT OF GASTRIC CANCER – OUR EXPERIENCE**

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**Objectives:** The gastric cancer incidence is declining in the Czech Republic. But nearly 2/3 of them are diagnosed in the advanced stage of the disease. The peritoneal dissemination is the most common reason of treatment failure.

Intraperitoneal chemotherapy in heated form (HIPEC) or sprayed form (PIPAC) is promising oncosurgical technique to prevent or treat this cancer spread.

**Methods:** We have used HIPEC in 29 patients with gastric cancer (two of them were operated twice) and PIPAC in 5 patients.

We use closed HIPEC and the chemotherapy drug are oxaliplatin or cisplatin. In case of PIPAC we use cisplatin together with doxorubicin.

We have four indications for HIPEC in the gastric cancer patients – therapeutic, prophylactic, palliative and neoadjuvant.

PIPAC is indicated as palliative treatment or neoadjuvant treatment

**Results:** Palliative treatment – 7 patients, average survival 2, 5 months

Neoadjuvant treatment – 3 patients, survival 6 - 10 month

Therapeutic application – 7 patients, three of them are still alive (6 years and 12 and 8 months after surgery) average survival 15 months

Prophylactic application – 12 patients, half of them are still alive (one 4 years and all patients operated since 2020).

Average survival 12 months.

PIPAC

We used PIPAC in five patients since 2020. There were 1 – 3 PIPAC applications in every patient. Unfortunately we have not noticed the decreasing of PCI to switch to HIPEC.

**Conclusions:** Therapeutic HIPEC in cases with low PCI (max 10 – 12) is the only chance for long term survival. Adjuvant HIPEC has potential to improve the survival in the patients with advanced stages of the disease, but the confirmation in larger group of patients is necessary.

We try to minimise palliative HIPEC – we use it only in cases of malignant ascites.

We completely abandoned neoadjuvant HIPEC and use PIPAC instead it.

Supported by RVO VFN 64165 and Progres Q25

***Management of stage IV gastric cancer, peritoneal targeted therapy***

IGCC22-ABS-1314

**GASTRIC CANCER WITH PERITONEAL CARCINOMATOSIS: A CLINICAL PROGNOSTIC SCORE**

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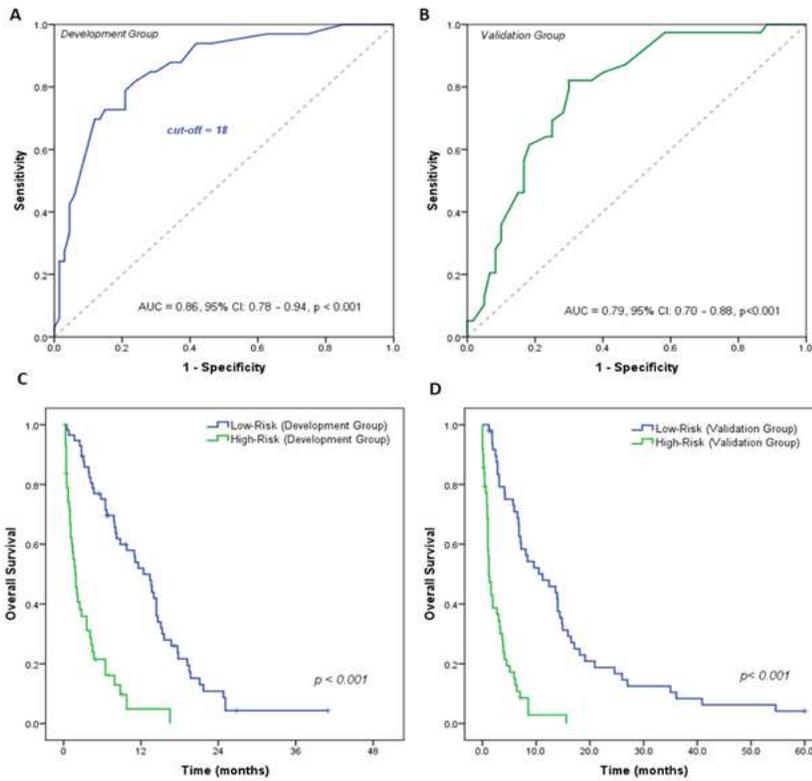
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**Objectives:** Gastric cancer (GC) with peritoneal carcinomatosis (PC) is a very aggressive disease. The limited survival of these patients raises doubts about which factors confer an extremely worse outcomes, and those who could benefit from surgical procedures and may achieve an improvement in survival. Accordingly, this study aimed to create a prognostic score based on clinical and treatment variables for 90-d mortality in GC with PC.

**Methods:** We performed a retrospective analysis of stage IV GC with PC. Patients were randomized in 2 groups for the score construction: Development (DG) and validation (VG). Variables were selected to define the score categories: age, sex, ASA, comorbidities, neutrophil-lymphocyte ratio (NLR), surgical procedure and palliative chemotherapy (CMT). Score performance metric was determined by the area under the receiver operating characteristic (ROC) curve (AUC) to define low and high-risk groups.

**Results:** Of the 363 stage IV GC, 199 (54.8%) had PC. Patients were predominantly male (61.3%) with a mean age of 60.6 years old. After randomization, binary logistic regression analysis was performed in DG (n=100) and points were assigned to the variables to build the score. ROC curve derived from these pooled parameters had an AUC of 0.86 to define risk groups. In overall survival (OS) analyses, high-risk group had worse survival than low-risk (12.4 vs 1.9 mo,  $p<0.001$ ). In the validation cohort (n=99), diagnostic accuracy for 90-days mortality based on the score had an AUC of 0.79. According to the cutoff, 50 GCs were assigned as low-risk and 49 as high-risk group. An increased 90-d mortality was related to high-risk group ( $p<0.001$ ). Low-NLR, surgical resection, and CMT were significantly associated with low-risk groups. Median OS was 11.2 and 1.2 months for low and high-risk patients in VG ( $p<0.001$ ).

**Image:**



**Figure:** Receiver operating characteristics (ROC) curve analysis of prognostic score for 90-days mortality in gastric cancer (GC) with peritoneal carcinomatosis (PC) in Development Group (A) and Validation Group (B); Overall survival curves for Low-Risk and High-Risk GC patients with PC in Development Group (C) and Validation Group (D)

**Conclusions:** The scoring system developed with 7 variables related to patient's characteristics and surgical treatment was able to distinguish GC with PC with high-risk of 90-d mortality.

***Management of stage IV gastric cancer, peritoneal targeted therapy***

IGCC22-ABS-1064

**INTRAPERITONEAL PACLITAXEL PLUS CAPECITABINE/OXALIPLATIN FOR GASTRIC CANCER PERITONEAL METASTASES**

Daryl Chia<sup>1</sup>, Raghav Sundar<sup>2</sup>, Guo Wei Kim<sup>1</sup>, Jia Jun Ang<sup>1</sup>, Jeffrey Lum<sup>3</sup>, Min En Nga<sup>3</sup>, Shaun G. Goh<sup>3</sup>, Cheng Ean Chee<sup>2</sup>, Hon Lyn Tan<sup>2</sup>, Jingshan Ho<sup>2</sup>, Natalie Y. Ngoi<sup>2</sup>, Matilda Lee<sup>2</sup>, Vaishnavi Muthu<sup>2</sup>, Gloria Chan<sup>2</sup>, Angela Pang<sup>2</sup>, Yvonne Ang<sup>2</sup>, Joan Choo<sup>2</sup>, Joline Lim<sup>2</sup>, Jun Liang Teh<sup>4</sup>, Aung Lwin<sup>4</sup>, Soon Yuen<sup>4</sup>, Asim Shabbir<sup>1</sup>, Wei Peng Yong<sup>2</sup>, Jimmy So<sup>1</sup>

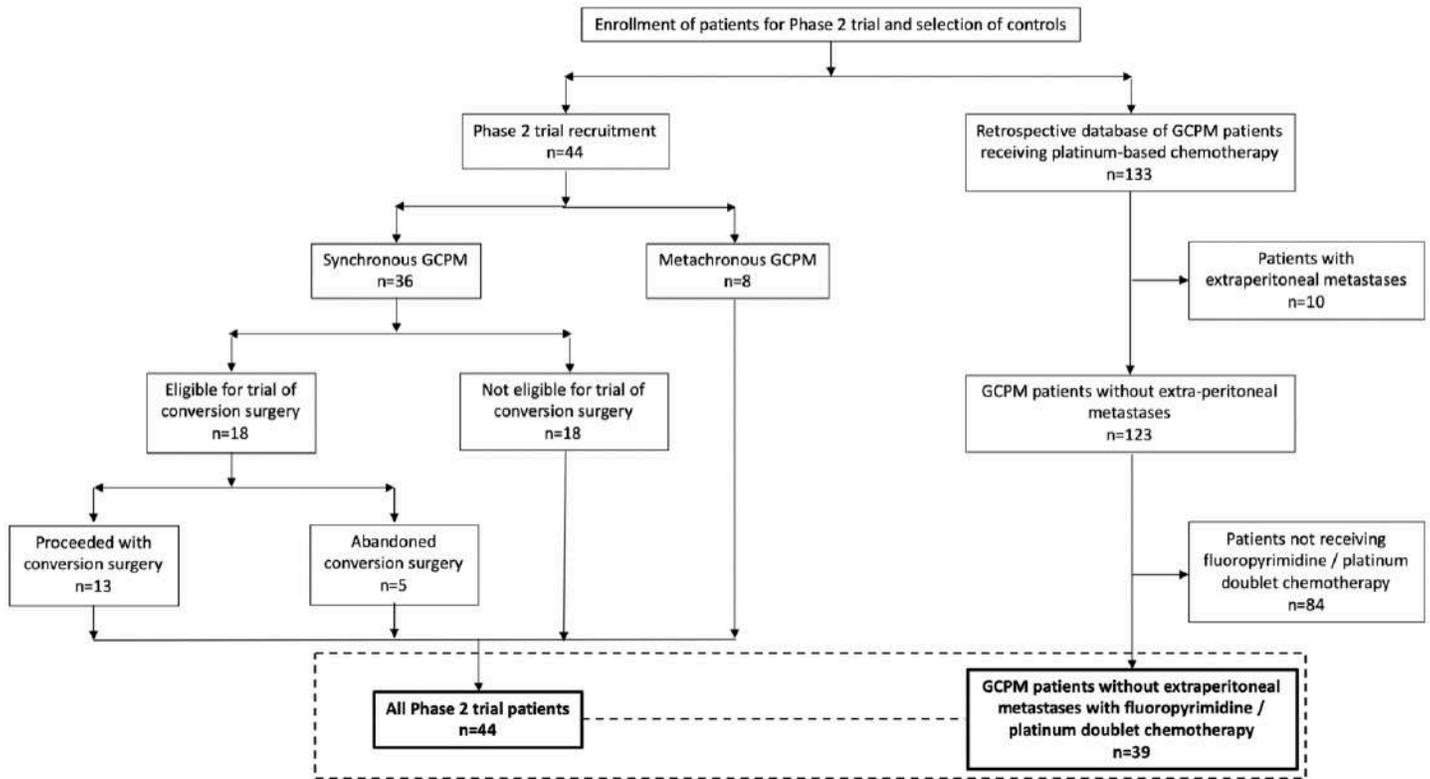
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**Objectives:** Adding intraperitoneal paclitaxel (IP-PTX) to paclitaxel/5-fluoropyrimidine has shown promising results in patients with gastric cancer peritoneal metastases (GCPM) but has not been studied with standard-of-care platinum/fluoropyrimidine combinations. Our aim was to evaluate IP-PTX with capecitabine/oxaliplatin (XELOX) in GCPM.

**Methods:** Forty-four patients with GCPM received IP PTX (40mg/m<sup>2</sup>, day 1,8), oral capecitabine (1000mg/m<sup>2</sup> twice daily, day 1-14) and intravenous oxaliplatin (100mg/m<sup>2</sup>, day 1) in 21-day cycles. Patients with synchronous GCPM underwent conversion surgery if they had good response after chemotherapy, conversion to negative cytology, no extraperitoneal metastasis and no peritoneal disease during surgery. The primary endpoint was overall survival and secondary endpoints were progression-free survival and safety. Outcomes from the trial were also compared against a matched cohort of 39 GCPM patients who received systemic chemotherapy (SC) comprising platinum/fluoropyrimidine.

**Results:** The median OS for the IP and SC groups was 14.6 and 10.6 months (HR 0.44; 95% CI, 0.26-0.74; p=0.002). The median PFS for the IP and SC group was 9.5 and 4.4 months respectively (HR 0.39; 95% CI, 0.25-0.66; P<0.001). Patients in the SC group were younger (IP vs. SC, 61 vs. 56 years, p=0.021) and had better performance status (ECOG 0, IP vs. SC, 47.7% vs. 76.9%, p=0.007) compared to the IP cohort. In IP group, conversion surgery was performed in 36.1% (13/36) of patients, with a median OS of 24.2 (95% CI 13.1-35.3) months and 1-year OS of 84.6%. Serious port-related complications occurred in 9% of trial patients.

**Image:**



**Conclusions:** IP PTX with XELOX is a promising treatment option for GCPM patients. In patients with good response, conversion surgery was feasible with favourable outcomes.

*Management of stage IV gastric cancer, peritoneal targeted therapy*

IGCC22-ABS-1145

**THE EFFECTS OF HIPEC ON SURVIVAL OF GASTRIC CANCER PATIENTS WITH PERITONEAL METASTASIS.**

**A RCT STUDY**

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**Objectives:** Peritoneal metastasis (PM) from gastric cancer (GC) cannot cure by cytoreductive surgery (CRS) or chemotherapy alone. Even after complete removal of PM, most patients die due to regrowth of residual micrometastasis (MM). Chemotherapy also cannot cure the patients by the contamination of multi-drug resistant cells. When preoperative chemotherapy could diminish post-CRS MM burden smaller than the threshold level which can be completely eliminated by intraoperative HIPEC, patients could be cured. We had performed a RCT study to validate the effect of HIPEC for GC-patients with PM.

**Methods:** During the last 10 years, 266 GC-patients with PM were treated with neoadjuvant intraperitoneal/systemic chemotherapy (NIPS), by combination of oral administration of S1 (60mg/m<sup>2</sup>) for 2 weeks, and intraperitoneal (IP) administration of docetaxel 30mg/m<sup>2</sup> plus CDDP 30mg/m<sup>2</sup> on day 1 and 8 (DCS IP). DCS IP was performed 3 cycles before CRS, and 239 patients were selected for CRS+extensive intraoperative lavage (EIPL) plus/minus HIPEC. EIPL refers to the intraoperative extensive lavage of peritoneal cavity with 1 liter of saline for 10 times and IP administration of 50mg of CDDP for 6 hours, dwelling after CRS. In CRS, D2 gastrectomy plus peritonectomy were performed in combined removal of macroscopically detectable PM, and HIPEC was performed with 43 °C for 40 min. To quantify the thermal injury, thermal doses were calculated using Arrhenius equation from temperatures. The primary end point is survival, and the secondary end points are postoperative morbidities and mortalities.

**Results:** There was no significant difference in clinicopathologic factors between HIPEC and non-HIPEC group. Grade 3, 4 complications were found in 26 (22%) and 32 (27%) in HIPEC and non-HIPEC group. There was no significant difference in Grade 3,4,5 complication rates. Five-year survival rates of HIPEC and non-HIPEC group were 16.4%, and 6.7% (P=0.035).

**Conclusions:** After NIPS, EIPL and CRS, HIPEC was safely performed, and HIPEC showed a role in survival benefit than non-HIPEC group.

## Management of stage IV gastric cancer, peritoneal targeted therapy

IGCC22-ABS-1278

### BONE METASTASIS FROM GASTRIC ADENOCARCINOMA-WHAT ARE THE RISK FACTORS AND ASSOCIATED SURVIVAL?

Lei Huang<sup>\*</sup> 1, Yan Shi<sup>1</sup>, Weiguo Hu<sup>2</sup>, Jun Zhang<sup>1</sup>

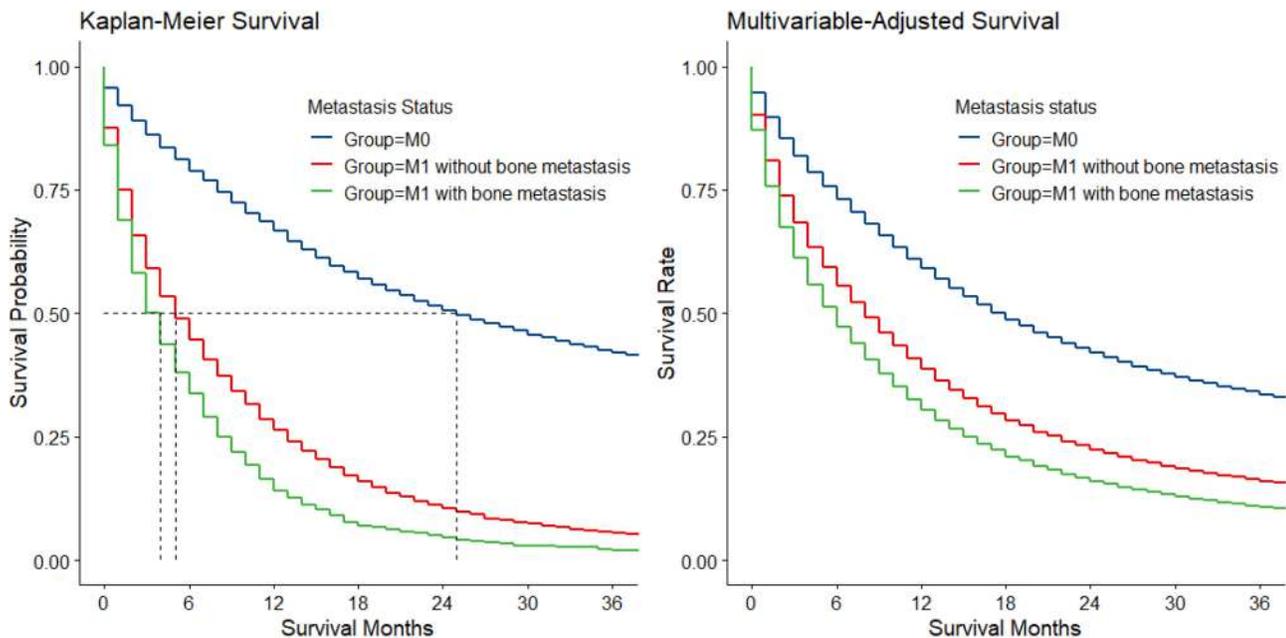
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**Objectives:** To explore factors associated with bone metastasis (BM) in gastric adenocarcinoma (GaC), and to investigate cumulative mortalities and prognostic factors in GaC patients with BM at the population level.

**Methods:** Data on patients with GaC diagnosed in 2010-2016 were retrieved from a large population-based database. We explored factors associated with BM using multivariable logistic model. We then calculated time-dependent cancer-specific mortalities in GaC patients with BM using cumulative incidence function. We further assessed factors associated with mortality using multivariable Fine-Gray subdistribution hazard model.

**Results:** Together 28,779 eligible patients were enrolled, which included 1511 (5%) people with bone metastasis and 9561 (33%) with other metastasis and which encompassed 39,190 person-years of follow-up. Bone metastasis was more frequently detected in 2014 or later, in younger patients, in patients with gastric cardia cancers, in people with signet-ring cell carcinoma, and in those with poorly-differentiated/undifferentiated cancers; it was less commonly observed in black patients. Bone metastasis was associated with more frequent brain and lung metastases. The median survival of patients with bone metastasis was 4 months; the 6-month and 3-year cancer-specific cumulative mortalities were 56% and 85%, respectively. Patients diagnosed after 2013, those with cardia cancers, and those undergoing resection had lower mortality hazards, while American Indians/Alaska Natives and people with positive lymph nodes had higher mortality risks.

**Image:**



**Conclusions:** In GaC patients bone metastasis was associated with various factors including age, ethnicity, tumor location, histology, differentiation, and metastasis to other sites. Patients with bone metastasis had poor prognosis which was associated with year of diagnosis, ethnicity, tumor location, lymph node involvement, and treatment. Our findings provide important hints for tailored patient management and for further mechanistic investigations.

***Management of stage IV gastric cancer, peritoneal targeted therapy***

IGCC22-ABS-1436

**PERITONEAL METASTASIS OF GASTRIC CANCER**

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**Objectives:** Gastric cancer is the second most common cause of cancer death globally. It is also a malignant tumor with high morbidity and mortality in China. The gastric cancer metastasized to the peritoneum more easily than other gastrointestinal malignancies. Peritoneal metastasis is one of the most cause of death in patients with advanced gastric cancer. Peritoneal metastasis is that cancer cells migrate to the peritoneum from the primary site either through the blood system, lymphatic system or by direct implantation. Peritoneal metastasis occurred in more than half of the staging for T3 and T4 patients after radical resection. The higher the degree of metastasis, the shorter the survival. Patients with peritoneal metastasis are usually accompanied by a large amount of pleural and abdominal effusion, hypoproteinemia, water and electrolyte imbalance, intestinal obstruction, liver failure and other difficulties in treatment. Currently, there is no effective treatment for peritoneal metastasis and associated symptoms of gastric cancer. In recent years, there are many exploratory studies on the treatment of peritoneal metastasis. At present, systematic chemotherapy is considered as the dominant treatment, combined with surgery, intraperitoneal perfusion chemotherapy, intraperitoneal thermal perfusion chemotherapy, radiotherapy, targeted therapy, immunotherapy, traditional Chinese medicine and other methods of combined treatment. Improve the quality of life and survival of patients, provide clinical decision-making for the treatment of peritoneal metastasis in advanced gastric cancer .

**Methods:** Comprehensive analysis of multiple data.

**Results:** To improve the quality of life and survival of patients, providing clinical decision-making for the treatment of advanced gastric cancer peritoneal metastasis.

**Conclusions:** To improve the quality of life and survival of patients, providing clinical decision-making for the treatment of advanced gastric cancer peritoneal metastasis.

***Management of stage IV gastric cancer, peritoneal targeted therapy***

IGCC22-ABS-1439

**CLINICAL IMPACT OF CY1 IN CONVERSION SURGERY FOLLOWING CHEMOTHERAPY FOR STAGE IV GASTRIC CANCER**

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**Objectives:** The aim of our study was to evaluate the clinical impact of peritoneal lavage cytology positive (CY1) in conversion surgery following chemotherapy for stage IV gastric cancer.

**Methods:** A total of 213 patients who underwent conversion surgery from 2007 to 2017 at 6 participating institutes following chemotherapy for stage IV gastric were enrolled in this multicenter retrospective study. Patients' background characteristics, surgical outcomes and survival outcomes were examined. Overall survival after conversion surgery were compared between the following 4 groups, R0 group, R1(CY1 only) group, R1(Except CY1) group and R2 group.

**Results:** The number of patients who received preoperative chemotherapy of platinum included doublet regimen, triplet regimen, S-1 monotherapy and intraperitoneal chemotherapy were 35, 152, 1 and 25 respectively. Median duration of chemotherapy was 3.2 (1.0-34.9) months. In terms of surgical procedure, distal gastrectomy was employed in 74 patients, proximal gastrectomy 12 patients and total gastrectomy in 127 patients. The OS of R1(CY1 only) group (n=27, MST 13.7 months) and R1 (Except CY1) group (n=5, MST 12.7 months) and R2 group (n=34, MST 14.7months) were equally impaired and significantly worse compared to R0 group (n=147, MST 39.2 months) (P<0.0001). Multivariate analysis indicated that CY1 at conversion surgery was an independent risk factor for poor prognosis (HR 1.74; 95% CI 1.09-2.72; P=0.021) as same as TG procedure, ypT4a-T4b, ypN1-3, presence of non-curative factor other than CY1. There was no significant characteristics of regimen and duration of preoperative chemotherapy in patients who achieve R0 resection among initially P1 or CY1 gastric cancer patients (N=99).

**Conclusions:** Modification of preoperative chemotherapy and implementation of more intense postoperative chemotherapy might be necessary for conversion surgery with CY1, because the prognosis after conversion surgery was poor, even if the non-curative factor was CY1 only.

**Novel drugs, targeted therapy, and immunotherapy**

IGCC22-ABS-1452

**INTRAPERITONEAL TRANSFER OF MICRORNA-29B CAN PREVENT PERITONEAL METASTASES OF GASTRIC CANCER**

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<sup>1</sup>Department of Surgery, Jichi Medical University, Shimotsuke, Japan

**Objectives:** Expression levels of exosomal microRNAs are dysregulated in peritoneal fluids in patients with peritoneal metastases (PM). We examined the effect of miR-29b on mesothelial cells (MC) which play critical a role in the development of PM through mesothelial-mesenchymal transition (MMT).

**Methods:** Human peritoneal mesothelial cells (HPMCs) were isolated from surgically resected omental tissue and MMT induced by stimulation with 10 ng/ml TGF- $\beta$ 1. MiR-29b mimics and negative control miR were transfected by lipofection using RNAiMAX and the effects on the MMT evaluated *in vitro*. To evaluate the effect of miR-29b *in vivo*, we inoculated murine gastric cancer cell YTN16P2 in peritoneal cavity of syngenic C57BL/6 mice. MiR-29b mimics or NC mixed with atelocollagen and intraperitoneally (ip) injected every 3 days from tumor implantation. The mice were sacrificed at 14 days after tumor implantation, and formation of peritoneal metastasis were evaluated.

**Results:** Transfection of miR-29b mimics significantly decreased the proliferation of NUGC-4 by 20% as compared with NC. Migration was inhibited more strongly by 90%. After 48 hr-culture with TGF- $\beta$ , HPMCs apparently changed the morphology from round to spindle shape. The expression level of E-cadherin and Calretinin in HPMCs was decreased while vimentin tended to be upregulated by TGF- $\beta$ . However, transfection of miR-29b mimics significantly suppressed the morphological changes and reduced the expression levels of vimentin with restored expression of E-cadherin and Calretinin, suggesting the inhibition of MMT in HPMCs. MiR-29b also decreased the proliferation and migration of HPMCs by 20% and 90% as compared with NC. Finally, mice treated with miR-29b developed less PM nodules than those treated with NC and only atelocollagen.

**Conclusions:** MiR-29b inhibits TGF- $\beta$ 1 induced MMT and replacement of miR-29b in the peritoneal cavity might be effective to prevent development of PM through the effects on both tumor and mesothelial cells.

***Novel drugs, targeted therapy, and immunotherapy***

IGCC22-ABS-1443

**CLINICAL RELEVANCE OF GENOMIC PROFILING FOR GASTRIC CANCER AND OTHER GASTROINTESTINAL MALIGNANCIES**

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<sup>1</sup>Chemotherapy department №2, N.N. Blokhin National Medical Research Center of Oncology, <sup>2</sup>OncoAtlas LLC, OncoAtlas LLC, Moscow, <sup>3</sup>Clinic "Luch", Clinic "Luch", St. Petersburg, <sup>4</sup>Oncology Department, MEDSI, <sup>5</sup>City clinical cancer hospital № 1, City clinical cancer hospital № 1, <sup>6</sup>Genetico LLC, Genetico LLC, <sup>7</sup>Genetico LLC, Genetico LLC, Moscow, <sup>8</sup>St. Petersburg Clinical Research Center of specialized types of care (Oncology), St. Petersburg Clinical Research Center of specialized types of care (Oncology), <sup>9</sup>department of patonatomy, Leningrad Regional Clinical Cancer Dispensary, St. Petersburg, <sup>10</sup>Chemotherapy department №4, N.N. Blokhin National Medical Research Center of Oncology, Moscow, Russian Federation

**Objectives:** The aim of our study was to evaluate the efficacy of systemic treatment for gastric cancer and other gastrointestinal malignancies guided by comprehensive genomic profiling (CGP).

**Methods:** This retrospective study included patients (pts) with gastric cancer and other gastrointestinal malignancies who received treatment from 2016 to 2021. DNA was extracted from either tumor sample or plasma if the tumor sample was unavailable. CGP included NGS panel.

**Results:** We included 92 pts: 9 (9.8%) pts with gastric cancer, 2 (2.2%) - esophageal cancer, 53 (57.6%) - colon cancer, 7 (7.6%) - cholangiocarcinoma, 17 (18.8%) - pancreatic cancer, 4(4.3%) - small bowel cancer. Median age at diagnosis was 56 years (range, 34-68,8). Patients received a median of 2 lines (range: 0-4) of prior systemic therapy. The median time from CGP test to treatment was 10 months (range, 7-14). Of the 92 pts included in this analysis, 91% had actionable mutations based on their CGP results. The average number of genes with actionable genomic alterations in the gastric cancer cohort was 3.2 (0-6), the average VUS number - 7 (0-12). The most common GAs in gastric cancer samples were CDKN2A (4/9), ATM (2/9), PIK3CA (2/9). Median tumor mutational burden in gastric cancer samples was 3.5 (0-12) mutations/MB. Molecularly targeted therapy based on CGP results were recommended for gastric cancer pts: PARP inhibitors - 3, immunotherapy - 1, CDK4/6 inhibitors - 1, PI3K- inhibitor – 1. Based on the CGP assay, no pts with gastric cancer received profiling driven therapy. Based on the CGP assay, 8 pts with other gastrointestinal malignancies (9 %) received targeted therapy based on NGS. Disease control rate was 2% (2/94) for all pts.

**Conclusions:** Despite the identification of actionable genomic alterations in gastric cancer patients, targeted therapy has not been performed. Despite the identification of actionable genomic alterations in gastric cancer patients, targeted therapy has not been performed.

***Novel drugs, targeted therapy, and immunotherapy***

IGCC22-ABS-1113

**IMATINIB MESYLATE ENHANCE THE RADIOSENSITIVITY OF GASTROINTESTINAL STROMAL TUMORS BY TARGETING RAD51**

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**Objectives:** Gastrointestinal stromal tumor (GIST) has been considered radiation-resistant and recommended only for symptomatic palliation in current treatment guidelines. The aim of this study was to investigate the radiosensitization effect of imatinib mesylate on gastrointestinal stromal tumors and the role of Rad51 in radiosensitization of imatinib.

**Methods:** Immunohistochemistry was conducted to evaluate the expression of Rad51 in GIST tissues. Rad51 expression was determined after exposure to r-ray (0,2,4,8 Gy) and imatinib (0,1,2,4uM).The effects of IM combined with radiation on cell proliferation, invasion and migration, apoptosis and radiosensitivity of gastrointestinal stromal tumor were investigated by CCK-8, colony formation assay, Transwell assays, scratch assay and flow cytometry. Western blot and immunofluorescence were applied to assess r-H2AX and Rad51 protein expression levels and focal site formation, and comet assay was used to verify DNA double-strand damage.

**Results:** Rad51 was detected to be high expression in GIST tumor tissues compared with normal tissues from individuals. Moreover, Rad51 was elevated with the increase of radiation dosage and significantly decreased after imatinib treatment in a dose-dependent manner. Inhibition of Rad51 expression by B02 can increase radiosensitivity of GIST882 cells. Meanwhile, overexpression of Rad51 reversed IM-induced radiosensitization. Our finding showed that pretreatment with IM induced radiosensitizing effect in GIST882 cells and significantly enhanced the radiation-induced incidence of apoptosis and the expressions of cell-associated apoptotic protein by inhibiting DNA double-strand damage repair, and inhibited cell proliferation, invasion and migration.

**Conclusions:** Our study supports that inhibition of Rad51 by Imatinib mesylate is an effective strategy for radiosensitization in gastrointestinal stromal tumor and opens up new scenarios of use of radiotherapy, especially if combined with molecularly targeted therapy, can improve patients' prognosis.

***Novel drugs, targeted therapy, and immunotherapy***

IGCC22-ABS-1152

**A PHASE I STUDY OF TST001 (ANTI-CLAUDIN 18.2 MONOCLONAL ANTIBODY) IN PATIENTS WITH SOLID TUMORS**

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**Objectives:** Primary objectives are to evaluate the safety and tolerability, to identify MTD and recommended phase 2 dose (RP2D). Secondary objectives include the assessment of pharmacokinetic parameter, immunogenicity, and preliminary anti-cancer activity.

**Methods:** This phase I clinical trial enrolls patients with advanced or metastatic solid tumors who progressed on or after standard treatments. In the dose escalation phase, patients without preselection of tumor CLDN18.2 expression were given increasing doses of TST001 intravenously every 3 weeks (Q3W) using a 3+3 design.

**Results:** As of Sept. 7, 2021, 11 patients had been treated at the dose levels of 3, 6, and 10 mg/kg Q3W. Nine patients were DLT evaluable with no DLT reported and MTD has not been reached. TST001 demonstrated a roughly linear PK profile as both C<sub>max</sub> and AUC increased proportionally across the dose range following the first dose. No drug accumulation was observed in Q3W cohort. 10 mg/kg Q3W was designated as RP2D for further expansion study and three additional patients were enrolled into the expansion phase at the 10 mg/kg Q3W dose. The most common AEs (>20%) included nausea (64%), vomiting (50%), anemia (43%), hypoalbuminemia (29%), abdominal distension (21%), constipation (21%). 5 patients experienced Grade 3 AEs, including blood pressure increased, bilirubin conjugated increased, hyponatremia, nausea and vomiting, pulmonary embolism. Two patients experienced 3 SAEs including hypoalbuminemia, jaundice cholestatic; pulmonary embolism. No treatment related Grade 4 or 5 event was reported. One patient with CLDN18.2 overexpression gastric signet ring cell carcinoma who progressed on multiple lines of chemotherapies, anti-PD1 and anti-VEGF therapies in the 6 mg/kg cohort achieved a confirmed partial response at week 12.

**Conclusions:** TST001 demonstrated a manageable & tolerable safety profile in patients with advanced solid tumors and preliminary anti-tumor activity in a heavily pretreated gastric cancer patient expressing CLDN18.2.

*Novel drugs, targeted therapy, and immunotherapy*

IGCC22-ABS-1396

## **IMPACT OF THE DEEP NEUROMUSCULAR BLOCK ON ONCOLOGY OF OBESE PATIENTS DURING LAPAROSCOPIC GASTRECTOMY**

Shin-Hoo Park<sup>1</sup>, Hyub Huh<sup>2</sup>, Sung Il Choi<sup>3</sup>, Jong-Han Kim<sup>4</sup>, You-Jin Jang<sup>4</sup>, Oh Jeong<sup>5</sup>, Joong-Min Park<sup>6</sup>, Chang Min Lee<sup>7</sup>, Seong-Heum Park<sup>1</sup>, Sungsoo Park<sup>1</sup>

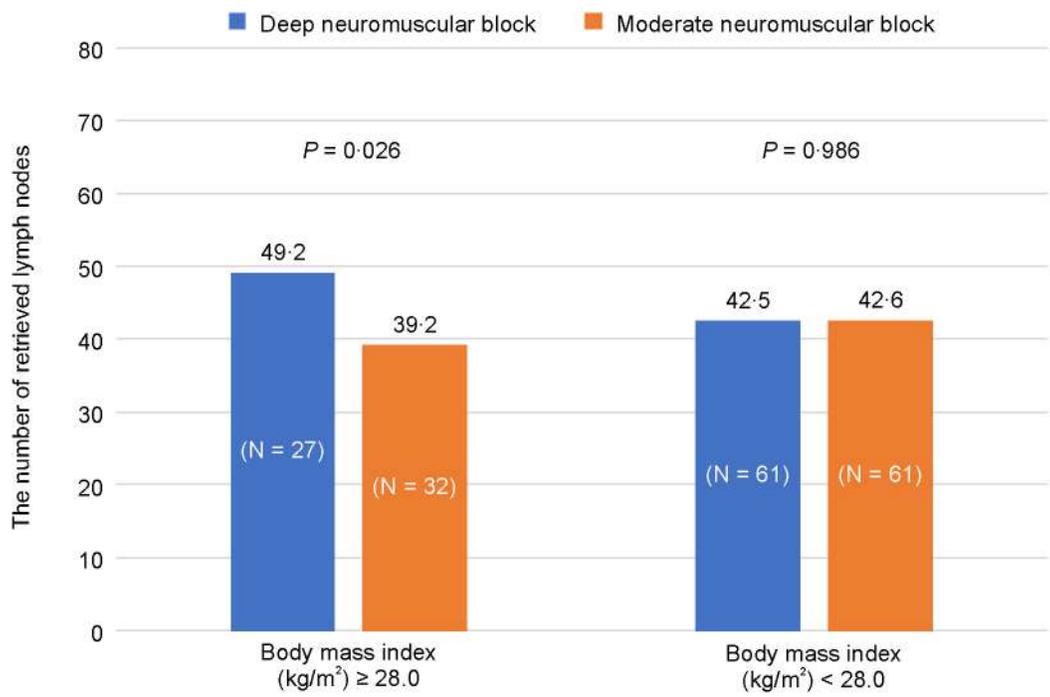
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**Objectives:** Obesity can hinder laparoscopic procedures and impede oncological safety during laparoscopic cancer surgery. Deep neuromuscular block (NMB) reportedly improves laparoscopic surgical conditions, but its oncological benefits are unclear. We aimed to evaluate whether deep NMB improves the oncologic quality of laparoscopic cancer surgery in obese patients.

**Methods:** We conducted a double-blinded, parallel-group, randomized phase 3 trial in nine centers in Korea. Clinical stage I-II gastric cancer patients with a body mass index (BMI)  $\geq 25$  kg m<sup>-2</sup> were eligible and randomized 1:1 ratio to the deep or moderate NMB groups, with continuous infusion of rocuronium (0.5–1.0 and 0.1–0.5 mg kg<sup>-1</sup> h<sup>-1</sup>, respectively). The primary endpoint was the number of retrieved lymph nodes (LNs). The secondary endpoints included the surgeon's surgical rating score (SRS) and interrupted events.

**Results:** Between August 2017 to July 2020, 196 patients were enrolled. Fifteen patients were excluded, and 181 patients were finally included in the study. There was no significant difference in the number of retrieved LNs between the deep (N=88) and moderate NMB groups (N=93) (446 $\pm$ 17.5 vs. 415 $\pm$ 16.9,  $P=0.239$ ). However, deep NMB enabled retrieving more LNs in patients with a BMI  $\geq 28$  kg m<sup>-2</sup> than moderate NMB (49.2 $\pm$ 18.6 vs. 39.2 $\pm$ 13.3,  $P=0.026$ ). Interrupted events during surgery were lower in the deep NMB group than in the moderate NMB group (21.6% vs. 36.6%;  $P=0.034$ ). The SRS was not influenced by NMB depth.

**Image:**



**Conclusions:** Deep NMB provided oncological benefits by retrieving more LNs in patients with BMI  $\geq 28$  kg m<sup>-2</sup> during laparoscopic gastrectomy.

*Novel drugs, targeted therapy, and immunotherapy*

IGCC22-ABS-1095

## TARGETING ZFP64 PROMOTES EFFECT OF NAB-PACLITAXEL AND REVERSES IMMUNOSUPPRESSIVE MICROENVIRONMENT

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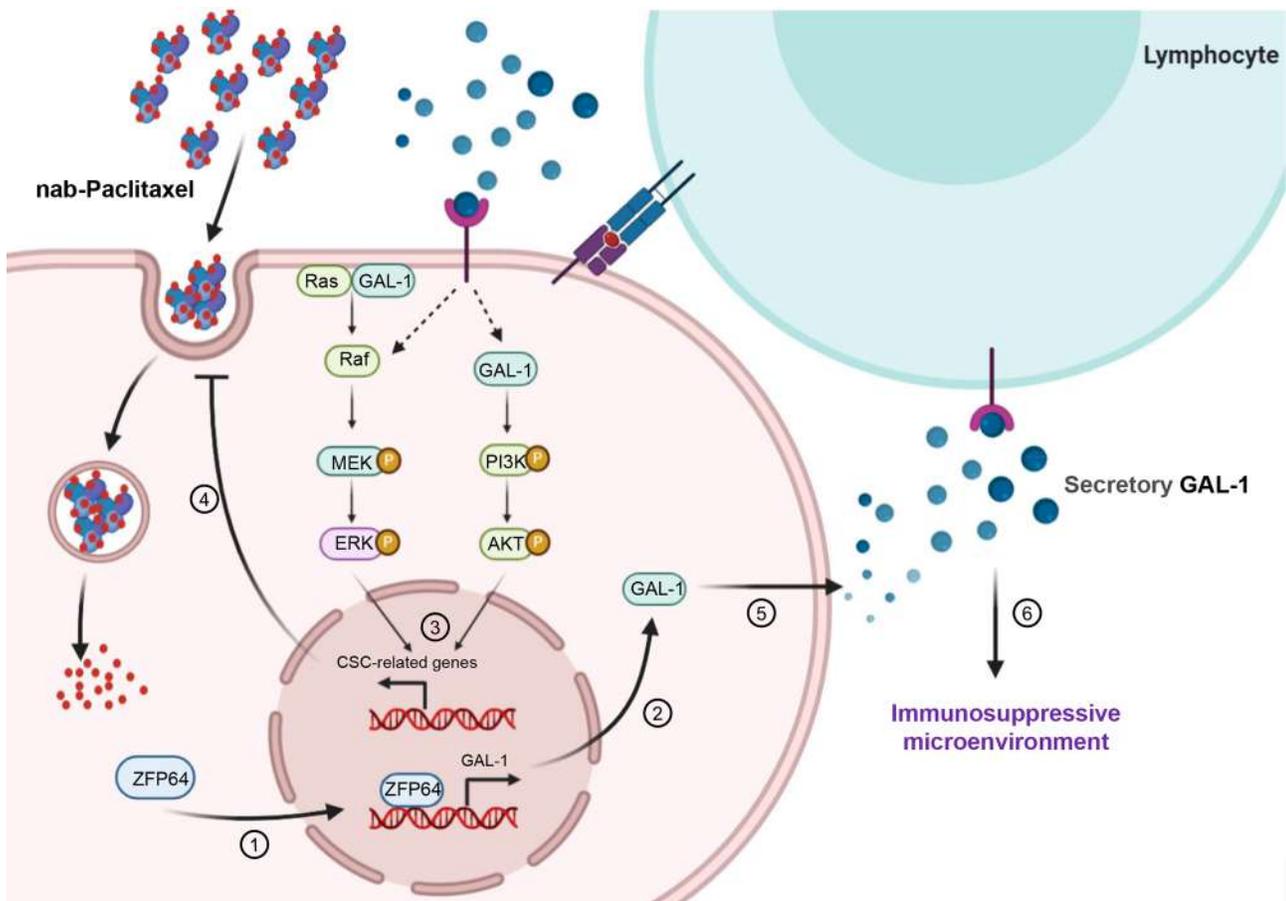
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**Objectives:** Chemoresistance is a main obstacle in gastric cancer (GC) treatment, but its molecular mechanism still needs to be elucidated. Here, we aim to reveal the underlying mechanisms of nanoparticle albumin-bound paclitaxel (nab-paclitaxel) resistance in GC.

**Methods:** We performed RNA sequencing (RNA-seq) on samples from patients who were resistant or sensitive to nab-paclitaxel, and identified Zinc Finger Protein 64 (ZFP64) as critical for nab-paclitaxel resistance in GC. CCK8, flow cytometry, TUNEL staining, sphere formation assays were performed to investigate the effects of ZFP64 in vitro, while subcutaneous tumor formation models were established in nude mice or humanized mice to evaluate the biological roles of ZFP64 in vivo. Chromatin immunoprecipitation sequencing (CHIP-seq) and double-luciferase reporter gene assay were conducted to reveal the underlying mechanism of ZFP64.

**Results:** ZFP64 overexpression was linked with aggressive phenotypes, nab-paclitaxel resistance and served as an independent prognostic factor in GC. As a transcription factor, ZFP64 directly binds to Galectin-1 (GAL-1) promoter and promoted GAL-1 transcription, thus inducing stem-cell like phenotypes and immunosuppressive microenvironment in GC. Importantly, compared to treatment with nab-paclitaxel alone, nab-paclitaxel plus GAL-1 blockade significantly enhanced the anti-tumor effect in mouse models, particularly in humanized mice.

**Image:**



**Conclusions:** Our data support a pivotal role for ZFP64 in GC progression by simultaneously promoting cellular chemotherapy resistance and tumor immunosuppression. Treatment with the combination of nab-paclitaxel and a GAL-1 inhibitor might benefit a subgroup of GC patients.

***Novel drugs, targeted therapy, and immunotherapy***

IGCC22-ABS-1096

**INHIBITION OF C-MET/VEGFR PATHWAYS ENHANCES NANO-PARTICLE PACLITAXEL RESPONSE IN GASTRIC CANCER**

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**Objectives:** Gastric adenocarcinoma (GAC) is among the most lethal malignancies in the World. Several growth factors and their receptors including c-Met and VEGFR are overexpressed in GAC and thus represent potentially effective therapeutic targets. Merestinib (Mer) is a potent, small-molecule inhibitor targeting c-Met and VEGFR pathways that is currently under clinical investigation for several solid tumors.

**Methods:** *In vitro* cell proliferation and protein expression were evaluated by colorimetric WST-1 assay and Immunoblotting. Animal survival and tumor growth studies were performed using human GAC MKN-45 cells in peritoneal dissemination and subcutaneous xenografts in NOD/SCID mice.

**Results:** Animal survival was increased by nab-paclitaxel (118%) and merestinib (41%) treatment compared with controls. The addition of merestinib to nab-paclitaxel led to a further extension in animal survival (153%). In subcutaneous xenografts, compared to controls, tumor growth inhibition by nab-paclitaxel and merestinib was 77% and 82%, respectively. Merestinib combination with nab-paclitaxel showed an additive effect on tumor regression. *In vitro* cell proliferation of gastric cancer epithelial cells (MKN-45 and KATO-III) and gastric fibroblasts demonstrated that *nab*-paclitaxel and merestinib decreased proliferation and combination of *nab*-paclitaxel with merestinib had an additive effect. Immunoblot analysis revealed that merestinib caused a decrease in the expression of phospho-c-MET, phospho-EGFR, phospho-IGF-1R, phospho-AKT, phospho-ERK and an increase in apoptosis-related proteins cleaved PARP-1 and cleaved caspase-3 in GAC cells either alone or in combination with *nab*-paclitaxel.

**Conclusions:** Simultaneous inhibition of c-MET, VEGFR and EGFR pathways by merestinib has antitumor efficacy in GAC and it can significantly improve nab-paclitaxel chemotherapy response. This therapeutic approach might lead to a clinically relevant combination to increase GAC patients' survival.

***Novel drugs, targeted therapy, and immunotherapy***

IGCC22-ABS-1237

**BLOOD MICROBIOME DNA AND CYTOKINE AS EFFICACY MONITORING STRATEGIES FOR GASTRIC CANCER IMMUNOTHERAPY**

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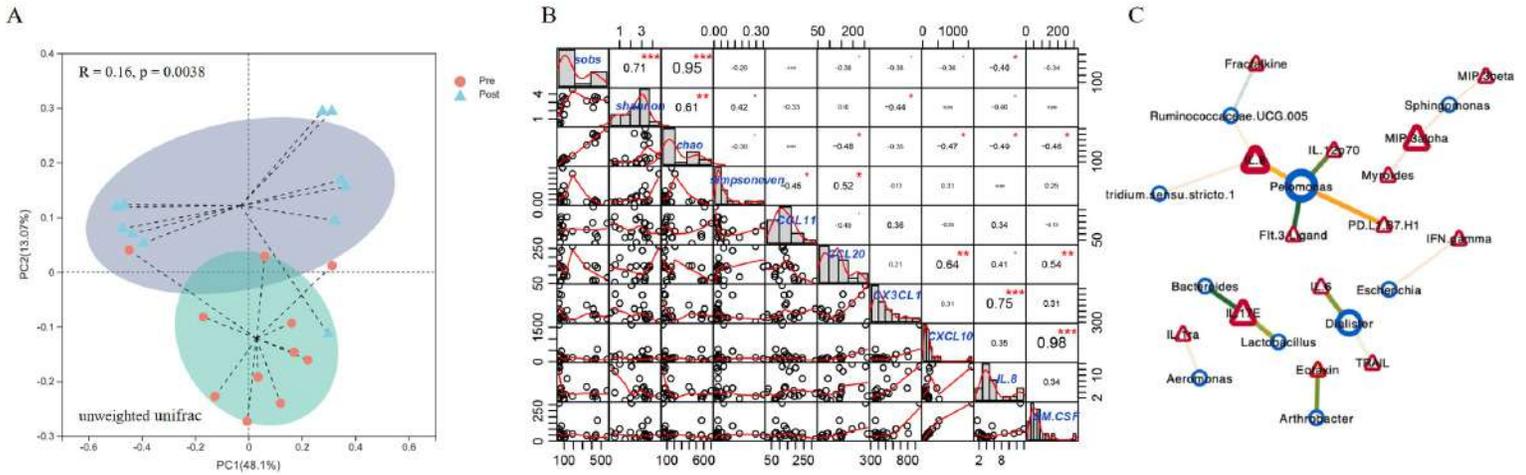
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**Objectives:** The efficacy of immunotherapy for advanced gastric cancer is limited without effective efficacy predictors. Blood microbiome DNA (bmDNA) can reflect the translocation of systemic microorganisms, which can be used for tumor diagnosis and prediction of curative effect. However, there is no research report on the predictive value of bmDNA and cytokines in gastric cancer immunotherapy.

**Methods:** The study prospectively collected baseline and dynamic sequence blood samples of 11 patients who were diagnosed advanced gastric cancer with PD-1 combined with chemotherapy. Peripheral blood mononuclear cells (PBMC) were used for bmDNA detection by 16S rRNA sequencing to compare the differences of bmDNA before and after PD-1 immunotherapy and to analyze the correlation between the diversity of bmDNA and the efficacy of PD-1 immunotherapy. Plasma were used for cytokines detection by using the Luminex technology to analyze the correlation between the immunotherapy efficacy and cytokines and between bmDNA diversity and cytokines.

**Results:** Firmicutes or Proteobacteria is the dominant bmDNA of patients. The decrease abundance of the Ruminococcaceae.UCG.005 is related to the increase in Interleukin-8 (IL-8). The high levels of IL-8 is related to short PFS. There was significant difference in the bmDNA diversity before and after PD-1 immunotherapy with the diversity of bmDNA decreased after treatment. The baseline diversity of bmDNA is higher in patients with long PFS than in patients with short PFS and the diversity in patients with long PFS is higher than that in patients with short PFS after treatment. Cytokines that are related to the bmDNA are CCL11, CCL20, CXCL1, IL-8, GM-CSF. Bacteria that are most widely related to cytokines are *Pelomonas*, *Enhydrobacter*, *Vibrio*. The cytokines that related to bmDNA are IL8, CCL11.

**Image:**



A: PCoA on OTU level of unweighted unifracs for the blood microbiome before (pre) and after (post) PD-1 immunotherapy.  
 B: Correlation matrix plot with significance levels between alpha-diversity index of blood microbiome and cytokines. The upper triangular matrix shows the Pearson correlation plus significance level (as stars). Each significance level is associated to a symbol: p-values 0.001 (\*\*\*), 0.01 (\*\*), 0.05 (\*).  
 C: Network diagram of blood cytokines (red nodes) and bacterial genus (blue nodes). The orange and green edges represent the positive ( $r > 0.3$ ) or negative ( $r < -0.3$ ) correlations.

**Conclusions:** There are bmDNA in the blood of advanced gastric tumor patients. The diversity and abundance of bmDNA of key bacteria or IL-8 may be effective biomarkers for PD-1 treatment of gastric cancer.

***Novel drugs, targeted therapy, and immunotherapy***

IGCC22-ABS-1068

**COMBINATION IMMUNOTHERAPY BY STROMAL REMODELING IN SCIRRHOUS GASTRIC CANCER**

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**Objectives:** Scirrhous gastric cancer (GC) contains excessive stroma and cancer-associated fibroblasts (CAFs) enhancing cancer progression through remodeling the tumor microenvironment. Although we demonstrated TGF $\beta$  signaling activation in scirrhous gastric cancer (GC) CAFs by comprehensive genomic analysis, understanding of scirrhous GC stroma was still insufficient.

**Methods:** We first examined the significance of PDGF ligands in 338 GC tissues. Gene expression change in human CAFs stimulated by PDGF ligands was examined by RNA sequencing. Mouse GC cell line (KP cells) was generated from genetically engineering GC mouse model to address the role of CAFs in immune microenvironment. Moreover, scirrhous GC syngeneic mouse model harboring severe fibrosis was developed by serial transplantation of KP cells.

**Results:** Here we identified the interaction between TGF $\beta$  and PDGF signaling are critical for forming immunosuppressive tumor microenvironment in scirrhous GC. We demonstrated the expression of PDGF ligands are significantly associated with poor prognosis in GC patients. CAFs stimulated by PDGF ligands remarkably increased the growth and the expression of CXCL2, 3, 5 and 8 involving myeloid derived suppressor cell (MDSC) recruitment by RNA sequencing. Notably, we found the decrease of tumor infiltrating lymphocytes and Gr-MDSC accumulation by flow cytometry in serial transplanted KP tumors. Lastly, we showed the synergistic effect of anti-PD-1 antibody and PDGFR blockade through remodeling of immune microenvironment in the mouse model.

**Conclusions:** These findings highlight the evidence of combination immunotherapy for remodeling of immune microenvironment in scirrhous GC.

*Novel drugs, targeted therapy, and immunotherapy*

IGCC22-ABS-1167

**SAFETY AND EFFICACY OF CAMRELIZUMAB IN COMBINATION WITH NAB-PACLITAXEL PLUS S-1 FOR GASTRIC CANCER**

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**Objectives:** To investigate the safety and efficacy of camrelizumab in combination with nab-paclitaxel plus S-1 for the treatment of gastric cancer with serosal invasion.

**Methods:** 200 patients with gastric cancer with serosal invasion who received neoadjuvant therapy from January 2012 to December 2020 were retrospectively analyzed. According to the different neoadjuvant therapy regimens, the patients were divided into the following three groups: the SOX group (S-1 + oxaliplatin) (72 patients), SAP group (S-1 + nab-paclitaxel) (95 patients) and C-SAP group (camrelizumab + S-1 + nab-paclitaxel) (33 patients).

**Results:** The pathological response (TRG 1a/1b) in the C-SAP group (39.4%) was not significantly different from that in the SAP group (26.3%) and was significantly higher than that in the SOX group (18.1%). The rate of ypT0 in the C-SAP group (24.2%) was higher than that in the SAP group (6.3%) and SOX group (5.6%). The rate of ypN0 in the C-SAP group (66.7%) was also higher than that in the SAP group (38.9%) and SOX group (36.1%). The rate of pCR in the C-SAP group (21.2%) was higher than that in the SAP group (5.3%) and SOX group (2.8%). The use of an anti-PD-1 monoclonal antibody was an independent protective factor for TRG grade (1a/1b). The use of camrelizumab did not increase postoperative complications or the adverse effects of neoadjuvant therapy.

**Conclusions:** Camrelizumab combined with nab-paclitaxel plus S-1 can significantly improve the rate of tumor regression grade (TRG 1a/1b) and the rate of pCR in gastric cancer with serosal invasion.

*Novel drugs, targeted therapy, and immunotherapy*

IGCC22-ABS-1356

## **BATF2 INDUCES THE M1 POLARIZATION OF MACROPHAGES BY ACTIVATING LIQUID-LIQUID PHASE SEPARATION**

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**Objectives:** This project is expected to clarify the key role of BATF2 in the process of M1 type polarization of macrophages, to provide a sufficient scientific basis for the establishment of BATF2 as a new clinical target for enhanced gastric cancer immunotherapy.

**Methods:** This project was carried through the combination of in vitro and in vivo studies in an interdisciplinary system such as molecular biology and biophysics.

**Results:** Our research shows that BATF2 can regulate the transcriptional expression of M1-type polarization-related genes by activating the transcription factor activity of c-Jun. This is completely contrary to previous reports that BATF2 inhibits c-Jun transcription factor activity in tumors. To clarify the key role of BATF2 in activating the transcription factor activity of c-JUN, we first noticed that there were a lot of intrinsically disordered regions in the amino acid sequence of BATF2 by structural biology analysis. The presence of disordered domains often prevents proteins from forming stable tertiary structures, but they are usually closely related to the protein phase transition. Further investigation proved that the high aggregation of BATF2 could form phase separation, which did not interfere with c-Jun expression but affected the transcriptional regulation of c-Jun on M1-type polarization-related genes in downstream macrophages. Mechanism research showed that BATF2 protein could form phase separation droplets in the nucleus after high aggregation, which activated c-Jun transcription ability and promoted the transcription of its downstream genes through the recruitment of transcription cofactor IRF1.

**Conclusions:** We proposed that BATF2 protein aggregation induces transcription cofactor IRF1 through liquid-liquid separation, activates the transcription activity of c-JUN, regulates the transcription of downstream macrophage M1 polarization-related genes, and enhances its anti-tumor immune effect.

***Novel drugs, targeted therapy, and immunotherapy***

IGCC22-ABS-1447

**PEMBROLIZUMAB AS A NEW PARADIGMA IN LOCALLY ADVANCED GASTRIC CANCER. OUR EXPERIENCE**

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**Objectives:** The aim of this study si to present the use of Pembrolizumab as an off-label neoadjuvant treatment in locally advanced gastric cancer (LAGC) with a complete pathological response.

**Methods:** A 66-year-old man, with no relevant personal history, presented a neoplasm located in an antrum compatible with intestinal-type gastric adenocarcinoma. As an extension study, a CT scan and endoscopic ultrasound were performed, which showed locoregional lymphadenopathies suspected of malignancy. A staging laparoscopy without data on peritoneal carcinomaosis and with negative cytology was performed. We decided to start neoadjuvant therapy according to FLOT scheme, but tumor progression was evidenced in a control CT scan after two cycles of chemotherapy. In the complementary immunohistochemical study, the result was positive for MSI-H and negative for HER2, so treatment with Pembrolizumab was started. After the treatment, and with a control CT scan in which a complete response was observed, a surgical intervention was decided: laparoscopic subtotal gastrectomy. Pathological anatomy: pTisN0. After 15 months of follow-up, he had not presented tumor recurrence.

**Results:** Although FLOT chemotherapy (with HER2-positive trastuzumab) as first-line therapy is the standard treatment for LAGC, the prognosis remains poor, and the median survival is around 1 year.

Pembrolizumab is an anti-PD-1 monoclonal antibody approved for the treatment of LAGC PD-L1 positive in the United States. In Japan it is recommended as a second-line treatment for patients with MSI-H (microsatellite instability-high) or MMR-D (mismatch repair deficient), which is identified in up to 6% of these patients.

**Conclusions:** The development of immunotherapy has led to a paradigm shift in the treatment of LAGC. Its efficacy as first and second line therapy is currently being studied. In recent studies in patients with LAGC (MSI-H or MMR-D), treatment with Pembrolizumab has shown good results.

*Economic burden of GC and treatment in different healthcare systems*

IGCC22-ABS-1366

**NATIONAL CANCER SCREENING PROGRAM FOR GASTRIC CANCER IN KOREA: NATIONWIDE TREATMENT BENEFIT AND COST**

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**Objectives:** The purpose of this study was to evaluate the nationwide benefit and cost of the National Cancer Screening Program (NCSP) for gastric cancer treatment.

**Methods:** As a nationwide population-based study, we restructured the Korean National Health Insurance Big Data Base, which includes gastric cancer-related treatment information and the costs for all gastric cancer patients aged 40 years and older between 2004 and 2013. Gastric cancer patients who participated in the NCSP at least once (screening group) were compared to those who did not participate in the NCSP (nonscreening group).

**Results:** The screening group (n=116,775) spent significantly less on medical care expenses than did the nonscreening group (n=74,927) during 5 years since the initial treatment ( $P<0.0001$ ). The screening group presented a significantly better prognosis for 5 and 9 years than that of the nonscreening group ( $P<0.0001$ ). The screening group revealed a 41% decreased hazard ratio ( $P<0.0001$ ) for death compared with that of the nonscreening group; the prognostic benefit became more obvious when treatment was started within 4 months after screening. The age-standardized mortality rate ratio of the screening group compared to the nonscreening group was 0.62 ( $P<0.0001$ ). The NCSP for gastric cancer required an average of 22,169,769 KRW (20,309 USD) to increase 1 life-year saved, which was less than the average GDP per capita in Korea.

**Conclusions:** The screening group required significantly lower medical care expenses and showed a significantly better prognosis than that of the nonscreening group. Considering GDP per capita, the NCSP for gastric cancer on treatment prognosis was cost-effective.

## ***Economic burden of GC and treatment in different healthcare systems***

IGCC22-ABS-1293

### **TWO DECADES OF GASTRIC CANCER SCREENING IN WESTERN HONDURAS AND THE EFFECTS OF COVID-19 OUTBREAK.**

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**Objectives:** Gastric cancer (GC) is the third cause of cancer mortality, with high incidence in Asia and mountainous Latin America. GC and cervical cancer lead in northern Central America, the “CA-4 region” (Guat, ES, Hond, Nica; pop >40M). Honduras has among the highest incidence rates in the western hemisphere (ASIR 30.8, 13.9). We report the two-decade summary (2002-21) of the Western Honduras GC program, one of the largest population-based case-control studies in Latin America, and including the Covid-19 pandemic period.

**Methods:** Incident cases were prospectively enrolled at the Western Hospital, the district hospital (referral pop 1.1M). *H. pylori* and CagA serostatus were determined by ELISA and DKFZ multiplex assay.

**Results:** 1096 GC cases were diagnosed, 94.1% non-cardia, median age of 65 (IQR 55, 74), 66.3% males, and a majority agriculture workers (51.5%). Pyloric obstruction and Borrmann classification were a proxy for advanced disease: 32.7% with incomplete (14.3%) or complete (18.4%) pyloric obstruction and 75.0% with Borrmann type III. Subtypes were intestinal (44.5%) and diffuse (38.2%). Diffuse patients were younger, median age 63 (IQR 53, 72) vs 67 years (IQR 57, 75), p-value <0.001. Premalignant lesions were noted in 24.7% of cancer-negative endoscopies. Intestinal metaplasia (GIM) was most common (10.4%), of which 67% were incomplete, noted in younger subjects (median 55, IQR 46-64.5). Positive *H. pylori* in histology noted in 73.2% of cancers, and positive ELISA in 90.0% overall. CagA was positive in 92% of GC and 78% of controls (subset of n=1426). During COVID-19 pandemic endoscopy utilization rate was reduced by 90% with very few incident GC cases.

**Image:**

**Table 1. Table of general characteristics**

	n (%)
<b>N</b>	3163
<b>Age, median (IQR)</b>	56 (44, 68)
<b>Age Category</b>	
Younger than 45	800 (25.4%)
45-54	676 (21.5%)
55-64	694 (22.1%)
65-74	533 (17.0%)
75 and Older	441 (14.0%)
<b>Sex</b>	
Female	1466 (46.5%)
Male	1688 (53.5%)
<b>Diagnosis</b>	
<b>Controls</b>	
Endoscopy Negative	785 (37.9%)
NAG	717 (34.7%)
Atrophic Gastritis	104 (5.0%)
Intestinal Metaplasia	228 (11.0%)
Complete	90 (38.6%)
Incomplete	143 (61.4%)
Dysplasia	15 (0.7%)
Benign Ulcer	167 (8.3%)
<b>Cases</b>	
Adenocarcinoma	1096 (100.0%)
Intestinal	475 (44.5%)
Diffuse	408 (38.2%)
Mixed	184 (17.2%)
<b>Gastric Cancer Site</b>	
Cardia	65 (5.9%)
No Cardia	1030 (94.1%)
<b>Anatomic Subsite</b>	
Pylorus	38 (3.5%)
Pyloric Antrum	744 (68.0%)
Incisura	292 (26.7%)
Corpus	3 (0.3%)
NOS	12 (1.1%)
<b>Pyloric Syndrome</b>	
No obstruction	738 (67.3%)
Incomplete Pyloric Obstruction	157 (14.3%)
Complete Pyloric Obstruction	201 (18.4%)

**Conclusions:** GC is a leading cancer in Honduras, most presenting with advanced disease. The diffuse subtype and premalignant conditions, primarily incomplete GIM, are common in younger patients. COVID-19 has significantly impacted endoscopy programs in resource limited settings.

*Economic burden of GC and treatment in different healthcare systems*

IGCC22-ABS-1469

**OUTCOMES OF TREATMENT OF GASTRIC CANCER: REAL-WORLD DATA FROM A TERTIARY CANCER CENTRE IN INDIA**

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**Objectives:** Real world data on the long-term oncological outcomes of treatment of gastric cancer from low-middle income countries is scarce. We aimed to analyse the oncological outcomes after curative treatment for gastric cancer in India

**Methods:** Analysis of a prospectively maintained database of patients with gastric and gastro-esophageal junction (GEJ) cancer treated at a tertiary cancer centre in India, a low-middle income country between 2007 and 2018. All patients with adenocarcinoma of the stomach who underwent surgery with a curative intent were included in the study.

**Results:** Of the 1718 patients with gastric and GEJ tumors treated in this time period, 514 gastric cancer patients were included in this study. The median age of the patients was 56 years (range 18-84) and there was a male preponderance (73%). A D2 dissection was performed in 87% of patients. Peri-operative or only adjuvant chemotherapy was given to 28% and 34% patients respectively while 38% received no chemotherapy. The proportion of T3, T4a, N0 and N3 tumors in patients who underwent upfront surgery or received peri-operative chemotherapy was 11%, 68%, 23%, 42.5% and 35%, 29%, 39%, 25% respectively. Loco-regional, peritoneal, distant or combined recurrence as the first site of recurrence was observed in 5%, 12%, 21% and 7% of patients respectively. The 3 and 5-year overall survival was 51.5% and 41.7% respectively. On univariate analysis, factors significantly associated with overall survival were age, gastric outlet obstruction,  $\geq$ pT3, grade 3, pN stage and  $>$ 3 cycles chemotherapy, whereas only age, N stage, gastric outlet obstruction, grade and no. of chemo cycles retained independent prognostic value on multivariate analysis. **Conclusions:** The real-world oncological outcomes of treatment of gastric cancer in India are worse than that reported in clinical trials from far east Asian countries but comparable to that from the western world. Advanced stage of presentation and biological differences in the patients may account for these observed differences.

*Economic burden of GC and treatment in different healthcare systems*

IGCC22-ABS-1112

**EVALUATION OF GLOBAL OUTCOMES IN GASTRIC CANCER SURGERY: AN INTERNATIONAL PROSPECTIVE COHORT STUDY**

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**Objectives:** We aimed to explore the epidemiology and current state of practice in gastric cancer diagnosis and management globally.

**Methods:** This was a multicentre, international prospective cohort study of patients undergoing surgery for gastric cancer. Primary outcomes were death or major complications (Clavien-Dindo III/IV) within 30 days of surgery. Quality metric analyses against National Institution for Clinical Excellence (NICE) and American College of Surgeons (ACS) guidelines were limited to patients with adenocarcinoma receiving an elective procedure with curative intent. Multilevel logistic regression analyses including patient and disease factors were used to evaluate impact of quality metrics on outcomes.

**Results:** This analysis included 890 patients from 209 hospitals in 82 countries. 87.9% of patients were diagnosed following symptomatic presentation. The proportion of patients undergoing emergency operations doubled in low and middle income countries (LMICs) compared to high income countries (HICs) (10.7% vs 4.2%), as did those operated on with palliative intent (21.1% vs 11.1%). Most patients underwent endoscopy (98.3%, N = 875) and biopsy (96%, N = 854). Levels were lower for D2 resection (LMICs: 62%, N = 119; HICs: 68.8%, N = 339) and neoadjuvant chemotherapy (LMICs: 28%, N = 374; HICs: 28.9%, N = 363). Few patients across all income levels underwent staging laparoscopy (28%, N = 249). 30-day mortality was significantly higher in low or lower-middle income countries (adjusted odds ratio 3.72, 95% CI 1.70-8.16).

**Conclusions:** Global practice appeared closely aligned to Western quality standards for diagnosis but there was variability in staging and treatment, particularly in LMICs.

*Economic burden of GC and treatment in different healthcare systems*

IGCC22-ABS-1274

**CHARACTERISTICS AND IN-HOSPITAL OUTCOMES OF GASTRIC CANCER PATIENTS ≥65 YEARS IN A HOSPITAL IN CHINA**

Lei Huang<sup>\*</sup> 1, Yan Shi<sup>1</sup>, Weiguo Hu<sup>2</sup>, Jun Zhang<sup>1</sup>

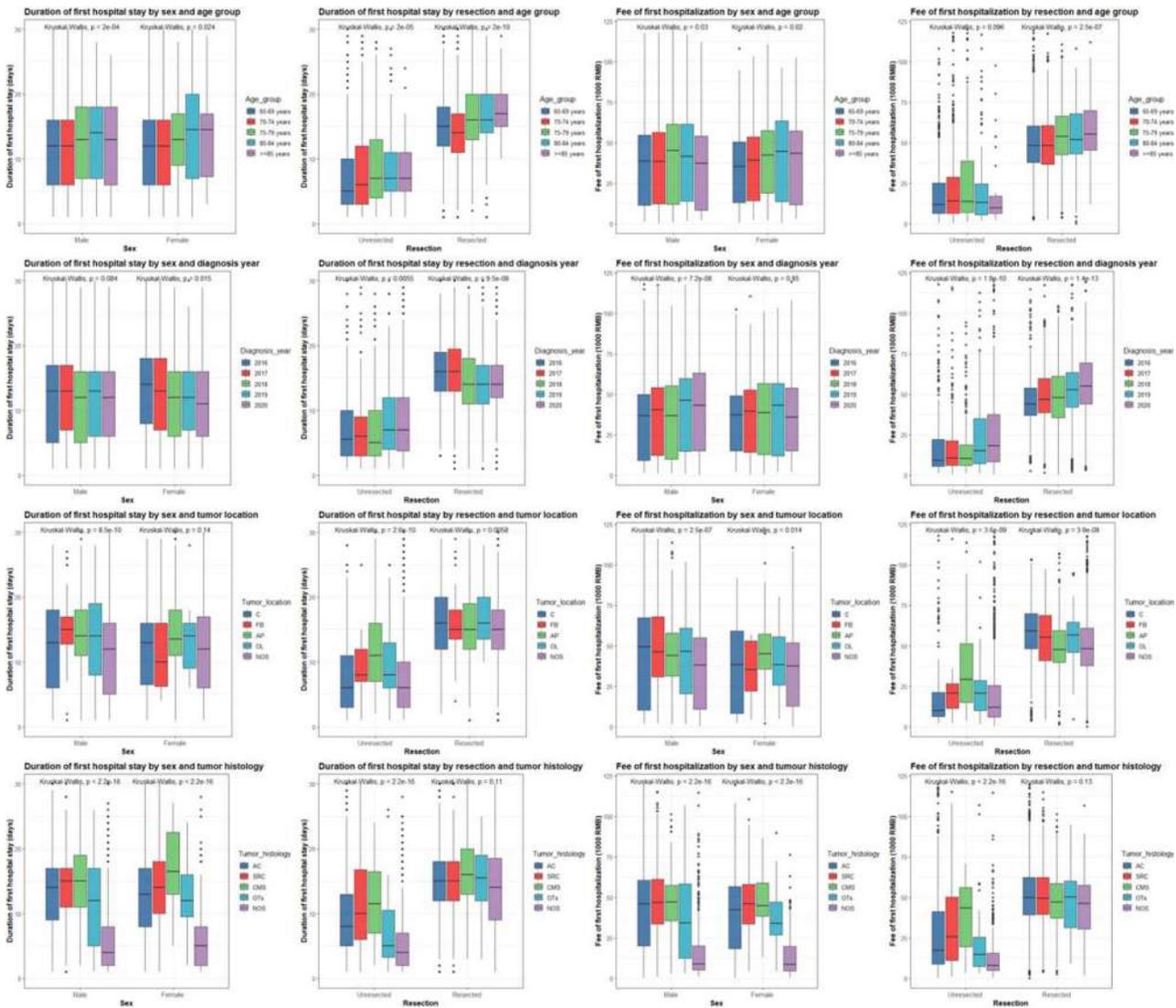
<sup>1</sup>Department of Oncology, <sup>2</sup>Medical Center on Aging; Department of Geriatrics, Ruijin Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China

**Objectives:** To describe the features and in-hospital outcomes and explore factors associated with duration and fee of hospitalization in older patients with gastric cancer (GC) admitted to a hospital in China.

**Methods:** Data on hospitalized GC patients ≥65 years were retrieved from the electronic medical records of Ruijin Hospital, Shanghai Jiao Tong University School of Medicine. Patient and tumor characteristics were compared between males and females and between unresected and resected cases. Factors associated with duration and fee of first hospitalization were explored using multivariable logistic regression.

**Results:** 3238 eligible patients were analyzed. The median duration and fee of first hospitalization were 13 days and 40,000 RMB, respectively. 16 (<1%) and 32 (1%) deaths occurred during first and any hospitalization, respectively. Compared to males, females had more often signet ring cell carcinoma (SRC), reduced food intake, resection in our hospital, and history of major abdominal surgery. Compared to unresected cases, resected ones were more often enrolled via emergency pathway, and had higher BMI and Barthel indexes, less often reduced food intake, weight loss, and malnutrition risk, longer hospital stay, and higher fee. Multivariable analyses showed that: Longer first hospital stay was associated with older ages, emergency admission, SRC, resection, history of anticoagulant intake, larger body mass index, and non-common, non-low-salt, and non-diabetes diets; higher fee of first hospitalization was associated with male sex, older ages, emergency admission, SRC, and resection. Fee was significantly correlated with duration ( $r=0.811$ ).

**Image:**



**Conclusions:** While with frequent and complex conditions, older GC patients had good in-hospital outcomes in our hospital. Various differences existed between male and female patients and between unresected and resected cases, and various factors were associated with duration and fee of first hospitalization, highlighting the need of individualized and stratified care.

*Economic burden of GC and treatment in different healthcare systems*

IGCC22-ABS-1341

**OVERVIEW OF THE TREATMENT OF GASTRIC CANCER IN BRAZIL: A MULTI-INSTITUTIONAL PROSPECTIVE STUDY**

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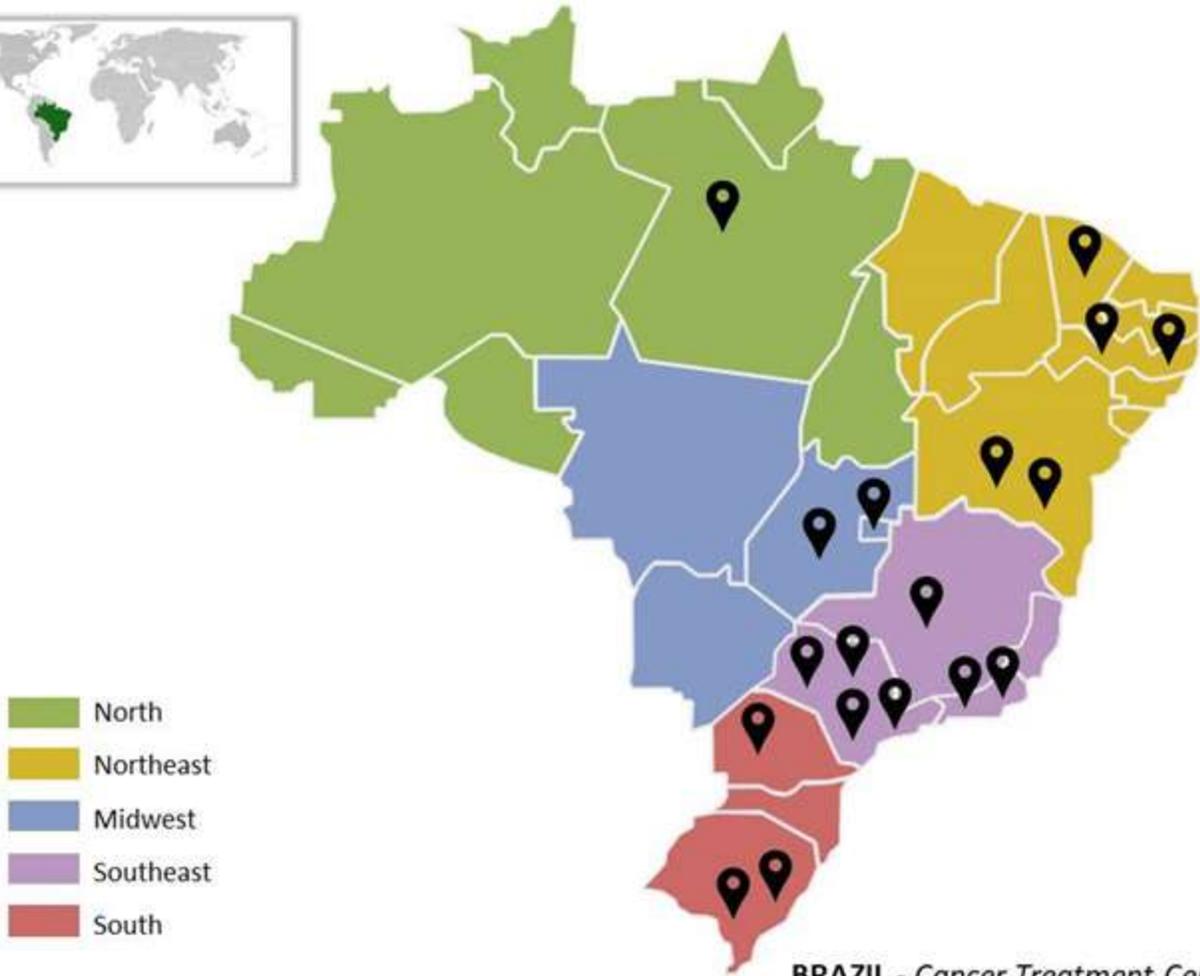
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**Objectives:** The aim of this study is to assess the surgical treatment of gastric cancer (GC) in Brazil, including patients' characteristics and the treatment modality used in different regions of the country. This project was development by the Brazilian Gastric Cancer Association to attempt to establish a major national registry of GC. This report describes the initial phase of the database project implementation.

**Methods:** Multidisciplinary Institutions dedicated to treatment, educational and research of cancer from different regions across Brazil were invited to participate. Patient data will be prospectively collected over a period of one year, according to the following inclusion criteria: (1) diagnosis of gastric adenocarcinoma, (2) performance of any surgical procedure related to the treatment of GC. The GC surgery database was constructed using the REDCap software.

**Results:** A total of 18 centers were included. Four (22.2%) centers are private institutions, and the remaining are public Hospitals (77.8%). According to geographical location, 7 (38.9%) centers are in the Southeast, 5 (27.8%) in the Northeast, 3 (16.7%) in the South, 2 (11.1%) from Midwest and 1 (5.6%) in the North of Brazil. Establishment of database proceeded in four stages: 1) Standardization of variables; 2) Implementation of institutional REDCap software; 3) Development of data collection forms; 4) Expansion of registration to other centers using REDCap software. After a pilot project with the inclusion of 5 patients from each center to verify the functionality of the template and data sharing, the final database was composed of 7 forms and 71 variables (fields). The prospective collection began on July 1, 2021.

**Image:**



**BRAZIL - Cancer Treatment Centers**

**Conclusions:** The design and implementation of the first national multi-institutional prospective study of cancer treatment was successfully carried out. It is expected that in the second half of 2022 the first results will be available, providing an overview of GC treatment in western centers.

*Survivorship, Supportive and Palliative care, Nutrition, Quality-of-life*

IGCC22-ABS-1446

**DEVELOPMENT AND VALIDATION OF QUALITY OF LIFE QUESTIONNAIRE (KOQUSS-40) FOR GASTRIC CANCER PATIENTS**

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**Objectives:** Gastric cancer patients who undergo gastric surgery have unique symptoms that are not appropriately assessed using currently available tools. The aim of this study was to develop and validate a symptom-focused quality of life (QoL) questionnaire for patients with gastric cancer who received gastrectomy.

**Methods:** Literature review, patient interviews and expert consultation by the Korean Quality of life in Stomach cancer patients Study group (KOQUSS) developed the initial item pool. Two large scale developmental studies were then sequentially conducted for exploratory factor analyses for content validity and item reduction. The final item pool was then validated in a separate cohort of patients, and assessed for its internal consistency, test-retest reliability, construct validity, and clinical validity.

**Results:** The initial item pool consisted of 46-items in 12 domains. Data from 465 patients at 11 institutions, followed by 499 patients at 13 institutions, were used to conduct item reduction and exploratory factor analyses. The final questionnaire (KOQUSS-40) comprised 40 items within 11 domains. Validation of KOQUSS-40 was conducted on 413 patients from 12 hospitals. KOQUSS-40 was found to have good model fit. The mean summary score of the KOQUSS-40 correlated with EORTC QLQ-C30 and STO22 (correlation coefficients: 0.821 and 0.778, respectively). The KOQUSS-40 score correlated with clinical factors, such as weight loss and surgical extent, and had acceptable internal consistency (> 0.7). Test-retest reliability for the overall scale was greater than 0.8.

**Conclusions:** The KOQUSS-40 can be used to assess QOL in gastric cancer patients after gastrectomy and will allow for the robust comparison of surgical technique in clinical trials.

## Survivorship, Supportive and Palliative care, Nutrition, Quality-of-life

IGCC22-ABS-1254

# RESIDENCE AREA WAS A SIGNIFICANT PROGNOSTIC FACTOR FOR ELDERLY GASTRIC CANCER PATIENTS IN CHINA

Xiaodong Chen\*<sup>1</sup>

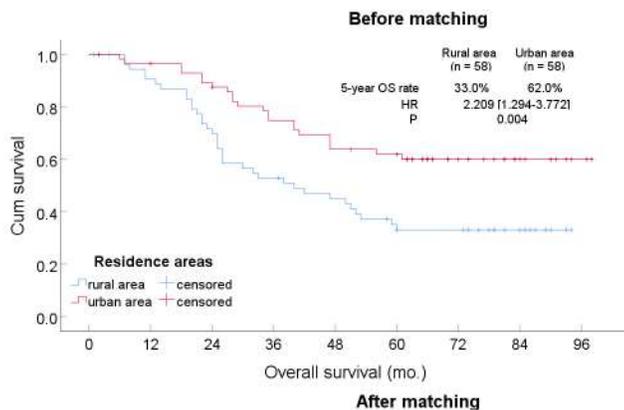
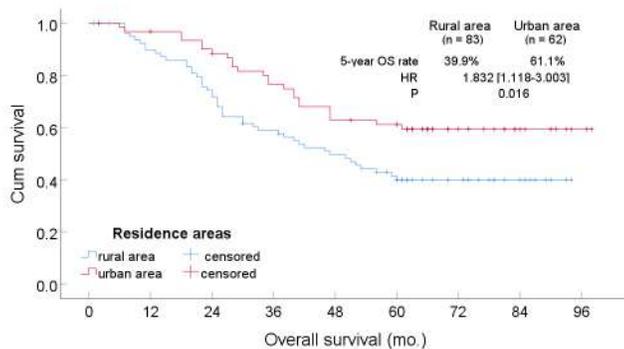
<sup>1</sup>Gastrointestinal Surgery, Sichuan Cancer Hospital, Chengdu, China

**Objectives:** The study analyzed clinicopathological features and overall survival (OS) of elderly ( $\geq 60$  years) gastric cancer (GC) patients in Southwest China to identify prognostic factors.

**Methods:** A retrospective analysis was performed in elderly GC patients with M0 disease and R0 resection using Kaplan-Meier analysis and Cox regression. According to residence areas, the patients were allocated to rural group ( $n = 83$ ) and urban group ( $n = 62$ ). Clinicopathological features and overall survival were compared between rural and urban areas. Propensity score matching (PSM) was undertaken to control for possible confounders.

**Results:** A total of 145 consecutive patients including 120 males, with a median age 66.0 years (range 60-78 years), were analyzed. The 5-year OS rate was 49.2% and median OS was 60.0 months. Kaplan-Meier analysis identified residence area, albumin, type of gastrectomy, macroscopic type, lymphovenous invasion, neural invasion, pT, pN, pTNM and adjuvant chemotherapy as prognostic factors; however, only residence area, pT, pN and adjuvant chemotherapy were identified in multivariate Cox regression. After PSM, 116 patients were included, with 58 in each group. Kaplan-Meier analysis identified residence area, albumin, type of gastrectomy, macroscopic type, neural invasion, pT, pN, pTNM and adjuvant chemotherapy as prognostic factors; however, only residence area, albumin and macroscopic type were identified in multivariate Cox regression. Rural patients were associated with *significantly worse* OS than urban patients (before matching: HR = 1.832 [1.118-3.003],  $P = 0.016$ ; after matching: HR = 2.209 [1.294-3.772],  $P = 0.004$ ).

**Image:**



**Conclusions:** Residence area was a significant prognostic factor for elderly gastric cancer patients in Southwest China. Special attention should be paid to rural patients to anticipate better prognosis.

*Survivorship, Supportive and Palliative care, Nutrition, Quality-of-life*

IGCC22-ABS-1350

**DIABETES PREDICTION SCORE: PREDICTING ABRUPT DIABETES REMISSION AFTER GASTRIC CANCER SURGERY**

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<sup>1</sup>Foregut Surgery, Korea University College of Medicine, Seoul, <sup>2</sup>College of Pharmacy and Research Institute of Pharmaceutical Sciences, Kyungpook National University, Daegu, <sup>3</sup>Medicine, Korea University College of Medicine, Seoul, <sup>4</sup>Statistics, Daegu University, Gyeongbuk, Korea, Republic Of

**Objectives:** Type 2 diabetes (T2D) care for gastric cancer patients is demanding due to the variable course of T2D after gastrectomy for cancer. Although abrupt T2D remission after gastric cancer surgery has been consistently reported, little is known about predicting postoperative T2D remission.

**Methods:** We used a database provided by the National Health Insurance Service in South Korea, and enrolled 5,150 T2D patients who underwent gastric cancer surgery. Patients were randomly assigned to a training cohort (for statistical model development) (n = 3,546) and a validation cohort (n = 1,604), respectively. T2D remission was assessed at 3 years after gastric cancer surgery. Postoperative T2D remission was defined as discontinuation of diabetes medication for at least 1 year. We developed the diabetes-prediction (DP) score, which predicts postoperative T2D remission using preoperative variables selected by a logistic regression model.

**Results:** The DP score consisted of five parameters (baseline body mass index [ $<25$  or  $\geq 25$  kg/m<sup>2</sup>], surgical procedure [subtotal or total gastrectomy], age [ $<65$  or  $\geq 65$  years], fasting plasma glucose level [ $\leq 130$  or  $>130$  mg/dL], and diabetes medications [combination therapy including sulfonylurea, combination therapy not including sulfonylurea, single sulfonylurea, or single non-sulfonylurea]). The DP score showed useful predictive performance for T2D remission at 3 years postoperatively (training cohort: area under the receiver operating characteristics [AUROC] 0.73, 95% confidence interval [CI], 0.71–0.75; validation cohort: AUROC 0.72, 95% CI, 0.69–0.75)

**Conclusions:** We developed and validated the DP score that is easy to use and enables stratification of gastric cancer patients based on the likelihood of T2D remission post-surgery. We expect our results to help healthcare professionals to provide personalized T2D management for patients undergoing gastric cancer surgery. (This study has been published recently in *Gastric Cancer*.)

*Survivorship, Supportive and Palliative care, Nutrition, Quality-of-life*

IGCC22-ABS-1379

## **GASTROINTESTINAL HORMONES AND HEMODYNAMICS HAVE A ROLE IN DEVELOPMENT OF EARLY DUMPING SYNDROME**

Jun-Young Yang<sup>1, 2</sup>, Hyuk-Joon Lee<sup>1, 3</sup>, Woon Kee Lee<sup>2</sup>, Ji-Hyeon Park<sup>1, 2</sup>, Seong-Ho Kong<sup>1</sup>, Do-Joong Park<sup>1</sup>, Han-Kwang Yang<sup>1, 3</sup>

<sup>1</sup>Department of Surgery, Seoul National University Hospital, Seoul, <sup>2</sup>Department of Surgery, Gachon University Gil Medical Center, Incheon, <sup>3</sup>Cancer Research Institute, Seoul National University College of Medicine, Seoul, Korea, Republic Of

**Objectives:** Early dumping syndrome after gastrectomy has a negative impact on patients' quality of life, of which mechanism, however, is not completely understood. The aim of this study was to analyze gastrointestinal (GI) hormones and hemodynamics for early dumping syndrome in gastrectomized patients.

**Methods:** Forty-two patients who underwent gastrectomy for gastric cancer and 18 controls who had no previous abdominal surgery were enrolled. At baseline and post-prandial 20 mins after liquid meal (400 kcal) ingestion, blood glucose, insulin, glucagon-like peptide-1 (GLP-1), GLP-2, and vasoactive intestinal peptide (VIP) concentrations and superior mesenteric artery (SMA) and renal blood flow were measured. During 20 mins, heart rates were recorded at 5-min intervals. The questionnaire investigations were performed for all patients and controls using Sigstad's clinical diagnostic index.

**Results:** Blood glucose, insulin, GLP-1, and GLP-2 levels, SMA blood flow, renal resistive index and heart rate was increased significantly greater in patients who underwent gastrectomy than in controls (all  $p < 0.010$ ). Within patients who underwent gastrectomy, those after total gastrectomy demonstrated greater postprandial responses in blood glucose ( $p < 0.001$ ), GLP-1 ( $p = 0.025$ ), GLP-2 ( $p = 0.001$ ), and heart rate ( $p = 0.016$ ) than those after distal gastrectomy. Sigstad clinical diagnostic index for early dumping syndrome was also significantly higher in total gastrectomy than in distal gastrectomy (hazard ratio 0.076, 95% confidence interval 0.011–0.531;  $p = 0.009$ ).

**Conclusions:** In gastrectomized patients, GI hormone and blood flow responses after meal ingestion were more prominently enhanced than in controls, especially after total gastrectomy. This suggests that post-prandial humoral and hemodynamic responses have a role in the development of early dumping syndrome.

*Survivorship, Supportive and Palliative care, Nutrition, Quality-of-life*

IGCC22-ABS-1268

**LONG-TERM OUTCOMES OF ELDERLY PATIENTS WITH GASTRIC CANCER UNDERWENT CURATIVE MULTIMODAL TREATMENTS**

Jacopo Desiderio<sup>1</sup>, Andrea Sagnotta<sup>2</sup>, Irene Terrenato<sup>3</sup>, Eleonora Garofoli<sup>4</sup>, Claudia Mosillo<sup>4</sup>, Ilenia Grandone<sup>5</sup>, Federico Tozzi<sup>6</sup>, Stefano Trastulli<sup>1</sup>, Federica Arteritano<sup>7</sup>, Sergio Bracarda<sup>8</sup>, Amilcare Parisi<sup>1</sup>

<sup>1</sup>Digestive Surgery, St. Mary's Hospital, Terni, <sup>2</sup>General surgery and surgical oncology, San Filippo Neri Hospital, <sup>3</sup>Biostatistics and Bioinformatic Unit, Scientific Direction, IRCCS Regina Elena National Cancer Institute, Rome, <sup>4</sup>Medical oncology, St. Mary's Hospital, <sup>5</sup>Clinical nutrition and dietetics, St. Mary's Hospital, Terni, Italy, <sup>6</sup>surgical oncology and endocrine surgery, Mays Cancer Center, University of Texas Health Science Center San Antonio, San Antonio, United States, <sup>7</sup>Digestive surgery, St. Mary's Hospital, <sup>8</sup>Medical oncology, St. Mary's Hospital, Terni, Italy

**Objectives:** This study investigates the effect of curative treatments for non-metastatic gastric cancer in the elderly. A comparison with the young population was also considered.

**Methods:** Patients were identified from the SEER database. Those underwent gastrectomy with stage I–III gastric cancer were considered for inclusion. Five groups were compared. They were Non-elderly patients (NEG, <65yo), Elderly (EG, 65-74yo), Middle old (MG, 75-84yo) and oldest old (OG, ≥85yo). The main outcomes were overall survival (OS) and cancer-specific survival. Data were analyzed by the Kaplan-Meier product-limit method, log-rank test, hazard risk, and Cox proportional univariate and multivariate models.

**Results:** AGC was shown in majority of cases (EG=72%, MG=72%, OG=75%). Patients underwent mainly a partial gastrectomy (EG=75%, MG=80%, OG=87%). In the EG 48% of patients received a multimodal treatment while this rate decreased proportionally in the MG (28%) and in the OG (9%).

The univariate analysis showed that variables related to survival in all groups were: sex, stage, race, tumor location, grading, histology.

Among those the multivariate analysis showed that favorable prognostic factors were: female sex (EG: HR=0.92, 95%CI:0.85-0.99, p=0.027; MG: HR=0.83, 95%CI:0.77-0.89, p<0.001; OG: HR=0.88, 95%CI:0.79-0.98, p=0.021) and stage I (reference value) in all groups; asian race (EG: HR=0.77, 95%CI:0.70-0.85, p<0.001; MG: HR=0.74, 95%CI:0.68-0.81, p<0.001) and intestinal type (EG: HR=0.91, 95%CI:0.82-1.01, p=0.088; MG: HR=0.88, 95%CI:0.80-0.96, p=0.004) in the EG and MG, tumor located in the antrum/pylorus in the OG (HR=0.78, 95%CI:0.67-0.92, p=0.003).

**Conclusions:** The elderly has not to be considered as an absolute limiting factor to potentially curative treatments.

The possibility to benefit more from multimodal treatments is undoubtedly shown in patients with age <75yo, however even with surgery alone, selected oldest old patients can obtain a prolonged survival.

*Survivorship, Supportive and Palliative care, Nutrition, Quality-of-life*

IGCC22-ABS-1298

## **PREOPERATIVE PROGNOSTIC NUTRITIONAL INDEX AND GASTRIC CANCER**

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<sup>1</sup>General Surgery, University of Health Sciences izmir, Faculty of Medicine, <sup>2</sup>General Surgery, University of Health Sciences Turkey, İzmir Bozyaka Health Practice and Research Center, İzmir, Turkey

**Objectives:** The preoperative nutritional index (PNI) is used to evaluate the nutritional status and predict the severity of the disease in cancer patients. we aimed to investigate the effect of PNI on complications and survival in our series.

**Methods:** Cases who were operated for non-metastatic gastric cancer by a single team in our clinic and operated for gastric and esophagogastric junction tumors were included. PNI was calculated with the formula albumin (g/L) + 5 x total lymphocyte count (10<sup>9</sup>/L). Complication development was done according to "Clavien Dindo". Cut off value was calculated for PNI. Below this value was grouped as group I, above were group II.

**Results:** Seventy nine cases were included in our study. The cut-off value was calculated as 44.95 according to the PNI complication. At this value, the sensitivity and specificity were calculated as 64.7 and 65.5, respectively. Our complication rates were 21.5%. There was no difference between the groups in terms of complication rates, operation times, number of lymph nodes removed, body mass index, ASA, gender, disease stage, vascular invasion, perineural invasion, lymphovascular invasion ( $p>0.05$ ). The mean age of the group with low PNI value was significantly higher ( $P:0.001$ ). PNI was not significant in overall survival, 1-year survival and 2-year survival ( $p>0.05$ ).

**Conclusions:** In our series, the Prognostic Nutrition index was not found to be effective in predicting the development of complications and survival in gastric and esophagogastric junction tumors.

*Survivorship, Supportive and Palliative care, Nutrition, Quality-of-life*

IGCC22-ABS-1347

**SURVIVAL RATES AND QUALITY OF LIFE ACCORDING TO THE FOLLOW-UP INTENSITIES; MULTICENTER RCT TRIAL**

Bangwool Eom<sup>\*1</sup>, Dong-Hoe Koo<sup>2</sup>, Ji Yeong An<sup>3</sup>, Han Hong Lee<sup>4</sup>, Hyoung-Il Kim<sup>5</sup>, Hoon Hur<sup>6</sup>, Moon-Won Yoo<sup>7</sup>, Min-Hee Ryu<sup>8</sup>, Hyuk-Joon Lee<sup>9</sup>, Su Mi Kim<sup>10</sup>, Ji-Ho Park<sup>11</sup>, Jae Seok Min<sup>12</sup>, Kyung Won Seo<sup>13</sup>, Sang-Ho Jeong<sup>14</sup>, Oh Jeong<sup>15</sup>, Oh Kyoung Kwon<sup>16</sup>, Seung Wan Ryu<sup>17</sup>, Chang Hak Yoo<sup>18</sup>, Jae Moon Bae<sup>3</sup>, Keun Won Ryu<sup>1</sup>

<sup>1</sup>Center for Gastric Cancer, National Cancer Center, Goyang, <sup>2</sup>Department of Internal Medicine, Kangbuk Samsung Hospital, <sup>3</sup>Department of Surgery, Samsung Medical Center, <sup>4</sup>Department of Surgery, Seoul St. Mary's Hospital, <sup>5</sup>Department of Surgery, Yonsei University Severance Hospital, Seoul, <sup>6</sup>Department of Surgery, Ajou University Hospital, Suwon, <sup>7</sup>Department of Surgery, <sup>8</sup>Department of Oncology, Asan Medical Center, <sup>9</sup>Department of Surgery and Cancer Research Institute, Seoul National University Hospital, Seoul, <sup>10</sup>Department of Surgery, CHA Bundang Medical Center, Seongnam, <sup>11</sup>Department of Surgery, Gyeongsang National University Hospital, Jinju, <sup>12</sup>Department of Surgery, Dongnam Institute of Radiological and Medical Sciences, <sup>13</sup>Department of Surgery, Kosin University Gospel Hospital, Busan, <sup>14</sup>Department of Surgery, Gyeongsang National University Changwon Hospital, Jinju, <sup>15</sup>Department of Surgery, Chonnam National University Hwasun Hospital, Hwasun, <sup>16</sup>Department of Surgery, Kyungpook National University Chilgok Hospital, <sup>17</sup>Department of Surgery, Keimyung University Dongsan Hospital, Daegu, <sup>18</sup>Department of Surgery, Kangbuk Samsung Hospital, Seoul, Korea, Republic Of

**Objectives:** Patients who underwent curative gastrectomy for gastric cancer are regularly followed-up for the early detection of recurrence and postoperative symptom management. However, there is a lack of evidence with regard to proper surveillance intervals and diagnostic tools. This study aims to evaluate whether frequent surveillance tests have a survival benefit or improve the quality of life in patients who underwent curative resection for advanced gastric cancer.

**Methods:** The STOFOLUP trial is an investigator-initiated, parallel-assigned, multicenter randomized controlled trial involving 16 hospitals in the Republic of Korea. Patients (n=886) diagnosed with pathological stage II or III gastric adenocarcinoma will be randomized to either the 3-month or the 6-month group at a 1:1 ratio, stratified by trial site and tumor stage. Patients allocated to the 3-month group will undergo an abdominal computed tomography (CT) scan every 3 months postoperatively and those allocated to the 6-month group will undergo CT every 6 months. The primary endpoint is 3-year overall survival and the secondary endpoints are quality of life, as assessed using KOQUSS-40, EORTC QLQ-C30, and STO22, and nutritional outcomes. Other survival data including data concerning 3-year disease-free survival, recurrence-free survival, gastric cancer-specific survival, and post-recurrence survival will also be estimated.

**Results:** The first patient was enrolled on July, 2021 and active patient enrollment is currently underway.

**Conclusions:** The STOFOLUP trial is the first large-scaled multicenter randomized controlled trial to evaluate oncological and clinical effect of postoperative surveillance in patients who underwent curative resection for advanced gastric cancer. We hope that the results of this trial can provide confirmative evidence for appropriate surveillance intervals and diagnostic tools in cases of advanced gastric cancer.

*Survivorship, Supportive and Palliative care, Nutrition, Quality-of-life*

IGCC22-ABS-1420

**CONDITIONAL SURVIVAL AFTER GASTRECTOMY OF EARLY-ONSET GASTRIC CANCER: EVAPORATING HAZARD DISPARITIES**

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<sup>1</sup>Department of General Surgery, First Affiliated Hospital of Nanjing Medical University, Nanjing, <sup>2</sup>Department of Gastrointestinal Surgery, The Affiliated Hospital of Qingdao University, Qingdao, China

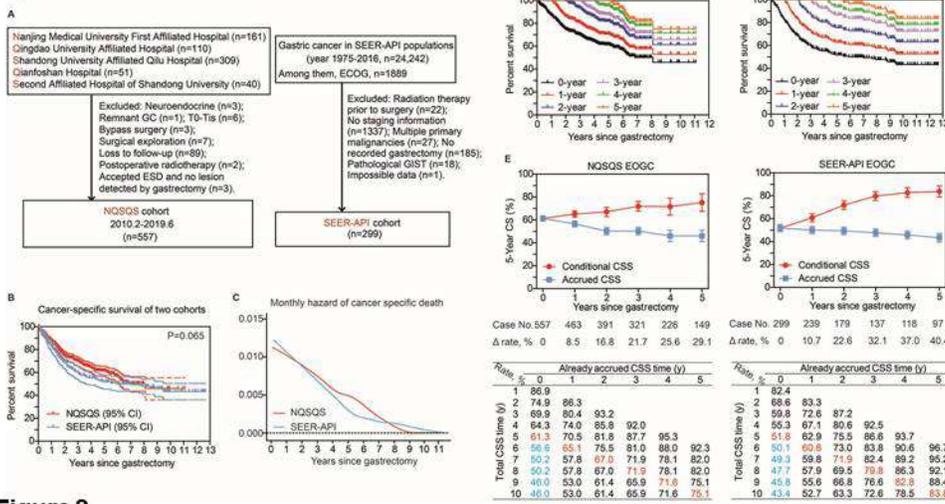
**Objectives:** Estimating long-term survival of early-onset gastric cancer (EOGC, diagnosed age  $\leq$  45 years old) and mapping its hazard pattern would be invaluable for improving personalized surveillance strategy. We aim to determine the dynamic risk factors of EOGC prognosis by evaluating conditional survival.

**Methods:** This cohort study includes two independent cohorts; one cohort contains 557 cases from five Chinese medical centers from February 2010 to June 2019 (namely the NQSQS cohort). The other cohort contains 299 cases in SEER database from year 1975 to 2016 (SEER-API cohort). All cases underwent radical gastrectomy of primary gastric cancer with intact follow-up, and cancer-specific survival (CSS) was compared.

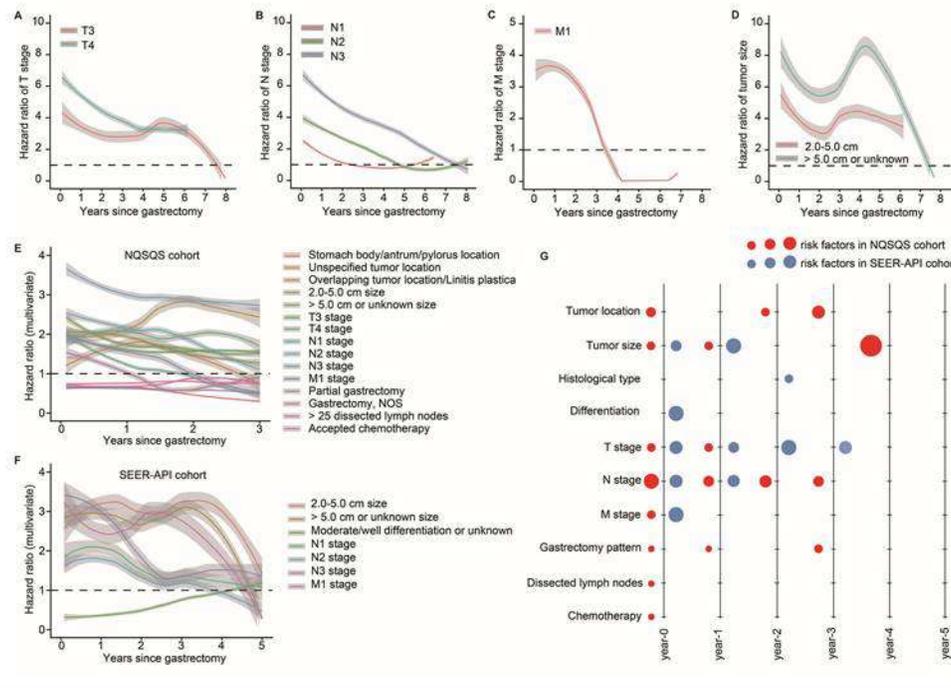
**Results:** The follow-up time was  $42.3 \pm 1.1$  months and  $48.9 \pm 2.4$  months for NQSQS cohort (ranging 0.5-133.1 months) and SEER-API cohort (ranging 3.0-152.0 months), respectively. The 5-year CSS rates were 61.3% and 51.8% for the two cohorts, showing no statistically significant difference ( $P=0.065$ ). In NQSQS cohort, the 5-year conditional CSS (CCSS) rate increased from 61.3% at CCSS (5|0) to 75.1% at CCSS (5|5), while increased from 51.8% to 83.8% in the SEER-API cohort. Patients characterized with positive lymph nodes (LN) showed poorer CSS compared to those with negative ones. Increasing differences on accrued CSS rates were observed between positive-LN groups and negative-LN groups along with the follow-up, thus seemed like intensified risk contributions. Actually, in both the two cohorts, positive LN metastasis gradually lost its hazard contribution as reflected by 5-year CCSS curves and temporal dynamic hazard ratio curves. The decreased hazard contribution was also observed on other conventional risk factors including tumor size, invasion depth, distant metastasis, and TNM stage.

**Image:**

**Figure 1**



**Figure 2**



**Conclusions:** For the CSS of EOGC cases, the hazard contribution of each risk factor diminished until disappeared over time. Our findings provide evidence on improving personalized surveillance strategy for EOGC cases after surgical intervention.

*Survivorship, Supportive and Palliative care, Nutrition, Quality-of-life*

IGCC22-ABS-1069

**CLINICAL SIGNIFICANCE OF SERUM ZINC DEFICIENCY IN PATIENTS AFTER GASTRECTOMY FOR GASTRIC CANCER**

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**Objectives:** Zinc is an essential dietary component for humans and the second most prevalent trace element; however, serum zinc levels after gastrectomy has not been fully elucidated. This study aimed to evaluate the correlation between clinicopathologic features and serum zinc levels in patients who underwent gastrectomy for gastric cancer.

**Methods:** The study enrolled 617 patients who underwent gastrectomy for gastric cancer at the Kochi Medical School. Clinical data were obtained to investigate associations between clinicopathological features, including nutritional indicators and serum zinc levels. Serum zinc deficiency was defined as serum zinc level < 80 µg/dL.

**Results:** The median zinc level of the 617 patients was 73 µg/dL (range, 31–144 µg/dL), and serum zinc deficiency was present in 68.6% of patients. Median age was significantly higher in the zinc low level group than in the normal group (69 vs. 66 years,  $P < 0.001$ ). Albumin was significantly lower in the zinc low level group than in the normal group (3.9 g/dL vs. 4.2 g/dL,  $P < 0.001$ ). C-reactive protein level was significantly higher in the zinc low level group than in the normal group (0.12 mg/dL vs. 0.10 mg/dL,  $P = 0.014$ ). The median serum zinc level was significantly lower in the patients who received chemotherapy after gastrectomy than in those who were not received chemotherapy (72 vs. 76 µg/dL,  $P < 0.001$ ). Serum zinc levels showed a significant positive correlation with serum albumin ( $r = 0.505$ ,  $P = 0.044$ ). Multivariate analysis showed that serum albumin level was significantly associated with serum zinc level ( $\beta = 0.489$ ,  $P < 0.001$ ). **Conclusions:** Serum zinc deficiency was found in 68.6% of postoperative patients who underwent gastrectomy for gastric cancer, which was highly correlated with serum albumin.

*Survivorship, Supportive and Palliative care, Nutrition, Quality-of-life*

IGCC22-ABS-1370

## **PROGNOSTIC VALUE OF PLR IN PATIENTS RECEIVING POSTOPERATIVE XELOX CHEMOTHERAPY FOR GASTRIC CANCER**

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**Objectives:** Surgery combined with postoperative chemotherapy is an effective method for treating patients with gastric cancer (GC) in Asia. The important roles of systemic inflammatory response in chemotherapy have been gradually verified. The purpose of this study was to assess the difference in clinical effectiveness of FOLFOX (oxaliplatin + leucovorin + 5-fluorouracil) and XELOX (oxaliplatin + capecitabine), and the prognostic value of postoperative platelet-lymphocyte ratio (PLR) in the XELOX group.

**Methods:** Patients who received radical gastrectomy combined with postoperative chemotherapy between 2004 and 2014 were consecutively selected into the FOLFOX and XELOX groups. Group bias was reduced through propensity score matching, which resulted in 278 patients in each group. Cut-off values of systemic immune inflammation (SII) score and PLR were obtained by receiver operating characteristic curve. Kaplan-Meier and Log-rank tests were used to analyze overall survival. The chi-square test was used to analyze the association between clinical characteristics and inflammatory indexes. Univariate and multivariate analyses based on Cox regression analysis showed independent risk factors for prognosis. The nomogram was made by R studio.

**Results:** Patients receiving XELOX postoperative chemotherapy had better survival than those receiving FOLFOX ( $P < 0.001$ ), especially for stage III GC ( $P = 0.002$ ). Preoperative SII was an independent risk factor for prognosis in the FOLFOX group, and PLR of the second postoperative chemotherapy regimen in the XELOX group, combined with tumor size and pTNM stage, could construct a nomogram for evaluating recurrence and prognosis.

**Conclusions:** XELOX is better than FOLFOX for treatment of GC in Chinese patients, and a nomogram constructed by PLR, tumor size and pTNM stage can predict recurrence and prognosis.

*Survivorship, Supportive and Palliative care, Nutrition, Quality-of-life*

IGCC22-ABS-1415

## **MULTI-INSTITUTIONAL DEVELOPMENT AND VALIDATION OF A SURVIVAL NOMOGRAM OF EARLY-ONSET GASTRIC CANCER**

Hongda Liu\*<sup>1</sup>, Zequn Li<sup>2</sup>, Yanbing Zhou<sup>2</sup>, Zekuan Xu<sup>1</sup>

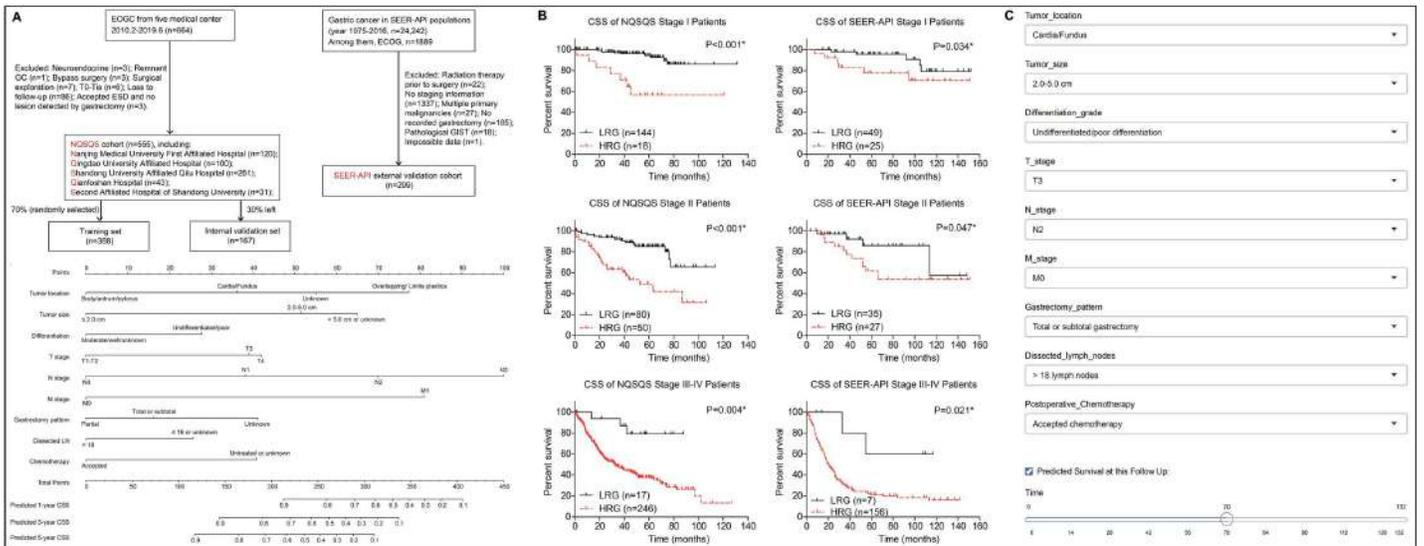
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**Objectives:** Early-onset gastric cancer (EOGC,  $\leq 45$  years old) is characterized with increasing incidence and more malignant phenotypes compared with late-onset gastric cancer. This study established a nomogram to help evaluate cancer-specific survival (CSS) of EOGC patients who underwent gastrectomy.

**Methods:** We retrospectively enrolled a cohort containing 555 EOGC cases from five independent medical centers in China, among which 388 cases were randomly selected into a training set while the other 167 cases were assigned into the internal validation set. Asian or Pacific Islander (API) patients diagnosed with EOGC during 1975-2016 were retrieved from the SEER database (n=299) and utilized as the external validation cohort. Univariate and multivariate analyses were conducted to test prognostic significances of clinicopathological factors in the training set. Accordingly, two survival nomogram models were established and compared by concordance index (C-index), calibration curve, receiver operating characteristics (ROC) curves and decision curve analyses (DCA).

**Results:** The 5-year CSS rate of training cohort was 61.3% with a median survival time as 97.2 months. High consistency was observed on calibration curves in all three cohorts. Preferred nomogram was selected due to its better performance on ROC and DCA results. Accordingly, a novel predicative risk model was introduced to better stratify high-risk EOGC patients with low-risk patients, which was further validated in patients with different TNM stages, respectively. Finally, a EOGC web-based survival calculator was established with public access.

**Image:**



**Conclusions:** In all, our data provided a precise nomogram on predicting CSS of postoperative EOGC patients with potential clinical applicability.

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IGCC22-ABS-1320

**COMPARISON OF CLINICAL BEHAVIOR OF ASIAN AND NON-ASIAN DESCENDANTS WITH GASTRIC ADENOCARCINOMA**

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**Objectives:** The primary objective is to compare survival between patients submitted to gastrectomy for gastric adenocarcinoma in Asian and non-Asian patients and, the secondary ones comprehend the epidemiologic and histopathologic analyses.

**Methods:** In a retrospective study based on prospective collected database, we analyzed patients with gastric adenocarcinoma who underwent gastrectomy with D1 and D2 lymphadenectomy, staging I-IIIC from January 1998 to December 2016, in a Brazilian hospital.

**Results:** Out of 462 patients, there were 29 (6.3%) Asian and 433 (93.7%) non-Asian patients. In the Asian group 23 patients (79.3%) were male and 6 (20.7%) were female, while in the non-Asian group 245 (56.6%) were male and 188 (43.4%) were female ( $p=0.016$ ). The 3-year and 5-year survival were respectively 75.79% and 67.37% for Asians, and 76.04% and 70.37% for non-Asians ( $p=0.974$ ). There were no statistical significance comparing Asians vs. non-Asians for other variables as location of tumor: distal 79.3% vs. 82.9% ( $p=0.72$ ); Laurén type: Intestinal 41.4% vs. 42.3% ( $p=0.92$ ); Signet ring cells: 27.6% vs. 31.9% ( $p=0.58$ ); and stage: I 31% vs. 38.5%, II 20.6% vs. 21% and III 48.2% vs. 40.5 ( $p=0.268$ ).

**Conclusions:** In our institution there was no survival difference between Asian and non-Asian patients submitted to gastrectomy for gastric adenocarcinoma. Also, neither for location of the tumor nor histological type or stage. The only difference was a higher prevalence of men in the Asian group.

*Survivorship, Supportive and Palliative care, Nutrition, Quality-of-life*

IGCC22-ABS-1399

**A NOVEL SURVEILLANCE FOR PATIENTS WITH GASTRIC NEC AFTER GASTRECTOMY**

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<sup>1</sup>Department of Gastric Surgery, Fujian Medical University Union Hospital, Fuzhou, China

**Objectives:** The best follow-up surveillance for cancer survivors after treatment should balance effectiveness and cost of disease detection while detecting recurrence as early as possible. Available follow-up strategies of patients with resectable gastric neuroendocrine carcinoma and mixed adenoneuroendocrine carcinoma [G-(MA)NEC] are inconsistent. We aimed to establish an optimal follow-up surveillance for patients with G-(MA)NEC.

**Methods:** Patients with G-(MA)NEC from 21 centers in China were included. The random forest survival model simulated the monthly probability of recurrence to establish an optimal surveillance schedule based on individual risk of recurrence to maximize the power of detecting recurrence at each follow-up. The power and cost-effectiveness were compared with the National Comprehensive Cancer Network (NCCN), European Neuroendocrine Tumor Society (ENETS), and European Society for Medical Oncology (ESMO) guidelines.

**Results:** A total of 801 patients were divided into four different risk groups according to the modified TNM staging system. There were 106 (13.2%), 120 (15.0%), 379 (47.3%), and 196 cases (24.5%) in modified groups IIA, IIB, IIIA, and IIIB, respectively. We established four follow-up strategies for different risk groups based on the probability of disease recurrence each month. The total number of follow-ups 5 years after surgery in the four groups was 12, 12, 13, and 13 times, respectively. The detection efficiency were better and more cost-effective than the control strategy recommended by the guidelines.

**Conclusions:** Compared with the traditional clinical practice guidelines, our strategies, which may maximize the detection power at each visit, were more economical, effective, and expected to further optimize the existing follow-up strategy for G-(MA)NEC.

*Survivorship, Supportive and Palliative care, Nutrition, Quality-of-life*

IGCC22-ABS-1072

**CLINICAL IMPACT OF PREOPERATIVE SERUM CHOLINESTERASE IN GASTRIC CANCER**

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**Objectives:** The preoperative nutritional and immunological statuses have been reported to be associated not only with postoperative complications, but also with prognoses of patients with gastroenterological malignancies. We have been reported the impact of the preoperative Onodera's prognostic nutritional index (PNI) and controlling nutritional status on both short-term and long-term outcomes in gastric cancer patients. The aim of this study was to investigate the value of the preoperative serum cholinesterase (ChE) levels on the short-term and long-term outcomes in gastric cancer. **Methods:** We reviewed the medical records of 330 patients with gastric cancer who underwent gastrectomy at our hospital from 2004 to 2010. Serum cholinesterase level was used as preoperative nutritional index. Patients were divided into normal ChE group and decreased ChE group. Postoperative complications were classified by Clavien-Dindo classification. Overall survival curves were calculated by Kaplan-Meier methods. The outcomes from different groups of patients were compared by log-rank test.

**Results:** The mean preoperative ChE level was 262.8. Preoperative ChE had a significant correlation with preoperative PNI. Preoperative ChE was not associated with postoperative complications. Patients with decreased preoperative serum ChE had significant poor prognoses than patients with normal ChE levels in gastric cancer. The decreases of preoperative serum ChE levels were related to deaths by cancer in stage II-IV gastric cancer and deaths by other disease in stage I gastric cancer.

**Conclusions:** This study suggested that preoperative cholinesterase is a simple nutritional index and one of the predictors of the survival in gastric cancer.

*Survivorship, Supportive and Palliative care, Nutrition, Quality-of-life*

IGCC22-ABS-1189

## **PREOPERATIVE MUSCLE-ADIPOSE INDEX A NEW PROGNOSTIC FACTOR FOR GASTRIC CANCER**

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**Objectives:** Studies have shown that traditional nutrition indicators and body composition indicators are closely related to prognosis after radical gastric cancer (GC) surgery. However, the effect of the combined muscle and adipose composite on the prognosis of GC has not been reported.

**Methods:** The clinicopathological data of 514 patients with GC were retrospectively analyzed. The skeletal muscle adipose tissue were measured by preoperative CT images to obtain the muscle index and adipose index. X-tile software was used to determine the diagnostic threshold of muscle-adipose imbalance.

**Results:** The 5-year OS and RFS of the muscle-adipose imbalanced group were significantly worse than those of the balanced group. Multivariate analysis showed that muscle-adipose imbalance and the CONUT score were independent prognostic factors of OS and RFS ( $p < 0.05$ ). The nuclear density curve showed that the recurrence risk of the muscle-adipose imbalanced group was higher than that of the balanced group, while the nuclear density curve of the CONUT score was confounded. Incorporating the muscle-adipose index into cTNM has the same prognostic performance as the pTNM staging system. Chemotherapy benefit analysis showed that, stage II/III patients in the muscle-adipose balanced group could benefit from adjuvant chemotherapy.

**Conclusions:** The preoperative muscle-adipose index discovered for the first time is a new independent prognostic factor that affects the prognosis with GC. In addition, the preoperative muscle-adipose index is better than traditional nutrition and body composition indicators in terms of the prognostic evaluation of GC patients and the predictive value of recurrence risk.

*Survivorship, Supportive and Palliative care, Nutrition, Quality-of-life*

IGCC22-ABS-1153

**IRON DEFICIENCY ANEMIA IN GI CANCER PATIENTS AT MOUNT SINAI HOSPITAL**

Alexandria Abbruzzino<sup>1</sup>, Janet Smith<sup>1</sup>, Jacob Kachura<sup>1</sup>, Madison Sherman<sup>1</sup>, Ronald Burkes<sup>1</sup>, Christine Brezden-Masley<sup>1</sup>

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**Objectives:** Few studies have identified the prevalence of iron deficiency (ID) anemia (IDA) or chemotherapy-induced anemia (CIA) in the population of GI malignancies. The objective of this retrospective study was to assess the prevalence of anemia, ID, IDA and CIA in GI cancer patients. These results would provide an understanding of local practice to iron surveillance and management in this patient population from which future quality improvement work can be based.

**Methods:** A retrospective chart review of patients diagnosed with GI cancer between Jan 2009 and Dec 2020. Data included demographics, history of IDA, previous IDA therapies, and cancer history. Hb, MCV and HCT were collected at 5 time points. TSAT, ferritin, iron serum and iron saturation were collected at pre- and post-chemotherapy initiation.

**Results:** In all, 425 patients (pts): 43 gastric, 214 colon, 55 recto-sigmoid, 112 rectal cancer patients (54.6% were male). At pre-chemotherapy initiation 46 (10.8%) pts had both ferritin and TSAT values assessed; 20 (43.5%) had ID and 17 (37.0%) had IDA. At post chemotherapy, 67 (15.8%) pts could be assessed for ID and IDA; 25 (37.3%) had ID and 22 (32.8%) had IDA. At initial consultation 42.6% (181/425) had anemia. By cycle 1, 49.8% (211/424) had anemia, cycle 4 57.8% (219/379), cycle 8 61.2% (169/276) and 33.4% (139/416) by the final follow-up visit. Males had a higher proportion of anemia. 90 pts developed CIA. Treatment by parenteral, oral iron or blood transfusion occurred in 137 pts. Of those that could be assessed, 30.8% (8/26) pts at pre-chemotherapy initiation who never received iron support had ID and 23.1% (6/26) had IDA.

**Conclusions:** Our study demonstrated that patients with GI cancer are significantly affected by anemia. IDA, while highly prevalent in the sample that could be assessed, was under-evaluated and iron indices need to be routinely examined. Guidelines are required to ensure anemia work-up and iron levels are assessed for all GI cancer patients with proper iron repletion.

*Survivorship, Supportive and Palliative care, Nutrition, Quality-of-life*

IGCC22-ABS-1302

**PROGNOSTIC SIGNIFICANCE OF NEOADJUVANT TREATMENT INDUCED SARCOPENIA IN PATIENTS WITH GASTRIC CANCER**

Elif Şenocak Taşçeyla Ozer<sup>1</sup>, Arda Ulaş Mutlu Metincan Erkaya<sup>2</sup>, Mirac Ajredini<sup>3</sup>, Ibrahim Yıldız<sup>1</sup>, Ahmet L. Güner<sup>1</sup>, Mustafa Bozkurt<sup>1</sup>, Ali Arıcan<sup>1</sup>, Özler Er<sup>5</sup>, Erman Aytac<sup>6</sup>

<sup>1</sup>Medical Oncology, Acıbadem Atakent Hospital, <sup>2</sup>Medical Faculty, Acıbadem MAA University, Istanbul, <sup>3</sup>Medical Faculty, Trakya University, Trakya, <sup>4</sup>Nuclear Medicine, <sup>5</sup>Medical Oncology, Acıbadem Maslak Hospital, <sup>6</sup>General Surgery, Acıbadem Atakent Hospital, Istanbul, Turkey

**Objectives:** Neoadjuvant treatment has become a standardized protocol in locally advanced gastric cancer (GC). Sarcopenia is a frequently seen problem associated with the toxic effects of neoadjuvant therapy and causes more complications postoperatively. This study aims to compare the effect of different neoadjuvant protocols on sarcopenia.

**Methods:** GC patients diagnosed with locally advanced disease between 2014-2020 were analyzed retrospectively. The patients who received neoadjuvant treatment were eligible. The total cross-sectional skeletal muscle area at the 3rd lumbar vertebra on computed tomography images – 30 to 150 HU for the muscle compartment) was measured using Leonardo volume analyzer. For normalization, the skeletal muscle area was divided by the square of the patient's height (cm<sup>2</sup>/m<sup>2</sup>). Sarcopenia cut-off values for males and females were 69.7 and 54.2 cm<sup>2</sup>/m<sup>2</sup>, respectively. Kaplan-Meier, log rank and independent T-test were used for analysis.

**Results:** The clinicopathological data of 26 patients were evaluated. The mean age was 58.9 and 53.8% were male. The number of patients in FLOT (5-fluoracil, oxaliplatin and docetaxel) and DCF (doxorubicin, cisplatin, 5-fluoracil) arm were equal. There was not any difference in demographic characteristics and treatment response between two groups. The decrease in muscle mass of FLOT group was 1.10%. An increase in muscle mass was seen, which is 0.13% in DCF group. Both results were not significant (p=0.761). None of the patients became sarcopenic. The albumin levels of patients in FLOT and DCF group decreased 10.3% and 21.3%, respectively (p=0.133). No significant relation was found with overall survival for both groups (p=0.407).

**Conclusions:** Limited number of patients included, and highly standardized supportive care measures might have contributed to absence of sarcopenia in our study. Even though the decrease in albumin levels were more evident in DCF group, there seems to be no difference regarding induction of sarcopenia among the two neoadjuvant regimens.

*Survivorship, Supportive and Palliative care, Nutrition, Quality-of-life*

IGCC22-ABS-1331

## **PREDICTION VALUE OF SEROLOGICAL-BASED CLINICAL MODEL IN THE PROGNOSIS EVALUATION OF GASTRIC CANCERS**

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<sup>1</sup>Department of Gastrointestinal Surgery, West China Hospital, Sichuan University, Chengdu, China

**Objectives:** Surgery-focused diagnosis and treatment is the most commonly used and effective for gastric cancer. This study aims to establish and validate a non-tumor-markers serological-based clinical score for predicting and evaluating the prognosis of gastric cancer patients.

**Methods:** Clinicopathological data of primary gastric cancer patients underwent surgical treatment from 2009 to 2017 were retrieved and divided into training cohort and validation cohort. Preoperative serological indicators were screened and generated individual serum risk score (serscore). Prognosis prediction models based on serum risk score were established and validated.

**Results:** A total of 2532 patients and 41 serological indicators were screened and analyzed. After LASSO-Cox analysis, 10 serological indicators (HGB, PLT, LYMPH, NEUT, ALB, ALP, CREA, HDL-C, LDH and FIB) were included to generate serscore. According to the cut-off value (-0.72) of serscore, patients in Low-risk group had significantly better survival than in High-risk group. Multivariate Cox analysis identified that serscore group (HR=1.278, P=0.004), tumor location (HR=0.753, P=0.001) radical degree (HR=1.642, P<0.001), T stage (HR=1.833, P<0.001), N stage (HR=2.429, P<0.001) and M stage (HR=1.643, P<0.001) were independent prognostics factors for overall survival. The multivariate nomograms were established, C-index were 0.715 in training and 0.700 in validation cohorts. Multivariate nomogram model had better predictive performance than serscore in training (AUC: 0.763 vs. 0.620) and validation (AUC: 0.780 vs 0.610 cohorts). Calibration curves of multivariate nomogram also had consistency with ideal predictive curves in both of the two cohorts.

**Conclusions:** The serscore model we screened, included 10 weighted preoperative serological indicators of primary gastric cancer patients. This provides an effective tool for the evaluation of the prognosis of primary gastric cancer, and lays the foundation for further prognosis model construction related of gastric cancers.

*Survivorship, Supportive and Palliative care, Nutrition, Quality-of-life*

IGCC22-ABS-1091

## **QUALITY AND UTILITY OF GASTRIC CANCER RELATED VIDEOS IN SOCIAL MEDIA VIDEOS PLATFORMS**

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**Objectives:** Gastric cancer is a major public health problem worldwide. Social media platforms constitute a powerful means of communication that can be used to educate patients and elevate public awareness of health care contexts, which have completely changed the way of health information dissemination. Both TikTok and its Chinese version Douyin are the most popular short video posting platform. This study aimed to evaluate the quality, utility, and completeness of videos for gastric cancer on TikTok and Douyin.

**Methods:** The terms “gastric cancer” was searched on TikTok in both English and Japanese, and on Douyin in Chinese. The first 100 videos in three languages (website’s default setting) were checked. Content was analysed under six categories (aetiology, anatomy, symptoms, preventions, treatments, and prognosis). The educational value and completeness were evaluated with a checklist developed by the researchers.

**Results:** A total of 78 videos in English, 63 in Japanese, and 99 in Chinese were analyzed. The types of sources were as follows: 6.4% in English, 4.8% in Japanese, and 57.6% in Chinese for health professionals; 93.6% in English, 95.2% in Japanese, and 3.0% in Chinese for private users; none in English and Japanese, but 39.4% in Chinese for other sources. In all, 20.5% in English, 17.5% in Japanese, and 93.9% in Chinese of videos had useful information about gastric cancer. Among the educational videos, prognosis in English (37.5%), symptoms in Japanese (54.5%), and prevention in Chinese (47.3%) were the most frequently covered topic.

**Conclusions:** TikTok in English and Japanese might not fully meet the gastric cancer information needs of public, but Douyin in Chinese was the opposite.

*Survivorship, Supportive and Palliative care, Nutrition, Quality-of-life*

IGCC22-ABS-1179

**THE GLIM CRITERIA AS AN EFFECTIVE TOOL FOR SURVIVAL PREDICTION IN GASTRIC CANCER PATIENT**

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**Objectives:** The Global Leadership Initiative on Malnutrition released a new version of the malnutrition criteria (GLIM criteria), but the impact of this indicator on the long-term survival of gastric cancer patients remains unclear.

**Methods:** We prospectively collected data from a retrospective study of gastric cancer patients who underwent radical resection in our department between January 2010 and December 2013. We then established a nomogram for predicting overall survival (OS) based on the GLIM criteria.

**Results:** According to the GLIM criteria, there were 776 cases in the malnourished group and 345 cases in the well-nourished group. The c index of GLIM criteria (0.597) was significantly better than that of the traditional criteria (0.542). The AUC of the GLIM criteria was significantly higher than that of the traditional criteria (0.611 vs. 0.541). Multivariate Cox regression analyses showed that malnutrition in the GLIM criteria was an independent risk factor for the 5-year OS (HR=1.311, CI: 1.006–1.710, p=0.045). Based on the GLIM criteria, the nomogram c index (0.768) was significantly better than that of the GLIM criteria (0.597) and traditional criteria (0.542). The AUC of the nomogram was significantly higher than that of the GLIM criteria or traditional criteria (0.788 vs. 0.611 vs. 0.541). The 5-year OS of patients receiving chemotherapy in the high-risk group was significantly higher than that of patients without chemotherapy (45.77% vs. 24.73%, p<0.001). For the 5-year OS of patients receiving chemotherapy and those without chemotherapy in the low-risk group, there was no significant difference in OS (75.58% vs. 78.63%, p=0.21).

**Conclusions:** The GLIM criteria independently influence the long-term outcome of patients after radical gastric cancer surgery. The nomogram can predict the long-term survival of patients with gastric cancer, and postoperative adjuvant chemotherapy for high-risk patients based on this nomogram model can significantly improve the 5-year OS of patients.

## ***Gastric cancer treatment during COVID-19 pandemic***

IGCC22-ABS-1243

### **IMPACT OF COVID-19 PANDEMIC ON THE SURGICAL TREATMENT OF GASTRIC CANCER**

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<sup>1</sup>Cancer Institute, University of São Paulo Medical School, SAO PAULO, Brazil

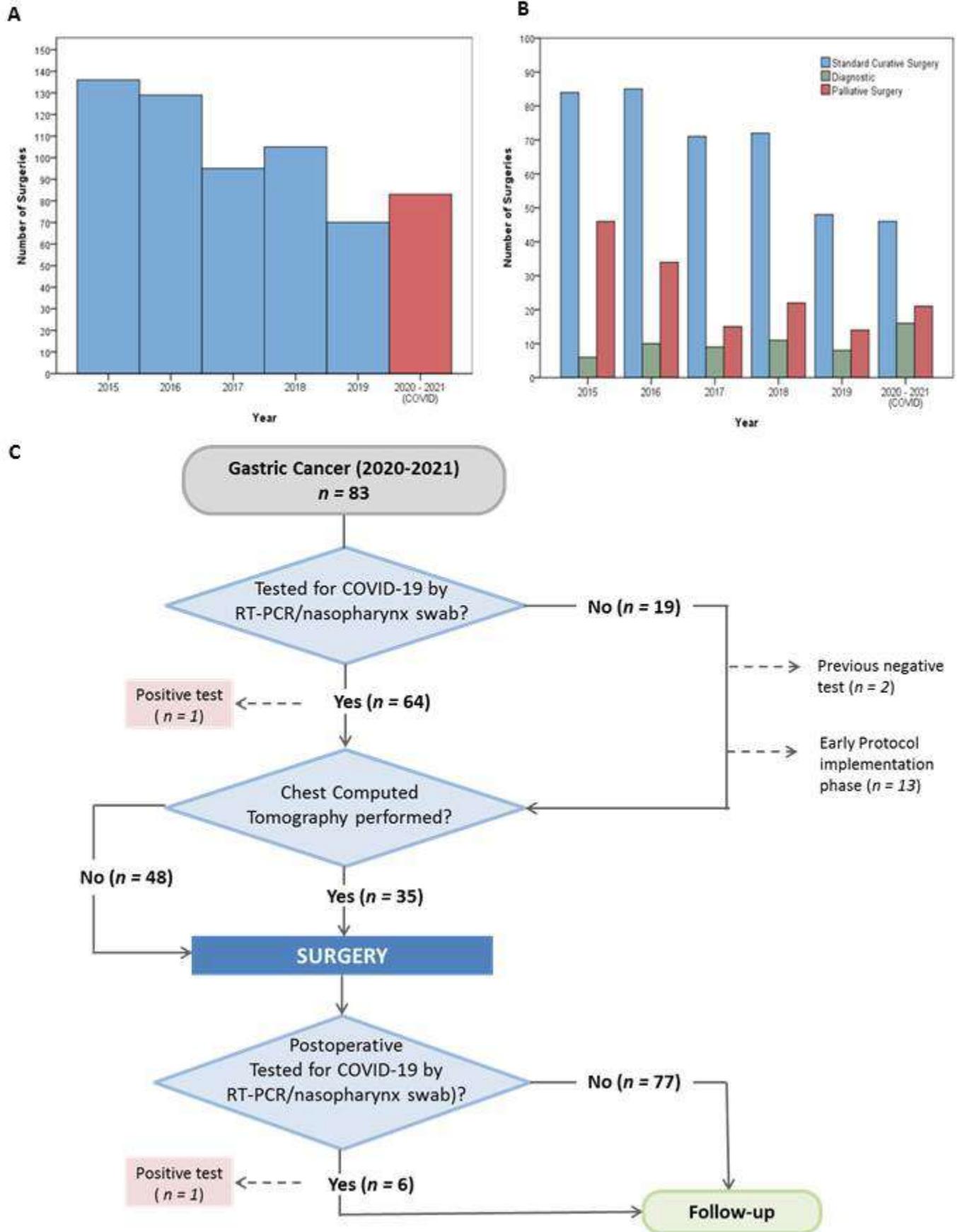
**Objectives:** The COVID-19 pandemic has saturated medical services globally and restricted the access of patients with other diseases, including gastric cancer (GC). This study aimed to evaluate the impact of the pandemic on surgical and oncological outcomes of patients with GC and verify the adherence of the screening protocol for COVID-19 adopted at the institution.

**Methods:** All GC patients who underwent surgical treatment from 2015 to 2021 were retrospectively evaluated. Patients were divided into two groups according to the date of the procedure: control group (between 2015 and 2019); and COVID group, between March 2020 and March 2021. Institution's protocol recommended that patients referred to surgery had to be submitted to the SARS-CoV-2 infection test through RT-PCR by nasopharynx swab.

**Results:** According to the groups, 83 patients were classified as COVID Group and 535 patients as control Group. The mean of surgical procedures per year in the control group was 107. There were no differences in clinical characteristics between groups. Diagnostic procedures ( $p=0.005$ ), indication for preoperative chemotherapy ( $p<0.001$ ), and adenocarcinomas without Lauren's subtype specification ( $p=0.009$ ) were more frequent in the COVID group. Regarding patients who underwent curative surgery, no statistical difference was observed in pathological and surgical outcomes between the groups. Considering the COVID protocol, among the 83 GC, 19 patients (22.9%) were not tested for COVID-19 before surgery. Only one patient was positive for COVID-19 in the preoperative period, and other in the postoperative. The adherence rate in the evaluated period was 77.1%.

**Image:**

**Figure.** Total surgical procedures performed between 2005 and 2021 (A), and according to the intention of treatment: curative surgery, palliative surgery and diagnostic procedures (B); Flowchart - Screening protocol for COVID-19 (C)



**Conclusions:** During the pandemic period, there was a decrease in the of procedures and a higher frequency of diagnostic procedures and preoperative chemotherapy. However, clinical characteristics, pTNM, and surgical outcomes were similar. GC surgical treatment could be safely performed during the pandemic, and the adherence to the screening protocol for COVID-19 was 77.1%.

## ***Gastric cancer treatment during COVID-19 pandemic***

IGCC22-ABS-1229

### **DIGITAL GASTRIC CANCER RESOURCES FOR PATIENT EDUCATION: A SCOPING REVIEW**

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**Objectives:** Gastric cancer (GC) is a burdensome chronic illness that affects patients both physically and psychologically. Patients frequently report feeling overwhelmed by their diagnosis and prognosis, and a better understanding of their treatment options may improve their care experience. As GC research and patient support is grossly underfunded in Canada, there is a perceived lack of comprehensive patient education resources. We will conduct a scoping review of existing educational Internet resources for GC patients to describe and assess the available literature.

**Methods:** A search of the top 30 results for six relevant search terms (gastric cancer, stomach cancer, gastrectomy, stomach cancer treatment, gastric cancer treatment, gastric cancer resources) on Google and Safari, respectively were conducted with a clear browser, representing the most common sites visited by Internet users as previously established in the literature. Freely-available, English-language websites for patient information for GC were eligible for inclusion. Two independent reviewers applied the Patient Education Materials Assessment Tool (PEMAT) to grade each site. Country of publication, recency, and sponsorship for each resource were also recorded.

**Results:** Early results demonstrate that few comprehensive resources for patient education are readily available through major search engines. The mean PEMAT rating amongst 40 studies was 71%, representing a poor average understandability. Description, diagnosis, and treatment of GC are frequently discussed; however, there is a dearth of ancillary, yet patient-specific, information about navigating the healthcare system, seeking psychosocial support, and nutritional education.

**Conclusions:** This review study will describe the information sources currently available for GC patients in a Canadian context. It will summarize the strengths and limitations of existing resources and provoke suggestions for improved patient education materials.

*Artificial intelligence in gastric cancer diagnosis/treatment*

IGCC22-ABS-1070

**CT RADIOMICS IN PREDICTION OF PROGNOSIS IN PATIENTS WITH HER2+ GASTRIC CANCER TREATED BY TRASTUZUMAB**

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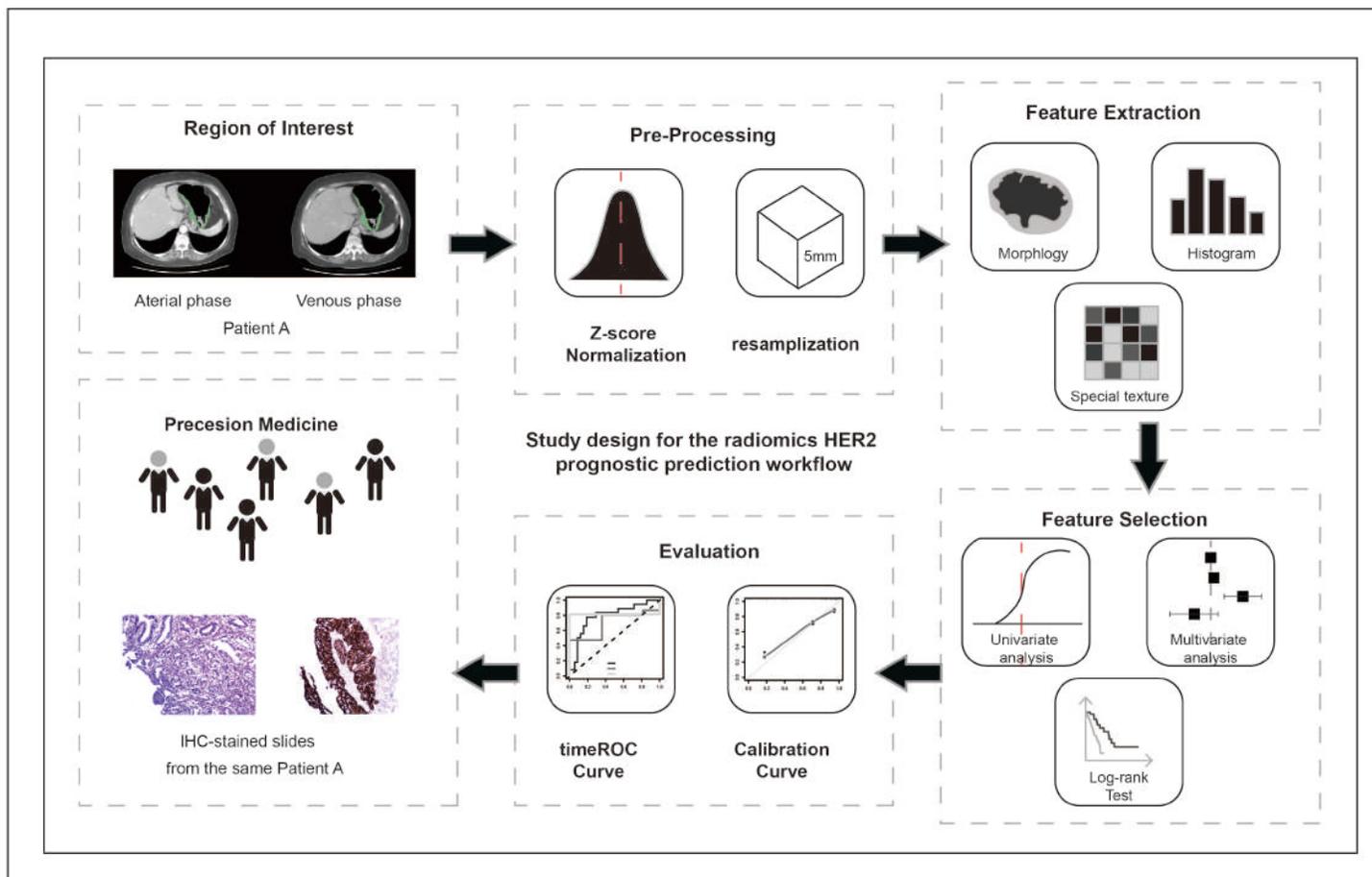
<sup>1</sup>Key Laboratory of Carcinogenesis and Translational Research (Ministry of Education/Beijing), Radiology Department, Peking University Cancer Hospital & Institute, <sup>2</sup>CAS Key Laboratory of Molecular Imaging, Institute of Automation, Chinese Academy of Sciences, Beijing, China

**Objectives:** Non-invasive assessment of targeted therapy outcomes for gastric cancer remains an urgent clinical need. We intend to determine whether CT radiomics features analysis could become potential biomarkers for the prognosis in HER2+ stage IV gastric cancer patients treated by trastuzumab.

**Methods:** A total of 70 HER2+ stage IV gastric cancer patients undergoing pretreatment contrast enhanced CT(CE-CT) scans were retrospectively enrolled into this study. One hundred and seventy-two quantitative features, including morphological features, histogram features and high-level texture features, were extracted from each of the regions of interest (ROI) on the largest slice of arterial and venous phases, respectively. After intra-class correlation coefficient (ICC) calculation and consistency test evaluating the reader agreement on feature extraction, Cox proportional hazard analysis and Kaplan-Meier analysis were used to determine the association of radiomic features with clinicopathological factors and overall survival (OS).

**Results:** Four arterial features and three venous phase features showed significant correlation with OS on multivariate analysis( $p<0.05$ ). Following parameters were significantly associated with prognosis and performed well risk stratification ability, according to different optimum thresholds - a\_O\_glcm\_lmc1 ( $p=0.038$ ), a\_H\_glrIm\_RV ( $p<0.001$ ), a\_H\_firstorder\_IR ( $p<0.001$ ) and a\_H\_glcm\_Id ( $p=0.004$ ) from the arterial phase; v\_L\_gclm\_JM ( $p=0.046$ ) and v\_H\_firstorder\_IR ( $p<0.001$ ) from the venous phase. For the radiomics HER2 defined (RHd-) high risk group, the Lauren classification is more likely to be diffuse or mixed as well as worse differentiation degree, while the RHd-low risk group is the opposite.

**Image:**



**Conclusions:** For HER2+ stage IV gastric cancer patients treated with trastuzumab, our CT-guided radiomics features have the potential to be the non-invasive biomarker for the prediction of OS. Examination of radiomic features from CE-CT in the future will shed light on their clinical utility.

*Artificial intelligence in gastric cancer diagnosis/treatment*

IGCC22-ABS-1109

**PERSONALIZED SURVIVAL MODELS BUILT FROM COMPOSITE MOLECULAR SUBTYPES IN 2202 GASTRIC CANCER PATIENTS**

Daniel Skubleny<sup>1</sup>, Thomas Williams<sup>1</sup>, Jim Wickware<sup>1</sup>, Russell Greiner<sup>2</sup>, Jennifer Spratlin<sup>3</sup>, Sunita Ghosh<sup>3</sup>, Dan Schiller<sup>1</sup>, Gina Rayat<sup>1</sup>

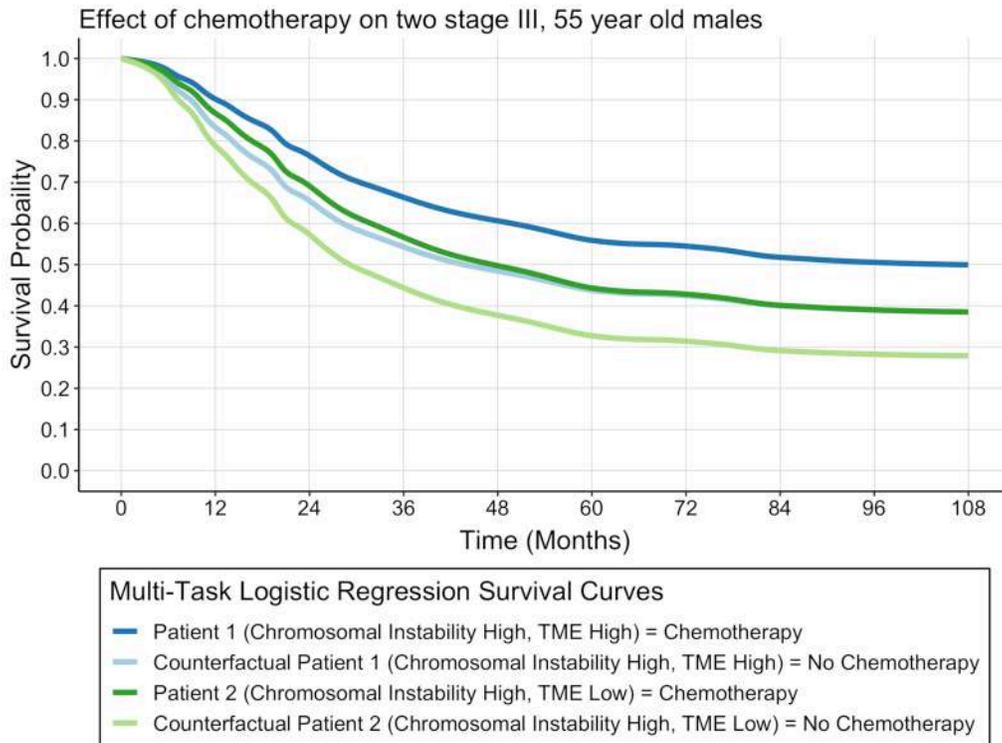
<sup>1</sup>Surgery, <sup>2</sup>Computing Science, <sup>3</sup>Oncology, University of Alberta, Edmonton, Canada

**Objectives:** Molecular classification systems in gastric cancer suffer from limited comparative analysis and small sample size. Here we integrate multiple classification systems to reveal novel biological insights and inform a personalized medicine model using individual survival distributions.

**Methods:** This retrospective study included 2202 gastric cancer transcriptomes with overall survival data from 10 public databases. Machine learning classifiers were created for The Cancer Genome Atlas (TCGA), Asian Cancer Research Group (ACRG) and Tumour Microenvironment Score (TME) classes. Survival analysis was conducted using Cox models and individual survival distributions were created using Multi-task Logistic Regression (MTLR).

**Results:** Classification models for TCGA (57 genes), ACRG (39 genes) and TME (50 genes) had a mean accuracy (Standard Deviation) of 89.46% (0.04), 84.66% (0.04) and 89.33% (0.02), respectively. In a multivariable model, TME high score provided the greatest survival benefit (HR 0.42 [95%CI 0.34–0.51],  $p < 0.001$ ). TME high cancers were most prevalent in ACRG Microsatellite Instability (MSI), TCGA MSI and Epstein-Barr type (58.06, 62.02 and 66.13% respectively,  $p > 0.05$ ) and least prevalent in Epithelial Mesenchymal Transition and Genomically Stable type (6.12 and 6.88% respectively,  $p > 0.05$ ). In a propensity score matched cohort an interaction-based Cox model found that increasing TME score is significantly associated with improved survival outcome in patients treated with chemotherapy (HR 0.58 [95%CI 0.36–0.93],  $p = 0.02$ ). An individual survival distribution with MTLR was selected (Concordance Index 73.01% (0.03)) to estimate survival probability at any desired time for any individual patient (Figure 1).

**Image:**



**Conclusions:** This is the largest analysis of multiple gastric cancer molecular subtypes. We establish the TME score as an important confounder in evaluating molecular subtypes in gastric cancer. We show how individual survival distributions are a valuable tool in implementing personalized medicine.

*Artificial intelligence in gastric cancer diagnosis/treatment*

IGCC22-ABS-1146

**MACHINE LEARNING MODELS FOR SURVIVAL PREDICTION OF RESECTABLE UPPER GASTROINTESTINAL CANCER**

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<sup>1</sup>General Surgery, University Hospital of Heidelberg, Heidelberg, <sup>2</sup>General Surgery, University Hospital of Cologne, Cologne, Germany

**Objectives:** Surgical oncologists are frequently confronted with the question of long-term prognosis after surgery. This study applied machine learning algorithms to optimize survival prediction after oncological resection of gastroesophageal malignancies.

**Methods:** Patients with oncological resection of distal esophageal, junction or gastric cancer were included. Data handling, imputation, hyperparameter optimization and statistical analyses were performed on Python 3.9. Machine learning models such as multi-task logistic regression and survival forests were compared with usual algorithms to establish an individual estimation.

**Results:** The final dataset consisted of 117 variables and 1,360 eligible patients with an overall missingness of 1.3%. Out of eight analyzed machine learning algorithms, the random survival forest (RSF) performed best with a concordance-index (c-index) of 0.736 and an integrated Brier score (IBS) of 0.166. The standard Cox proportional hazards (CPH) model reached a c-index of 0.645 and an IBS of 0.221.

The RSF model demonstrated a time-dependent area under the curve (AUC) of 0.814 over a time period of 10 years after diagnosis and thus outperformed the standard CPH model (AUC of 0.749). The most important single predictor was identified as lymph node ratio with a mean AUC of 0.731.

The final risk scoring model of the RSF identified three significantly different survival curves with the low-risk group having a 5-year survival rate of 73.18%, the medium-group showing 45.39% and the high-risk group finally 14.87% ( $p < 0.0001$ ). Median survival time was 18.754 months in the high-risk group, 44.557 months in the medium-risk group and in calculable (or >120 months) in the low-risk group.

**Image:**

Model and results	Actual vs. predicted	Prediction error curve with IBS
<b>(a) Standard Cox proportional hazards</b> RMSE = 16.818 c-index = 0.64481 IBS = 0.22097		
<b>(b) Non-linear Cox proportional hazards</b> RMSE = 9.455 c-index = 0.68098 IBS = 0.19360		
<b>(c) Linear multi-task logistic regression</b> RMSE = 21.762 c-index = 0.67250 IBS = 0.22929		
<b>(d) Neural multi-task logistic regression</b> RMSE = 9.188 c-index = 0.67185 IBS = 0.25387		
<b>(e) Parametric model (Gompertz)</b> RMSE = 20.947 c-index = 0.67658 IBS = 0.19390		
<b>(f) Conditional survival forest</b> RMSE = 9.062 c-index = 0.72577 IBS = 0.16660		
<b>(g) Extra survival trees</b> RMSE = 6.410 c-index = 0.73610 IBS = 0.16735		
<b>(h) Random survival forest</b> RMSE = 6.224 c-index = 0.73629 IBS = 0.16623		

**Figure 1:** Overview of machine learning algorithms and performances

**Conclusions:** The results suggest that random survival forest is most appropriate to predict long-term prognosis of resectable gastroesophageal cancer. We were able to establish a novel risk scoring model to improve survival prediction and individual consultation after curative upper gastrointestinal surgery.

*Artificial intelligence in gastric cancer diagnosis/treatment*

IGCC22-ABS-1169

**RADIOMIC IMMUNOSUPPRESSIVE SCORE PREDICTS PROGNOSIS AND CHEMOTHERAPY BENEFIT IN GASTRIC CANCER**

Jun-Peng Lin<sup>1</sup>, Fu-Hai Wang<sup>1</sup>, Jian-Xian Lin<sup>1</sup>, Ping Li<sup>1</sup>, Chao-Hui Zheng<sup>1</sup>, Changming Huang<sup>1</sup>

<sup>1</sup>Department of Gastric Surgery, Fujian Medical University Union Hospital, Fuzhou, China

**Objectives:** The immunosuppressive tumor microenvironment, especially immune checkpoints, is an extremely valuable prognostic biomarker. We aimed to develop a radiomic immunosuppressive scoring system (RISS) to predict prognosis and benefit from adjuvant chemotherapy in gastric cancer (GC) using preoperative computed tomography (CT) images.

**Methods:** A total of 642 patients with resectable GC from 3 centers were divided into 1 training cohort, 1 internal validation cohort, and 2 external validation cohorts. Radiomic features were extracted from portal venous-phase CT images of GC. LASSO regression model was used for data dimension reduction, feature selection, and RISS

construction. Moreover, we investigated the value of the RISS in predicting survival and chemotherapy response. **Results:**

The RISS, which consisted of 10 selected features, showed good discrimination of immunosuppressive status in 3 independent cohorts (AUC=0.840, 0.809, and 0.843). The RISS was significantly associated with both disease-free survival (DFS) and overall survival (OS) in all cohorts (all  $P < 0.05$ ). Multivariate analysis revealed that the RISS was an independent prognostic factor (all  $P < 0.05$ ). Incorporating the RISS into the radiomic nomogram resulted in better performance than the clinicopathologic nomogram and TNM stage alone. Further analysis revealed that stage II and III GC patients with low RISS exhibited a favorable response to adjuvant chemotherapy (OS: HR=0.407 (95% CI: 0.284-0.584); DFS: HR=0.395 (95% CI: 0.275-0.568)). Furthermore, the RISS could predict prognosis and select stage II and III GC patients who could benefit from adjuvant chemotherapy independent of microsatellite instability (MSI) status and Epstein-Barr virus (EBV) status.

**Conclusions:** The new, noninvasive radiomic signature could effectively predict the immunosuppressive status and prognosis of GC. Moreover, the RISS could help identify stage II and III GC patients most likely to benefit from adjuvant chemotherapy and avoid overtreatment.

*Artificial intelligence in gastric cancer diagnosis/treatment*

IGCC22-ABS-1225

**APPLICATION OF MACHINE LEARNING FOR PREDICTING ANASTOMOTIC LEAKAGE**

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<sup>1</sup>Department of Surgery, Tongji Hospital, Tongji Medical College, Huazhong University of science and technology, Wuhan Hubei, <sup>2</sup>Department of Vascular Surgery, First Hospital of Lanzhou University, Lanzhou University, Lanzhou Gansu, China

**Objectives:** Anastomotic leakage (AL) is a life-threatening complication in patients with gastric adenocarcinoma who received total or proximal gastrectomy, and there is still no model accurately predicting AL. We aim to develop a high-performance machine learning tool to predict AL in patients with gastric adenocarcinoma who received total or proximal gastrectomy.

**Methods:** A total of 1660 cases of gastric adenocarcinoma patients who received total or proximal gastrectomy in a large academic hospital from 1 January 2010 to 31 December 2019 were investigated, and these patients were randomly divided into training and testing sets at a ratio of 8:2. Four machine learning models, such as logistic regression (LR), random forest (RF), support vector machine(SVM), and XGBoost, were employed, and 24 clinical preoperative and intraoperative variables were included to develop the predictive model.

**Results:** The incidence of AL was 2.17% (36/1660). RF and XGBoost had higher area under the receiver operating characteristic curve (AUC) (RF-AUC=0.90, XGBoost-AUC=0.89) and RF performed with higher specificity (0.822, 0.775-0.862) and accuracy (0.822, 0.776-0.861) compared to XGBoost (specificity: 0.723, 0.670-0.770, accuracy: 0.729, 0.678-0.776) and SVM (specificity: 0.701, 0.647-0.750, accuracy: 0.708, 0.656-0.756) ( $p<0.05$ ). Using feature importance analysis, we found that hypertension, diabetes, BMI, Brinkman index, albumin, hemoglobin, tumor size, tumorous obstruction, ASA score and operation time were the ten most important predictors.

**Conclusions:** We developed a high-performance machine learning tool with 81.8% and 82.2% of sensitivity and specificity, respectively, which could calculate the risk of AL in gastric adenocarcinoma patients who received total gastrectomy or proximal gastrectomy. Furthermore, the web app (<https://gasal.21cloudbox.com/>) that we designed can produce real-time prediction which may be helpful to guide surgeons' intraoperative decision-making.

*Artificial intelligence in gastric cancer diagnosis/treatment*

IGCC22-ABS-1071

**CT RADIOMIC PREDICT SURVIVAL OUTCOMES AMONG OCCULT PERITONEAL METASTASIS IN GASTRIC CANCER**

Jia Fu\*<sup>1</sup>, Lei Tang<sup>2</sup>, Li Zi-yu<sup>3</sup>, Ji Jia-fu<sup>3</sup>, Zou Ying hua<sup>1</sup>

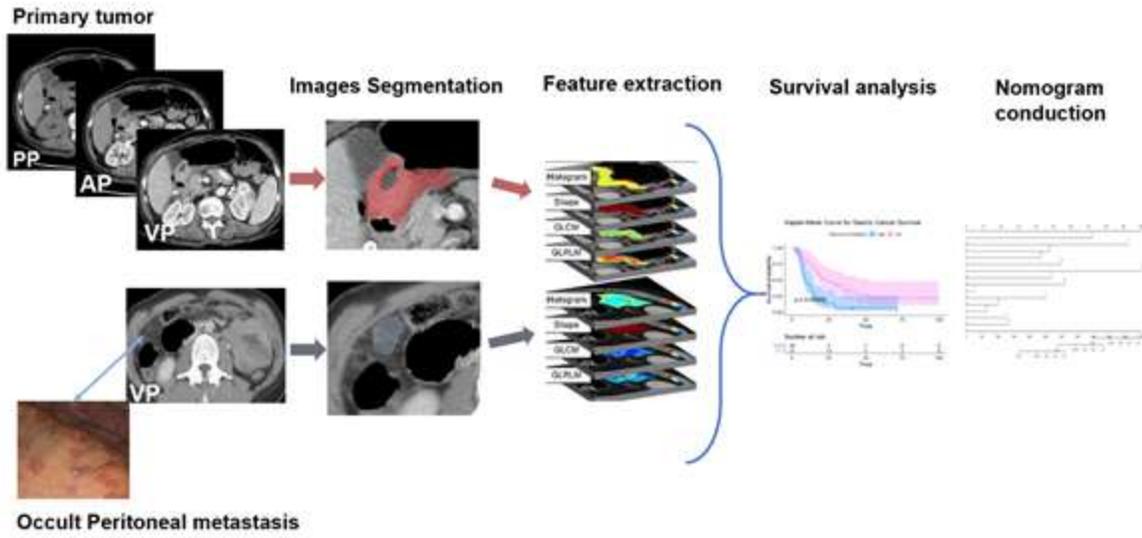
<sup>1</sup>Department of Interventional Radiology and Vascular Surgery, Peking University First Hospital, Beijing, China., <sup>2</sup> Radiology Department, <sup>3</sup>Department of Gastrointestinal Surgery, Peking University Cancer Hospital and Institute, Beijing, China

**Objectives:** To develop a radiomics nomogram for pretreatment prediction of overall survival in gastric cancer patients with occult peritoneal metastasis.

**Methods:** The research ethics board-approved retrospective study included 61 gastric cancer patients with laparoscopy confirmed occult peritoneal metastasis. Baseline clinical factor data were collected from medical records. Radiomics analysis included tumor segmentation, feature extraction, model construction and model evaluation. The radiomics features of primary tumor were extracted from the plain phase (PP), artery phase (AP), venous phase (VP) of pretreatment acquired CT in all patient. The radiomics of peritoneum region (PR) in VP were also build. Kaplan-Meier and Cox's hazard regression analyses were used to evaluate the prognostic significance. Final nomograms predicting overall survival (OS) of patients were established. C-index were used to assess the performance of nomograms.

**Results:** The median survival time was 14.55 months (range, 7.29-29.44m). Seven peritoneum region features in VP, six primary tumor features in three phases were showed significant correlation with OS on multivariate analysis ( $p < 0.05$ ). Peritoneum of original\_glcm\_SumSquares [hazard ratio (HR): 3.93(1.78-8.65), primary tumor of rbo3.1\_LH\_glrIm\_ShortRunEmphasis in PP [HR: 0.09(0.03-0.24)], sym11\_HL\_glrIm\_RunVariance in AP [HR: 1.87(1.04-3.36)], and db20\_LH\_glcm\_MaximumProbability in VP [HR: 1.882 (1.324-2.674)] were identified as the representative prognostic indicators. VP radiomics signatures on primary tumor and peritoneum region exhibited better performance than AP and PP radiomics signatures. A radiomic nomogram was then developed incorporating the primary tumor and peritoneum region with C-indexes of 0.905.

**Image:**



**Conclusions:** CT radiomics of primary lesion and peritoneal region may become the promising predictors of overall survival in occult peritoneal metastasis.

*Artificial intelligence in gastric cancer diagnosis/treatment*

IGCC22-ABS-1164

**THE RADIOMICS NOMOGRAM PREDICTS THE RISK STRATIFICATION OF GASTROINTESTINAL STROMAL TUMORS**

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<sup>1</sup>Department of Gastric Surgery, Fujian Medical University Union Hospital, Fuzhou, China

**Objectives:** To establish a mitotic model of GIST patients based on the preoperative CT radiomic characteristics to predict the preoperative risk stratification nomogram of GIST.

**Methods:** Data of 267 GIST patients were collected retrospectively and randomly divided into training cohorts and validation cohorts. Extract the CT image features of the lesions in GIST patients, use the LASSO regression to screen and construct an imaging omics model for judging the level of mitosis, and construct a predictive GIST preoperative nomogram of risk stratification.

**Results:** In this study, there were 161 cases in the training cohorts and 106 in the validation cohorts. Four imaging features closely related to the level of mitosis were obtained, and a mitotic radiology model was constructed. Among them, in the training cohorts, the area under the curve AUC = 0.752 (95% CI: 0.674-0.829), in the validation cohorts, the imaging omics has similar discriminative ability, and its area under the curve is AUC = 0.764 (95% CI: 0.667-0.862). Finally, the preoperative risk stratification nomogram is equivalent to the AUC (0.965vs0.983) ( $p=0.117$ ) of the accepted risk stratification standard ("gold standard"). In addition, by calculating the individual scores of the nomogram, the ROC curve was constructed to assess the predictive power of the preoperative risk stratified nomogram. Both recurrence-free survival (RFS) and overall survival (OS) AUC values obtained good results. The high- and low-risk groups distinguished by nomogram scores showed significant statistical differences in RFS and OS between the training cohorts and the validation cohorts ( $P<0.05$ ). The nomogram score is an independent risk factors for the long-term prognosis of patients.

**Conclusions:** The features of preoperative CT radiomics can effectively predict the number of GIST mitotics, combined with the size of the preoperative tumor, accurate preoperative risk stratification is feasible, which can guide clinical decision-making and individualized treatment.

*Artificial intelligence in gastric cancer diagnosis/treatment*

IGCC22-ABS-1422

**MACHINE LEARNING TO PREDICT PERITONEAL METASTASES FOR GASTRIC CANCER: A MULTICENTER STUDY**

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<sup>1</sup>Department of General Surgery, Nanfang Hospital, Guangzhou, Guangdong, China

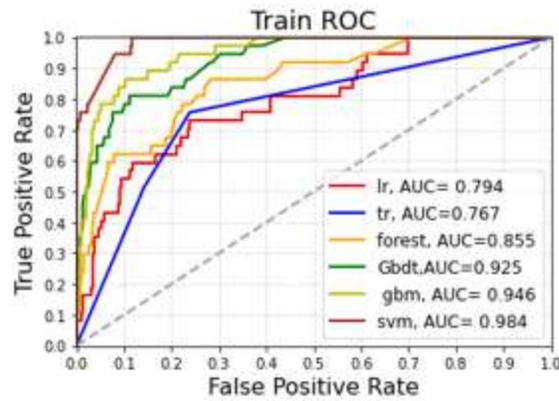
**Objectives:** The aim of this study was to develop and validate an artificial intelligence model using machine learning algorithms for preoperative predicting the risk of peritoneal metastasis in Gastric Cancer (GC) by analyzing clinicopathologic data.

**Methods:** Preoperative clinicopathologic data were collected from patients with gastric cancer from The First Affiliated Hospital of Sun Yat sen University(n=615, training : internal validation = 7:3) and Nanfang Hospital(n=477, external validation). Statistical analysis was conducted in R, and the model was constructed with Python. The machine learning model was run using the following models: Logistic Regression, Decision Tree, Random Forest, gbm, GBDT and SVM models.

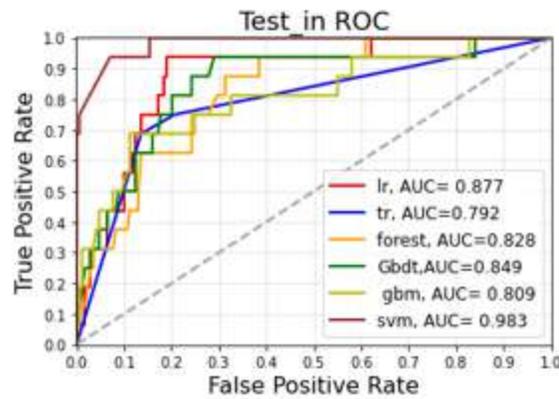
**Results:** 150 of the 1092 patients examined had histopathologic evidence of peritoneal metastasis, yielding a 13.7% metastasis rate. The features selected for model development were Borrmann type, degree of differentiation, depth of invasion, HGB, AFP and CA199 after variances and correlation analysis. Through machine learning, we found in both training and internal validation groups that the SVM model had achieved the highest accuracy score(0.972 / 0.968) and AUC value(0.984 / 0.983), and yet it performed poorly in the external group(accuracy: 0.797; AUC value: 0.684).In the meantime, we noticed that the GBDT and Gbm algorithm had demonstrated excellent prediction and generalization ability in all three datasets(accuracy score for GBDT in training, internal and external group: 0.933, 0.919 0.805;AUC values for GBDT in training, internal and external group: 0.925, 0.849, 0.808; accuracy score for Gbm in training, internal and external group: 0.926, 0.924, 0.805;AUC values for GBDT in training, internal and external group: 0.946, 0.809, 0.825).

**Image:**

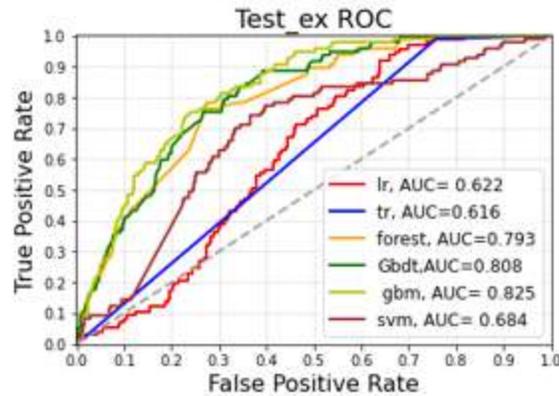
Training group



Internal validation group



external validation group



**Conclusions:** Machine learning can be an effective and powerful tool for predicting peritoneal metastasis of gastric cancer based on readily available preoperative data, providing a new insight for precision treatment in patients with end-stage gastric cancer.

*Artificial intelligence in gastric cancer diagnosis/treatment*

IGCC22-ABS-1180

**DEEP LEARNING HEMATOLOGICAL SCORE PREDICTS CHEMOTHERAPY BENEFIT AND RECURRENCE FOR GASTRIC CANCER**

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**Objectives:** This study aimed to construct a useful classifier to predict the AC benefit and recurrence hazard based on preoperative hematological indices through a multicenter database.

**Methods:** Data of locally advanced gastric cancer (LAGC) patients who underwent radical gastrectomy in Fujian Medical University Union Hospital (FJMUUH) between January 2010 and November 2014 were assessed. Training set (n=964) and internal validation set (n=414) were randomly splitted with a ratio of 7:3. External validation set were 251 patients from Sun Yat-sen university affiliated sixth hospital. The primary outcome were the long-term survival and recurrence pattern.

**Results:** AUC value of GCRF were 0.802, 0.710 and 0.753 in training set, internal and external validation set, respectively. LAGC patients were categorized into the high-risk group (HRG) and low-risk group (LRG) based on optimal cut-off of GCRF (0.46). In HRG, overall survival (OS) and disease-free survival (DFS) of the AC group are significantly higher than those of the non-AC group (all  $p < 0.05$ ), whereas in LRG, OS and DFS of the AC group are comparable to those of the non-AC group (all  $p > 0.05$ ). Furthermore, combined GCRF with 8th AJCC TNM staging system, only 650 (51.1%) patients can benefit most from AC among 1273 patients with pStage II-III. From the perspective of recurrence pattern, the recurrence rate of HRG is significantly higher than that of LRG in any recurrence type (all  $p < 0.05$ ).

**Conclusions:** This novel classifier based on preoperative hematological indices can predict not only the AC benefit of LAGC patients, but also the recurrence hazard after surgery. This classifier is expected to be an effective supplement to the 8th AJCC TNM staging system for the prediction of AC benefits. Further large-scale western studies are warranted.

*Artificial intelligence in gastric cancer diagnosis/treatment*

IGCC22-ABS-1223

**RADIOMIC-BASED MODELS ARE ABLE PREDICT THE RESPONSE TO NEOADJUVANT THERAPY FOR GASTRIC CANCER**

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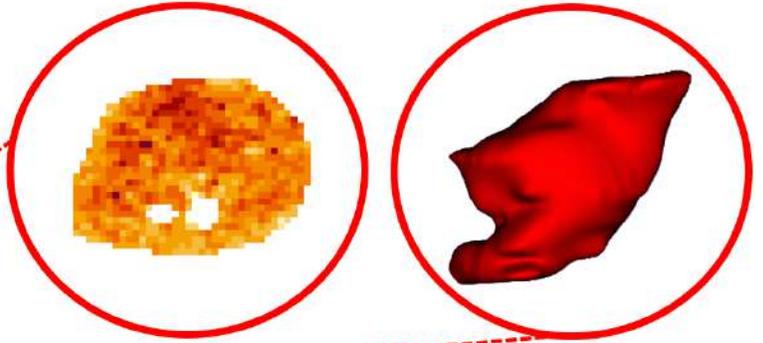
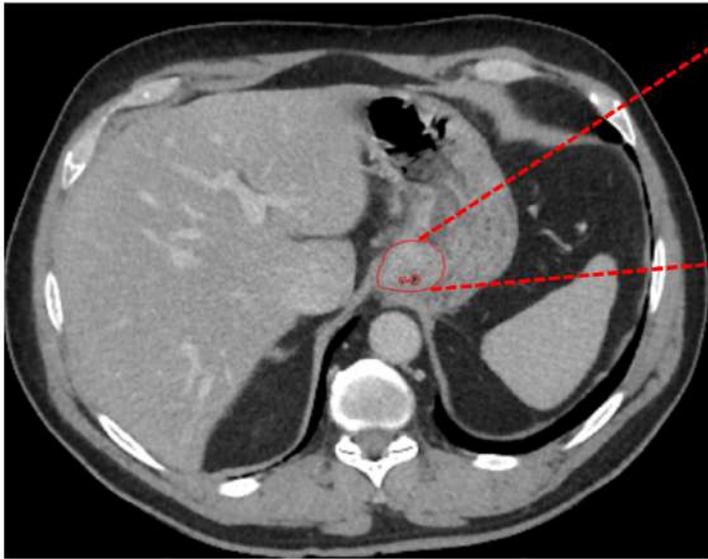
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**Objectives:** Based on the clinical need to identify early predictors for response to neoadjuvant chemotherapy (NAD) in patients with gastric and gastroesophageal junction cancer, the aim of this preliminary study was to apply radiomics to build prediction models for the response to NAD.

**Methods:** Major responders (MRs) were defined as TRG 1-2 and poor responders (PRs) as TRG 4-5. For every CT scan obtained before neoadjuvant chemotherapy, the images were segmented, and the region of interest (ROI) identified. The images were imported in MODDICOM and the radiomic features were extracted from the ROI. Initial radiomic feature selection was performed, and logistic regression analyses were applied to build radiomic and combined radiomic-clinicopathologic prediction models for the MR or PR status. Internal validation was performed for each model.

**Results:** The study included 77 patients undergoing neoadjuvant chemotherapy and subsequent tumor resection. The MR prediction model after all types of neoadjuvant chemotherapy (CF, FOLFOX, ECF/EOX and FLOT) had an overall good screening value (AUC 0.876, CI 95% 0.786–0.966, sensitivity 83% and NPV 96%). The models predicting NRs among patients undergoing ECF/EOX+FLOT (AUC 0.760, CI 95% 0.639-0.882), oxaliplatin-based chemotherapy (AUC 0.810, CI 95% 0.692-0.928) and FLOT (AUC 0.907, CI 95% 0.818 – 0.995) had a satisfactory performance with good discrimination and accuracy.

**Image:**



**Conclusions:** In this study, we developed a set of preliminary models, based on radiomic features extracted from the diagnostic CT scan of patients affected by GC and GEJC, to predict the response to different neoadjuvant chemotherapy strategies. These models are promising and once implemented, could be valuable and cost-effective instruments to target the multimodal treatment in patients with GC.

*Artificial intelligence in gastric cancer diagnosis/treatment*

IGCC22-ABS-1088

**COMBINATION OF AI-BASED ENDOSCOPY AND MIR148A METHYLATION FOR GASTRIC INDEFINITE DYSPLASIA DIAGNOSIS**

Yoshiyuki Watanabe<sup>1</sup>, Ichiro Oda<sup>2</sup>, Hiroyuki Yamamoto<sup>3</sup>, Tomohiro Tada<sup>4</sup>, Seiji Futagami<sup>5</sup>

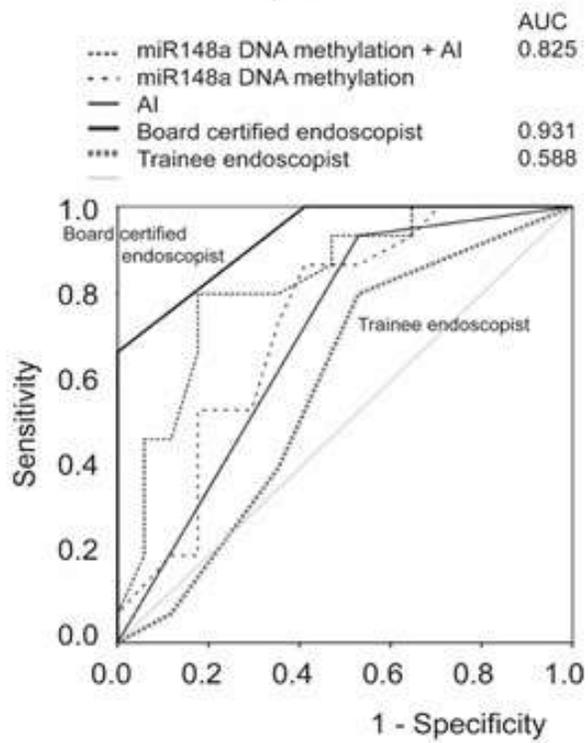
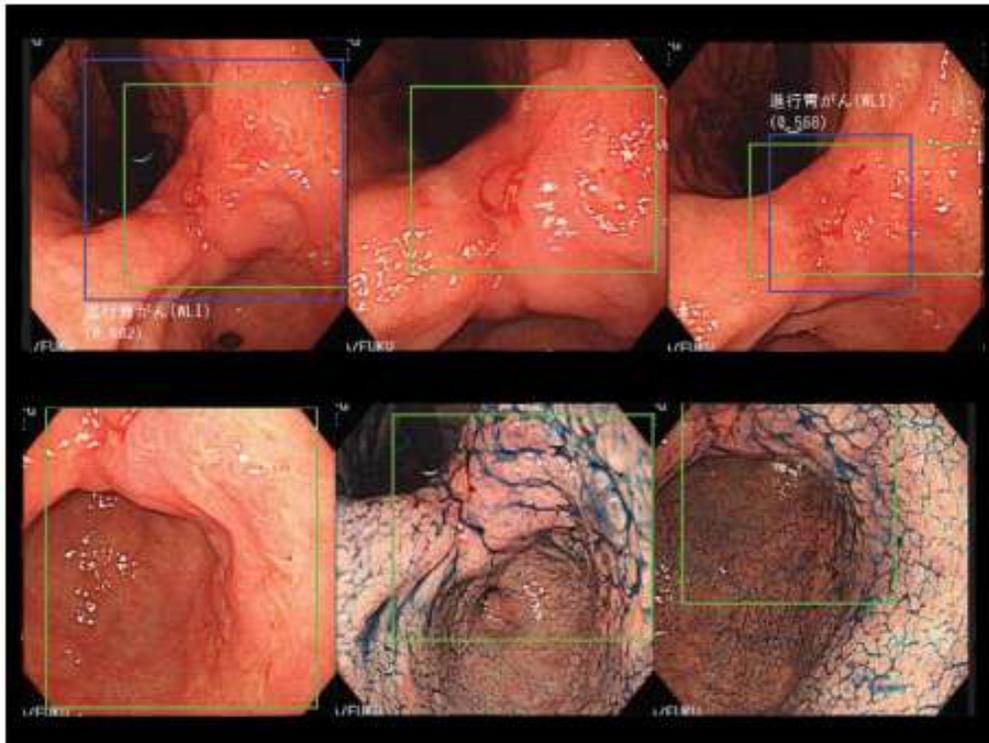
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**Objectives:** GI Endoscopy and biopsy-based pathological findings is basically needed to diagnose early gastric cancer. However, the information of biopsy specimen is limited because of the topical procedure. Thus, pathology doctors diagnose as gastric indefinite for dysplasia (GIN).

**Methods:** We compared the accuracy of physician-performed endoscopy (trainee; n=3: specialists; n=3), AI-based endoscopy, and/or molecular markers (DNA methylation: BARHL2, MINT31, TET1, miR-148a, miR-124a-3, NKX6-1, mutation: TP53 and MSI) in diagnosing GIN lesions. We enrolled 24388 patients who underwent endoscopy and 71 patients were diagnosed as GINs. Thirty-two endoscopic submucosal dissection (ESD) cases in 71 GINs and 32 endoscopically resected tissues were assessed by endoscopists, artificial intelligence (AI), and molecular markers to identify benign or malignant lesions.

**Results:** The endoscopy specialists group showed the highest accuracy in ROC curve (AUC: 0.931) followed by AI and miR148a DNA methylation (AUC: 0.825) than trainee endoscopists (AUC: 0.588).

**Image:**



**Conclusions:** AI with miR148s DNA methylation-based diagnosis is a potential modality to diagnose GIN.

***Surgery Videos***

IGCC22-VID-1325

**LAPAROSCOPIC PROXIMAL GASTRECTOMY WITH DOUBLE-FLAP RECONSTRUCTION FOR TUMORS IN 1/3 UPPER OF STOMACH**

Long D. Vo\*<sup>1</sup>

<sup>1</sup>Gastro-Intestinal Surgery, University Medical Center, Ho Chi Minh city, Vietnam, Ho Chi Minh, Viet Nam

**Video Summary:** Laparoscopic proximal gastrectomy is currently a standard of care of function-preserving procedure, not only for early gastric cancer, but also for large EG GIST. However, there is still debate on how to reconstruct the stomach after LPG. There are several techniques for post-LPG reconstruction but each has its own disadvantages. Direct esophago-gastrotomy has a high risk of reflux esophagitis; jejunal interposition can lead to delayed emptying of the stomach and anastomotic stenosis; while double-tract technique is a complicated procedure and has unclear functional effects. Double-flap esophago-gastrotomy has shown to prevent reflux esophagitis after LPG. Due to the difficulty and complexity of this procedure, there are a small number of studies and the evidence is limited.

In our hospital, we have performed LPG with double-flap reconstruction for early gastric cancer in the upper third of the stomach and large esophagogastric junction GIST since 2018 with promising results.

## ***Surgery Videos***

IGCC22-VID-1115

### **MEDIASTINOSCOPIC IVOR-LEWIS ESOPHAGECTOMY FOR ESOPHAGOGASTRIC JUNCTION ADENOCARCINOMA**

Akihiro Suzuki<sup>1</sup>, Taketo Matsubara<sup>1</sup>, Tadao Yokoi<sup>1</sup>, Takashi Taketa<sup>1</sup>, Gen Shimada<sup>1</sup>, Yohsuke Miyachi<sup>1</sup>, Akihiro Kishida<sup>1</sup>,  
Toshimi Kaido<sup>1</sup>

<sup>1</sup>Gastroenterological Surgery, St. Luke's International Hospital, Tokyo, Japan

#### **Video Summary:**

Minimally invasive mediastinoscopic esophagectomy (MIME) is reportedly less invasive and faster recovery than thoracoscopic esophagectomy. We present esophagogastric junction adenocarcinoma patients who were performed MIME under intraoperative nerve monitoring (IONM).

The procedure started with a patient lithotomy, and five trocars were made in the upper abdomen. Subsequently, a 35mm incision was made in the left side of the neck and a monitor was attached to the left vagus nerve. Three trocars were placed with single incision surgical devices. MIME was performed from cervical ports. Gastric tube reconstruction via mediastinum with cervical anastomosis was performed.

The operation was successful. Total operation time was 393 minutes, with an estimated blood loss of 5 ml. There were no complications and no recurrent laryngeal nerve palsy.

MIME with IONM is safe and less invasive especially for the respiratory system as a thoracotomy is unnecessary.

***Surgery Videos***

IGCC22-VID-1201

**REDUCED-PORTS DISTAL GASTRECTOMY USING LAPAROSCOPIC ARTICULATING DEVICES FOR  
ADVANCED GASTRIC CANCER**

So Hyun Kang<sup>1</sup>, Sang Woo Park<sup>1</sup>, Eunju Lee<sup>1</sup>, Sangjun Lee<sup>1</sup>, Young Suk Park<sup>1</sup>, Sang-Hoon Ahn<sup>1</sup>, Yun-Suhk Suh<sup>1</sup>,  
Hyung-Ho Kim<sup>1</sup>

<sup>1</sup>Department of Surgery, Seoul National University Bundang Hospital, Seongnam, Korea, Republic Of

**Video Summary:** Complete D2 lymph node dissection for advanced gastric cancer is a difficult procedure to be done through minimally invasive approach. It is even more complex for reduced-ports surgery which has no assistant ports. New laparoscopic devices such as the organ retractor and articulating laparoscopic instruments have been introduced in the market to facilitate this procedure. In this video, the effect of using the combination of the articulating grasper and the intra-abdominal organ retractor is demonstrated.

## ***Surgery Videos***

IGCC22-VID-1323

### **LAPAROSCOPIC SPLENIC HILAR LYMPHADENECTOMY FOR ADVANCED GASTRIC CANCER**

Long D. Vo\*<sup>1</sup>

<sup>1</sup>Gastro-Intestinal Surgery, University Medical Center, Ho Chi Minh city, Vietnam, Ho Chi Minh, Viet Nam

**Video Summary:** The benefit of removing the splenic hilar lymph nodes in patients with proximal gastric cancer has been still controversial. Splenic hilar lymphadenectomy has been included as a part of standard D2 lymphadenectomy for total gastrectomy. The incidence of the splenic hilar lymph node metastasis was range from 8.1% to 27.9%. The splenic hilar lymphadenectomy was feasible and safe that was reported of the intraoperative and postoperative was acceptable. For oncologic outcomes, no statistically significant difference was observed in 5-year survival for the patients with and without splenic hilar lymph node metastasis. Otherwise, some studies gave a statistically significant difference especially the tumor located at the non-greater curvature.

Indication of the splenic hilar lymph node dissection is still difference in many guideline for treatment of gastric cancer. In my center, the splenic hilar lymphadenectomy is applied for the tumor located at the upper third of the stomach with T3-4.

## ***Surgery Videos***

IGCC22-VID-1400

### **TOTALLY LAPAROSCOPIC MESOGASTRECTOMY WITH DELTA-SHAPED ANASTOMOSIS FOR POSTERIOR WALL SCHWANNOMA**

Lorenzo Ferri<sup>1</sup>, Annamaria Agnes<sup>1</sup>, Alberto Biondi<sup>1</sup>

<sup>1</sup>Department of General Surgery, Università Cattolica del Sacro Cuore - Policlinico Gemelli, rome, Italy

#### **Video Summary: INTRODUCTION**

Totally Laparoscopic Gastrectomy (TLG) is an ever growing reliable approach to treat lesions affecting the stomach. Modified delta-shaped gastrostomy has been proven to be a safe anastomosis for this minimally invasive approach. In this video we show our experience in treating a Schwannoma of the posterior gastric wall of the lesser curvature in a female patient with an incidental diagnosis.

#### **TECHNIQUE**

A mesogastrectomy was performed through the use of a laparoscopic linear cutter. As the mobility of the gastric stumps was ample and resection margins were free of disease, a modified delta-shaped gastrogastrostomy was created, reinforced with a self-locking double suture. Using this technique only one intersection for three sutures is created, thus theoretically reducing the risk of anastomotic leakage.

#### **CONCLUSION**

The purpose of the video is to show the feasibility of a technically challenging procedure like this totally laparoscopic anastomosis for an atypical gastrectomy.

***Surgery Videos***

IGCC22-VID-1433

**DOUBLE-LOOP INTRACORPOREAL RECONSTRUCTION AFTER ROBOTIC TOTAL GASTRECTOMY FOR GASTRIC CANCER**

Domenico Di Nardo\*<sup>1</sup>, Amilcare Parisi<sup>1</sup>

<sup>1</sup>DEPARTMENT OF EMERGENCY, SANTA MARIA DI TERNI HOSPITAL, TERNI, Italy

**Video Summary:** The reconstructive phase can be divided into two major categories based on the approach adopted: the execution of extracorporeal versus intracorporeal anastomosis. In turn, the surgical team can perform the latter with laparoscopic or robotic assistance. However, the question is, how should a robotic esophagojejunal anastomosis be performed after total gastrectomy? Most articles in the literature have reported the execution of mechanical anastomoses, especially with circular staplers via the creation of a manual purse-string around the anvil. Other solutions have described the use of the Orvil or the overlap technique. Only three authors have reported intracorporeal sutures with a completely robotic-sewn anastomosis. A new robotic technique (the Parisi technique) was developed and adopted at St. Mary's Hospital, Terni, Italy. A double-loop reconstruction method with an intracorporeal robot-sewn anastomosis is performed.

***Surgery Videos***

IGCC22-VID-1199

**SINGLE-PORT INTRAGASTRIC WEDGE RESECTION USING THE TUNNEL METHOD**

So Hyun Kang<sup>1</sup>, Sang Woo Park<sup>1</sup>, Eunju Lee<sup>1</sup>, Sangjun Lee<sup>1</sup>, Young Suk Park<sup>1</sup>, Sang-Hoon Ahn<sup>1</sup>, Yun-Suhk Suh<sup>1</sup>, Hyung-Ho Kim<sup>1</sup>

<sup>1</sup>Department of Surgery, Seoul National University Bundang Hospital, Seongnam, Korea, Republic Of

**Do you want to apply for travel grants?:** Yes

**Video Summary:** Gastric wedge resection is performed to treat gastric submucosal tumors (SMTs, and intragastric wedge resection is especially useful for SMTs that are mostly endophytic. However, the procedure is a difficult to perform for some patients whose stomach is far from the umbilicus, where the stomach is often pulled out to create the intragastric opening. The tunnel method using another wound retractor was developed to overcome this hurdle. This video shows how single-port intragastric wedge resection using the tunnel method is performed for a female 38-year old patient presenting with a gastric SMT in the cardia.

***Surgery Videos***

IGCC22-VID-1216

**TECHNICAL CHALLENGES IN A ROBOTIC TOTAL GASTRECTOMY**

Taleen A. Macarthur<sup>1</sup>, Travis E. Grotz<sup>1</sup>

<sup>1</sup>Department of Surgery, Mayo Clinic, Rochester, United States

**Video Summary:** This video describes a robotic assisted total gastrectomy, D2 lymphadenectomy, and en-bloc distal pancreatectomy and splenectomy for a locally advanced malignant gastric neuroendocrine tumor. The tumor abutted the pancreas, encased the splenic vessels, and invaded the spleen. Intraoperatively, the pancreas was too thick to transect with a stapler. Instead, the pancreas was divided with monopolar scissors at maximum settings and sealed with several pledgeted compression sutures. The celiac dissection was also challenging requiring different approaches. The patient did not develop any major pancreatic leak post-operatively. Robotic resection provides a less invasive option for patients undergoing total gastrectomy. However, locally advanced tumors can be challenging. In this case, pancreatic division and the celiac axis dissection were challenging. The illustrated techniques allowed us to stay MIS and minimize morbidity and recovery.

IGCC22-LB-1532

## MUTANT P53 PROTEINS ARE SHUTTLED BY CANCER EXTRACELLULAR VESICLES TO EDUCATE TUMOR MICROENVIRONMENT

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**Objectives:** Most cancers harbor mutations in the TP53 gene (encoding for the p53 tumor suppressor protein). Furthermore, gain-of-function (GOF) mutation in p53 imparts an aggressive traits to the cells when compared to the cancer cells harboring inactivating mutations or wild-type (WT)-p53. Notably, multiple studies have delineated the presence of GOF-mutant p53 protein in untransformed cells or in stromal compartments of tumor microenvironment (TME). In recent years, the involvement of extracellular vesicles (EVs) in cell-to-cell communication has emerged as a major route by which cancer cells can interact and educate immune, and non-immune cells in TME to become tumor supportive. To this end, we hypothesize that mutant p53 protein can be shuttled via EVs to TME cells thus shedding light on a novel non-cell autonomous role of mutant p53 cancers

**Methods:** EVs were isolated from various cancer cell lines (pancreas, colon) differing by their p53 status and the effect on neighboring cancer cells and TME cells was studied in vitro and in-vivo. We also utilized the human colorectal Colo-320DM cancer cell xenograft model, which expresses the R248W p53 mutant. FFPE sections of subcutaneous tumors derived from the Colo-320DM xenografts were stained for p53 using the DO-1 antibody that specifically recognizes human p53.

**Results:** Our data demonstrated that mutant p53 protein can be selectively sorted into EVs; that mutant p53 in EVs can be taken up by neighboring cancer cells and macrophages that do not harbor mutant p53 protein. Evident of macrophage education was seen with the increased expression and secretion of pro-inflammatory cytokines. Notably, mutant p53 expression was also found in non-tumor cells in both human cancers, and in non-human tissues in human xenografts.

**Conclusions:** Cancer cells harboring GOF p53 mutants, can package mutant p53 proteins in EVs, and deliver them to neighboring cancer cells and to the TME.

**Disclosure of Interest:** None declared

## Prevention and early detection

IGCC22-LB-1505

### THE USE OF GASTROEPIPLOIC ARTERY IN HEART SURGERY. IS ROUTINE POSTOPERATIVE ENDOSCOPY NECESSARY?

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<sup>1</sup>Department of Internal Medicine, University of South Florida, <sup>2</sup>Advanced Endoscopy, H. Lee Moffitt Cancer Center, Tampa, United States

**Objectives:** The right gastroepiploic artery (RGEA) has been used in coronary artery bypass grafting (CABG) as an arterial graft. However, an increased incidence of gastric cancers has been reported after using the RGEA in CABG. In addition, the treatment of gastric cancer in patients with a history of CABG using the RGEA is associated with many problems. The objective of this study is to provide a comprehensive literature review regarding such cases.

**Methods:** A literature review was performed in Cochrane Database, Embase, Medline, PubMed, and Scopus electronic databases using sentences as “coronary artery bypass graft surgery”, “right gastroepiploic artery” and “gastric cancer” to identify pertinent articles. The initial search yielded 361 studies which were manually reviewed, and 30 studies met the inclusion criteria.

**Results:** A total of 74 patients were reported in the literature. The mean age was 70.8 years old with males representing 90.6% of cases. Gastric cancer occurred after a mean of 71.3 months of using the right gastroepiploic artery (RGEA) as an arterial graft; in coronary artery bypass graft (CABG) surgery. 58.7% of cases were early gastric cancer, and the remaining cases were advanced cancer. Stage I,II,III AND IV gastric cancer was diagnosed in 63.2%,13.2%,15.8% and 7.9% of cases respectively. Subtotal or partial gastrectomy was performed in 78.26% of cases, and total gastrectomy was performed in the remaining cases. The RGEA was preserved in 72.6% of cases, while it was rerouted, reconstructed and/or resected in the remaining cases; to allow for complete dissection of lymph nodes.

**Conclusions:** Gastric cancer following the use of RGEA in CABG may be underreported. Case control studies are needed to know if patients with history of RGEA use in CABG; have greater risk to develop gastric cancer in comparison with the general population. Therefore, routine postoperative endoscopy might be necessary for early detection of gastric cancer, in cases where RGEA was used in CABG.

**Disclosure of Interest:** None declared

## Diagnosis and staging

IGCC22-LB-1492

### CURRENT TREND OF STAGING LAPAROSCOPY FOR GASTRIC CANCER IN COLOMBIA. HOW ARE WE DOING IT?

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<sup>1</sup>Gastrointestinal Surgery, Instituto Nacional de Cancerología, Bogotá, Colombia

**Objectives:** Gastric cancer (GC) is the leading cause of cancer mortality in Colombia, for this reason an adequate staging process is important to offer an appropriate treatment. The objective of this study is to report and clarify the current trends about the indications and technique aspects for the staging laparoscopy (SL) in Colombia for GC patients.

**Methods:** The Unit of Gastrointestinal Surgery of the Colombian National Cancer Institute conducted a survey for surgeons practicing in gastrointestinal cancer management in Colombia, on the choice for indications and trends in technique of the SL for GC patients.

**Results:** 74 surgeons replied the questionnaire. The main indication for SL was to discard peritoneal carcinomatosis for 43,8% of the surgeons and 39,7% considered the SL a reliable tool for define resectability. 54,1% perform the procedure for early stages, however, 48,6% consider SL in patients with a suspected carcinomatosis by imaging. The areas assessed by most surgeons (>85%) were the liver surface, diaphragmatic domes, paracolic gutters and pelvis, and the areas with the lower rate for routinely evaluation were the small bowel and mesentery (63,5%), ileocecal valve (40.5%) and Treitz ligament (39%). 23% of the surgeons do not use the Peritoneal Carcinomatosis Index to describe the presence of carcinomatosis and 33% do not take routinely peritoneal cytology.

**Conclusions:** In a country with high incidence rates of GC in advanced stages and with high-risk features, the SL is a reliable tool in the staging process and should be done from early stages since it has higher sensitivity to identify the presence and extension of peritoneal carcinomatosis. However, it is needed necessary a complete and adequate exploration of the abdominal cavity, assessing the areas of greatest settlement of tumor cells. For this reason, it is needed a systematization of the procedure to allow an optimal performance of the procedure and define an adequate treatment strategy for each patient.

**Disclosure of Interest:** None declared

## Endoscopic treatment

IGCC22-LB-1528

### LAPAROSCOPIC SUBTOTAL GASTRECTOMY WITH D2 LYMPHADENECTOMY USING INTRACORPOREAL HAND SEWN ANASTOMOSIS

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**Objectives:** gastric wall stapling is a common method of performing laparoscopic gastrojejunal anastomosis after Billroth II subtotal gastrectomy (DG). However safety of cost effectiveness of it is not clear for today.

**Methods:** This study was conducted from May 2020 to August 2021 at National Cancer Institute (Ukraine). There were two groups of patients, who was randomized after laparoscopic subtotal gastrectomy with D2 lymphadenectomy. Gastrojejunostomy in patients in Group A was performed using a linear stapling technique, while patients in Group B underwent hand sewing technique.

Primary endpoints of the study were surgical outcomes and cost of each type of operation.

Secondary endpoints were hospitalization time, time to first defecation, time to switch on solid diet, intraoperative blood loss, short and long term complications.

Baseline characteristics of patients in both groups were similar for more accurate data.

**Results:** 52 patients successfully underwent laparoscopic subtotal gastrectomy with D2 lymphadenectomy and gastrojejunostomy, 2 patients required conversion to laparotomy. Difference of operation time was significant between two groups ( $268.4 \pm 23.7$  min in Group A vs,  $324.2 \pm 28.3$  min,  $P=0.01$ ) time for gastrojejunostomy differ dramatically ( $46.5 \pm 20.5$  min vs.  $157.3 \pm 31.2$  min respectively,  $P=0.01$ ). There was no significant difference in blood loss ( $65.3 \pm 30.4$  ml vs  $57.4 \pm 26.8$  ml,  $P=0.28$ ), time to first defecation ( $3.2 \pm 0.6$  days vs,  $2.8 \pm 0.7$  days,  $P=0.14$ ), patients could switch on solid diet with no significant difference ( $4.9 \pm 1.6$  days vs.  $4.5 \pm 1.8$  days,  $P=0.38$ ), total hospitalization duration ( $8.2 \pm 2.3$  days vs.  $8.4 \pm 2.5$  days,  $P=0.69$ ) did not differ much in two groups. No serious mortality was registered in both groups. But cost of operation was significantly higher in Group A.

**Conclusions:** gastric wall stapling is faster and easier method of gastrojejunostomy comparing to hand sewn, but much less cost effective, there is no significant difference in safety between these two methods.

**Disclosure of Interest:** None declared

## Surgery and quality assurance

IGCC22-LB-1523

### IMPACT OF RESECTION MARGINS (R1) ON SURVIVAL OF PATIENTS WITH ADVANCED DIFFUSE TYPE GASTRIC CANCER

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**Objectives:** Gastric cancer (GC) is a leading cause of cancer-related mortality worldwide. Diffuse type GC have a much worse prognosis compared to intestinal type GC. There is an ongoing debate whether microscopic involvement of the proximal margin (R1 resection) influences overall survival (OS) in advanced GC.

The aim of this study was to assess OS in patients with diffuse GC and positive lymph node involvement who underwent oncological gastrectomy with R0 and R1 resections.

**Methods:** All consecutive patients from two tertiary centers operated with curative intent for diffuse GC between January 2005 and December 2018 were analyzed. Patients with R2 resections or missing data were excluded. Extracted data included demographics, major comorbidities, ASA score, neo-adjuvant treatment, pre- and postoperative staging, survival data and pattern of recurrence. Lymph node involvement was based on pathology.

**Results:** A total of 94 patients with diffuse GC were included. Two patients were excluded because of R2 resection and missing data regarding pathology, leaving a cohort of 92 patients. Sixty-four patients were lymph node positive (pN+); 48 patients (75%) with R0 resection and 16 patients (25%) with R1 resection. No difference in terms of preoperative data and intraoperative characteristics was found between R0 and R1 groups. Median OS was better in the R0 group (27 months, 95% CI 17-37) compared to R1 group (7 months, 95% CI 3-11,  $p < 0.001$ ). Similar results were found with disease-free survival (DFS) (25 vs. 6 months,  $p = 0.002$ ).

On multivariable analysis, T stage and resection margin (R status) were independent factors predicting OS (T stage: HR 4.5,  $p < 0.001$ , R status: HR 4.2,  $p < 0.001$ ) and DFS (T stage: HR 2.9,  $p = 0.004$ , R status: HR 3.5,  $p = 0.001$ ) in the cohort of patients with lymph node involvement.

**Conclusions:** The present series confirmed that patients with negative surgical margins have better OS compared to patients with positive margins in case of locally advanced diffuse GC. Therefore, R0 resections should be the goal of oncological gastrectomies.

**Disclosure of Interest:** None declared

## Minimally invasive and robot-assisted surgery

IGCC22-LB-1480

### OPEN VS LAPAROSCOPIC GASTRECTOMY FOR ADVANCED GASTRIC CANCER: A SURVIVAL ANALYSIS ON BEHALF OF GIRCG

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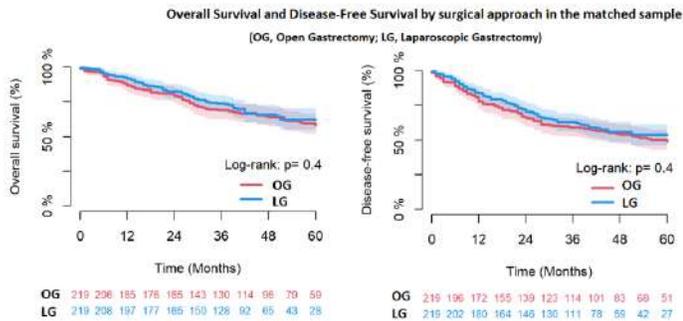
**Objectives:** Oncologic outcomes after laparoscopic gastrectomy (LG) in advanced gastric cancer (AGC) in the West are poorly investigated. The study analysed survival data of patients undergoing curative-intent distal or total gastrectomy with D2 lymphadenectomy for AGC by either laparoscopic (LG) or open (OG) approach performed in 20 national institutions belonging to the Italian Research Group on Gastric Cancer (GIRCG)

**Methods:** Data were gathered from 20 Institutions between January 2015 and May 2018 and retrospectively analyzed. A Propensity Score Matching (PSM) analysis was performed in order to balance baseline characteristics of LG and OG patients. The primary endpoint was 3-year overall survival (OS). Secondary endpoints were 3-year disease free survival (DFS) and short-term outcomes. Univariate and multivariate regression analyses were conducted to explore factors associated with OS

**Results:** From 717 total patients, after PSM 438 patients were correctly matched, 219 in each group. The 3-year OS rate was 73.6% for the LG group and 68.7% for the OG group, (p=0.4). When compared with OG, LG showed comparable 3-year DFS (62.8% vs 58.9%, p=0.4), comparable postoperative LOS (09.00 vs 10.00 days, p=0.056) higher rate of adjuvant chemotherapy (ACT) accomplishment (56.9% vs 40.2%, p=0.001), similar rates of 30-day morbidity/mortality and

readmission rates. Factors associated with OS were ASA Score  $\geq 3$ , age-adjusted Charlson Comorbidity Index (aCCI)  $\geq 5$ , lymph node ratio (LNR)  $\geq 0.15$ , p/ypTNM Stage III and performed ACT, but not the laparoscopic approach

**Image:**



**Conclusions:** LG for AGC offers similar rates of OS when compared to OG. Additionally, LG is associated with similar comparable postoperative LOS, higher rates of accomplishment of ACT, similar incidence of 30-day morbidity/mortality, readmission and DFS. The type of surgical approach was not shown as a prognostic factor for survival, in favour of ACT accomplishment, ASA Score, aCCI, LNR and p/ypTNM Stage

**Disclosure of Interest:** None declared

## Multidisciplinary treatment of localized gastric cancer

IGCC22-LB-1515

### UPPER GI BLEEDING AS THE MAIN FEATURE IN A TEENAGE PATIENT WITH GIST. CASE REPORT.

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**Objectives:** We present the case of a fourteen year old female with acute upper GI bleeding as primary presentation of gastric GIST.

**Methods:** Case Report:

GAC, fourteen year old female patient enters our hospital on June 2021 with a clinical history of hematemesis. After initial fluid resuscitation she underwent upper endoscopy that accused only gastritis.

Endoscopy was repeated on September 2nd, 2021 showing a middle body, posterior wall elevated lesion covered by hyperemic, smooth mucosa measuring 5 cm of diameter. Upon endoscopic ultrasound there was a 4,5 cm hypoechoic, heterogeneous mass with cystic components, poorly vascularized and with no signs of calcification. Gastric layer where the lesion arises was impossible to determine.

With these findings the patient was referred to GRAAC and submitted to radiology department where a CT scan of the abdomen and thorax was performed on October 10th. An exofitc heterogeneous lesion with peripheral enhancement with density of soft tissue in the lateral wall of the gastric fundus measuring 5,7 x 5,7 x 5,4 cm with no signs of peritoneal seedings, no thoracic nor hepatic metastasis or any other signs of extragastric compromise. Free fluid was absent on the study. An exofitc mass arising from the gastric lumen compatible with GIST was reported.

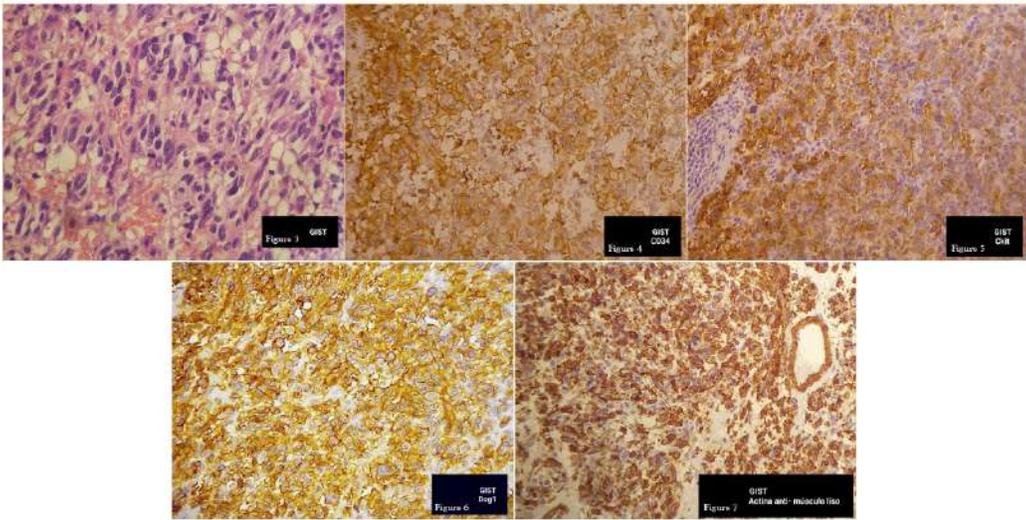
On October 20th the patient was submitted to laparotomy and a gastrotomy was performed with tumor resection and larger curvature lymphadenectomy. The stomach wound was closed and the patient had an uneventful recovery in the ICU.

**Results:** Pathology immunoreactivity was positive for CD34, CKIT, DOG1 and Anti-muscle Actin staining therefore confirming the GIST diagnosis.

**Image:**



Figures 1 and 2: CT Scan of the abdomen showing an endolic mass arising from the stomach greater curvature of approximately 5.7 x 5.7 x 5.4 cm diameter.  
 Figure 3: GIST Pathology  
 Figure 4: CD34 Staining  
 Figure 5: CKIT Staining  
 Figure 6: DOG1 Staining  
 Figure 7: Anti-Muscle Actin Staining



**Conclusions:** On early november the patient presented another episode of hematemesis without hemodynamic repercussion being referred for an upper endoscopy that did not show active bleeding or any abnormal lesions. Patient is still under oncologic surveillance with pediatric surgery and oncoloy. GISTs on pediatric population are rare and multidisciplinary management at high-volume centers is advised.

**Disclosure of Interest:** None declared

## Management of stage IV gastric cancer, peritoneal targeted therapy

IGCC22-LB-1510

### A NOMOGRAM USED TO EVALUATE THE SURGICAL BENEFITS OF THE GASTRIC CANCER PATIENTS TREATED BY HIPEC

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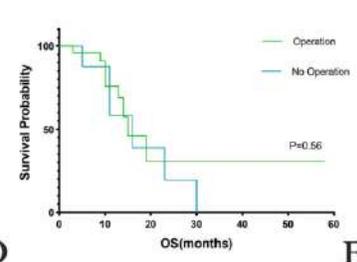
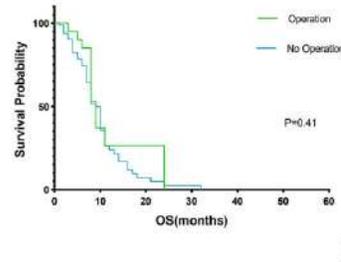
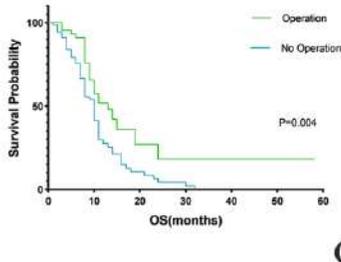
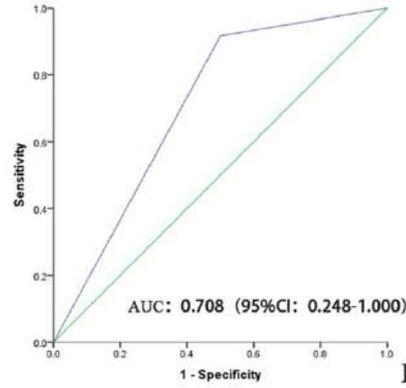
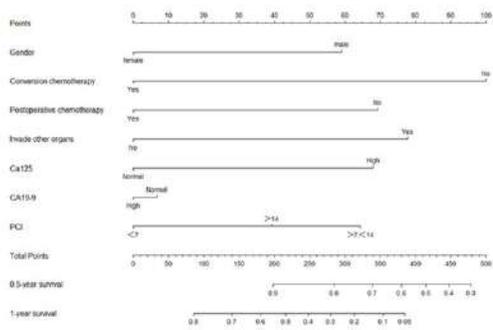
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**Objectives:** The efficacy of hyperthermic intraperitoneal chemotherapy ( HIPEC ) in gastric cancer patients with peritoneal metastasis is being confirmed by more and more studies. However, whether these patients with HIPEC can benefit after surgery is still controversial. This study hopes to use the nomograms to evaluate whether these patients with HIPEC can benefit from surgery.

**Methods:** The study analyzed the data of gastric cancer patients with peritoneal metastasis treated by HIPEC in this center from 2017 to 2021. They were randomly classified into either a training or validation group at a ratio of 9:1. The nomogram was constructed based on prognostic factors using Cox regression analysis. patients were divided into high-risk group and low-risk group by the nomogram. The overall survival time of operation and no operation patients in two groups were compared respectively.

**Results:** A total of 135 patients were included in this study. Gender , CA125 , Invade other organs , Conversion chemotherapy and Postoperative chemotherapy were significantly related to OS. The nomogram was established by combining the above five factors with CA19-9 and PCI. The C-index of the model is 0.765 and AUC is 0.708 (95% CI: 0.248-1.000) (Figure 1). In all patients, the median survival time of operation patients was longer than that of no operation patients (13 months VS 10 months ,  $p=0.0041$ ). In high-risk patients, there was no difference in overall survival between the two groups ( $P=0.41$ ), while in the low-risk group, although it did not have statistical significance ( $P=0.56$ ), two surgical patients achieved long-term survival (Figure 1).

**Image:**



**Conclusions:** The nomogram constructed with seven factors can accurately predict the patients with high and low risk of death. At the same time, it is suggested that cytoreductive surgery (CRS) with HIPEC can improve the survival time of patients. For the low-risk group, Surgical treatment can improve the possibility of long-term survival.

**Disclosure of Interest:** None declared

IGCC22-LB-1511

## N-RATIO INFLUENCE ON SURVIVAL IN PATIENTS WITH GASTRIC CANCER AFTER D2 GASTRECTOMY

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**Objectives:** To determine the outcome of gastric cancer after curative surgery TNM staging system is used, however this system has its limitations and therefore a new prognostic factor was introduced - ratio between metastatic and examined lymph nodes: N-ratio.

**Methods:** In a retrospective study we analyzed 275 patient cases from 2014 – 2015 who underwent D2 gastrectomy for gastric cancer at the Oncology Center of Latvia. N-ratio was set accordingly from other research results [1], respectively: N-ratio 0 = 0%, N-ratio 1 = 1% – 25%, N-ratio 2 = >25%. In the current study: lymph node stage, TNM stage, lymph node ratio and overall survival were analyzed.

**Results:** The mean of total dissected lymph nodes was 25 (SD=14.6) lymph nodes and the median of total dissected lymph nodes was 23 lymph nodes. Median overall survival (mOS) was 20 month. mOS using N-ratio: N-ratio 0 mOS =68 months, N-ratio 1 mOS=19 months, (95% CI 13.384 – 24.616), N-ratio 2 mOS =7 months (95% CI 4.687 – 9.313). mOS using lymph node stage: N0 mOS was 68 months, N1 mOS = 17 months (95% CI 0.000 – 35.908), N2 mOS = 16 months (95% CI 10.928 – 22.072), N3 mOS = 8 months (95% CI 4.614 – 11.386), (p=0.001). It was found out that N-ratio is an independent prognostic factor – N-ratio 1: HR=1.786 (p=0.03); N-ratio 2: HR = 4.349 (p=0.001), however lymph node stage was not found as an independent prognostic factor and was statistically insignificant. There was a very weak positive and statistically insignificant correlation between total dissected lymph nodes and N-ratio (r=0,107, p=0,078), however for lymph node there is a weak positive and statistically significant correlation between lymph node stage and total dissected lymph nodes (r=0.230, p=0.001).

**Conclusions:** Lymph node ratio is an independent prognostic factor that predicts more precisely radical gastrectomy outcomes, than N factor. Lymph node ratio also does not have any correlation with total dissected lymph nodes, meaning that it does not change its stage and therefore it can more precisely predict prognostic stage and outcome.

**Disclosure of Interest:** None declared