

657 ROUTINE ESOPHAGRAMS FOLLOWING HIATUS HERNIA REPAIR MINIMISES REOPERATIVE MORBIDITY: A MULTICENTER COMPARATIVE COHORT STUDY

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Hiatus hernia repairs are common. Early complications such as re-herniation, esophageal obstruction and perforation, although infrequent, incur significant morbidity. Here, we determine whether routine postoperative esophagrams following hiatus hernia repair may expedite the surgical management of these complications, reduce reoperative morbidity, and improve functional outcomes.

Methods: Analysis of a prospectively-maintained database of 1829 hiatus hernia repairs undertaken in 14 hospitals from 1 January 2000 to 30 September 2020. 1571 (85.9%) patients underwent a postoperative esophagram which was reviewed. An early (<14 days) reoperation was performed in 44 (2.4%) patients.

Results: Compared to those without an esophagram, patients who received one prior to reoperation (n=37) had a shorter time to diagnosis (2.4 vs. 3.9 days, p=0.041) and treatment (2.4 vs. 4.3 days, p=0.037) of their complications. This was associated with decreased open surgery (10.8% vs. 42.9%, p=0.034), gastric resection (0.0% vs. 28.6%, p=0.022), postoperative morbidity (13.5% vs. 85.7%, p<0.001), ICU admission (16.2% vs. 85.7%, p<0.001), and length-of-stay (7.3 vs. 18.3 days, p=0.009). Furthermore, patients who underwent early reoperations for asymptomatic re-herniation had less complications and superior functional outcomes at one-year follow-up than those who needed surgery for symptomatic recurrences later on.

Conclusion: Postoperative esophagrams decreases the morbidity associated with early and late reoperations following hiatus hernia repair, and should be considered for routine use.

658 BETTER SURVIVAL IN FEMALES THAN MALES AFTER RESECTION OF OESOPHAGEAL OR GASTROESOPHAGEAL JUNCTION CANCER: A COHORT STUDY IN SWEDEN

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Accumulating evidence points to a better survival in female patients after a curative oesophageal cancer surgery. However, there is a need for more well-designed and sufficiently powered studies for limitations in previous studies. Better understanding of sex differences in the postoperative survival may be helpful for a sex-specific treatment.

Methods: This is a population-based cohort study including all patients in Sweden with oesophageal cancer that underwent a curative surgical treatment between 2006 and 2017. Sex difference in postoperative survival was explored with excess mortality rate ratio (EMRR) and absolute difference of excess mortality rate along the whole follow-up time, using flexible parametric model. Age at the time of surgery, Charlson comorbidity index, ASA score, tumor stage, post-operative complications, marital status, education level and hospital volume were considered as covariates in the analysis model. Stratification analysis by clinical stages, perioperative neoadjuvant treatment and post-operative complications was also performed.

Results: In all, there were 1301 patients resected for oesophageal adenocarcinoma and 305 patients for oesophageal squamous cell carcinoma. For both oesophageal adenocarcinoma and oesophageal squamous cell carcinoma, female patients had a lower excess mortality rate than males (adjusted EMRR: 0.77, 95% CI: 0.58–1.01, P=0.059; 0.53, 95% CI: 0.33–0.85, P=0.009, respectively). This sex difference was particularly strong shortly after surgery then gradually decreased over the ensuing years (Figure) and was more profound in the early clinical stages, and in patients receiving neoadjuvant treatment and without post-operative complications.

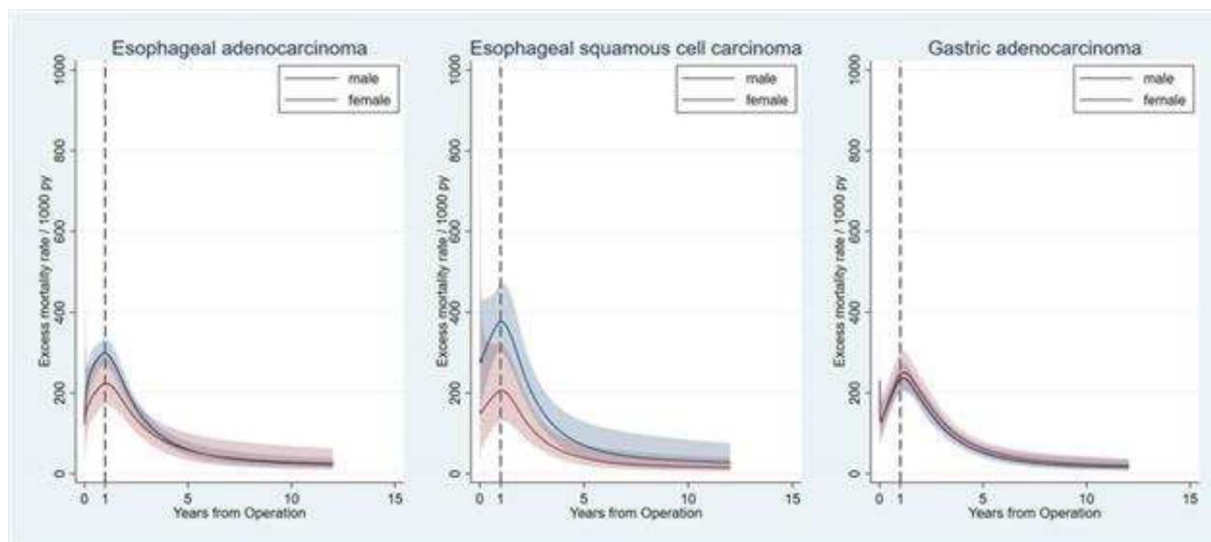
Conclusion: Female patients seem to have a better survival shortly after esophagectomy for patients with oesophageal adenocarcinoma and oesophageal squamous cell carcinoma, and the sex difference thereafter weakened. Our results may imply a different response to oesophageal cancer surgery between the sexes, and associated pre- and post-operative treatment, thus a sex-specific strategy may be considered in further work.

659 AN SINGLE-ARM OPEN-LABEL PHASE II STUDY OF CAMRELIZUMAB PLUS APATINIB AS SECOND-LINE TREATMENT FOR ADVANCED ESOPHAGEAL SQUAMOUS CELL CARCINOMA

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Esophageal squamous cell carcinoma (ESCC) as a common malignancy is prevalent in East Asia and in eastern and southern Africa. Although pembrolizumab, nivolumab and camrelizumab are respectively recommended as second-line treatment for advanced ESCC due to improved overall survival (OS), objective response rate (ORR) was modest. New effective treatments are needed. Hence, the study of camrelizumab plus apatinib (VEGFR2 inhibitor) as second-line treatment for advanced ESCC was performed.



Methods: This ongoing phase II trial (NCT03736863) in six sites in China enrolled pts aged 18-75 with unresectable locally advanced, locally recurrent, or metastatic ESCC that progressed or were intolerant after first-line chemotherapy, and an ECOG performance status of 0-1. Pts received 200 mg camrelizumab intravenously every 2 weeks and apatinib 250 mg orally once per day in 4-week cycles until disease progression, unacceptable adverse events (AEs) or withdrawal of consent. The primary endpoint was investigator-assessed ORR. Secondary endpoints included disease control rate (DCR), progression-free survival (PFS) and OS.

Results: At data cutoff (Feb 28, 2021), 52 pts were enrolled, including 42 males and 50 with distant metastases, with the median age of 62 years. In the evaluable population of 39 pts, ORR without confirmation was 43.59% and DCR was 94.87%. The median duration of response was 6.9 months (95% CI 4.57–9.23). The median PFS was 6.8 month (95% CI 2.66–10.94). The 12-month overall survival was 52.2%. A total of 80.8% of pts had treatment-related AEs (TRAEs) with 46.2% of grade ≥ 3 TRAEs. The safety profile of camrelizumab and apatinib was consistent with other anti-PD-1 antibodies and angiogenesis inhibitors.

Conclusion; This is the first study that evaluates the combination anti-PD-1 antibody and anti-angiogenesis inhibitor as a second-line therapy for advanced ESCC. Camrelizumab plus apatinib showed encouraging clinical efficacy and acceptable safety. Further phase III randomized trials are warranted.

661 EFFICACY OF ROBOT ASSISTED MINIMALLY INVASIVE ESOPHAGECTOMY: PROPENSITY MATCHED ANALYSIS OF RAMIE IN COMPARISON WITH CONVENTIONAL MIE

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Robot assisted minimally invasive esophagectomy (RAMIE) has been reported to be potential advantages in previous reports. Here we demonstrate the difference between these two minimally invasive procedures and investigated the surgical results of RAMIE in comparison with MIE using propensity matched-cohort.

Methods: We investigated 154 cases of thoracic esophagectomy conducted between 2020/1 to 2021/1. Among these cases, we analyzed 30 cases of RAMIE in comparison with 30 cases of matched-cohort which conducted conventional thoracoscopic esophagectomy (MIE) in the prone. Then we evaluated the surgical results between two groups.

Results: There were no differences in age (69.2 vs 69.1 yo), gender (M:F = 24:6 vs 24:6), cStage (Stage I,II,III,IV:6,3,14,7 vs 8,3,14,5), and preoperative chemotherapy (70% vs 66.7%) between RAMIE and matched-cohort MIE. There was statistically significant difference in total time of thoracic phase (233.1 vs 173.3 min; $p < 0.01$). There were no significant differences in postoperative events in RAMIE vs MIE (Clavien-Dindo Grade ≥ 2 ; Recurrent laryngeal nerve paralysis (RLNP) (16.7 vs 20.0%; $p = 0.19$). However, after the learning curve archived, seldom cases were diagnosed postoperative RLNP in RAMIE cases in comparison with MIE ($p = 0.06$).

Conclusion: We demonstrated the formalization of our procedure and surgical results of RAMIE. There were no significant differences in postoperative events between two groups. However RLNP was lower after the learning peak. Incidence of RLNP could be reduced in RAMIE.

662 MICROVASCULAR MYOCUTANEOUS AND CUTANEOUS FREE FLAP RECONSTRUCTION FOR PATIENTS WITH TERMINAL ESOPHAGOSTOMY AFTER COMPLICATED ONCOLOGICAL ESOPHAGUS RESECTION

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Persisting anastomotic leak after oncological esophagectomy is a severe problem associated with high mortality and morbidity. Unfortunately, treatment options with promising results are scarce especially when conventional operative and endoscopic methods have failed. Due to limitation of oral

Table 1. Complication according to Clavien-Dindo-Classification

Clavien-Dindo-Classification	Complications	Total number of patients
0		1
II	Delirium	1
IIIa	2x Stenting Endoscopic dilation	3
IIIb	2x Surgical revision	2
		7

intake and need for artificial nutrition quality of life is reduced. Microvascular myocutaneous and cutaneous free flap (MFF) reconstruction could be a promising alternative.

Methods: This retrospective cohort study presents seven patients treated between March 2017 and November 2020 at our surgical department, with terminal esophagectomy after complicated oncological esophagus resection without further feasible treatment options. All Patients received anastomotic MFF reconstruction. We have examined postoperative outcomes, complications according to Clavien-Dindo-Classification and patient contentment with a questionnaire. Additionally, we described important procedure related facts.

Results: The included seven male patients had median age of 65.15 years (range: 48–75). MFF function was adequate in six out of seven patients, graft rejection appeared in one patient. Five patients initially had good results, surgical revision was performed in one patient to ensure graft function. Postoperative complications appeared in 6/7 patients (Table 1). Mean duration of inpatient care was 63 days (Range: 24–156). At time of evaluation, one patient has died cancer related. No more additional nutrition was needed in 3/6 patients with adequate graft function. The majority of patients reported an improved quality of life compared to preoperatively.

Conclusion: MFF free flap can be a safe and feasible treatment option for patients with terminal esophagectomy after complicated oncological esophagus resection without further treatment options or in patients with complicated postoperative course with complex combined defects. The renewed ability of oral food intake results in a significant improvement of quality of life for the patients. No procedure related mortality was observed. Number of patients with regained ability of oral intake is encouraging.

663 QUANTITATIVE PERFUSION ASSESSMENT TO PREDICT ANASTOMOTIC LEAK AFTER ESOPHAGECTOMY

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Impaired gastric conduit perfusion is a risk factor for anastomotic leak after esophagectomy. Most studies evaluating conduit perfusion have been qualitative with limited impact on post-operative care. The aim of this study is to evaluate the feasibility of intraoperative quantitative assessment of gastric conduit perfusion with indocyanine green (ICG) fluorescence angiography as a predictor for cervical esophagogastric anastomotic (CEGA) leak after esophagectomy.

Methods: ICG fluorescence angiography using the SPY elite[®] (Stryker, MI, USA) system was performed in patients who had undergone a transhiatal or McKeown esophagectomy CEGA from July 2015 through December 2020. Fluorescence angiography assessed Ingress (dye uptake) and Egress (dye exit). Ingress Index, Ingress Time, Egress Index, and Egress Time at two anatomic landmarks (tip of the conduit, and 5 cm from tip) were calculated from the measured curve of fluorescence (Figure). The collected data between the leak (L) group and the no-leak (NL) group were compared by both univariate and multivariable analyses to analyze risk factors potentially associated with CEGA leak.

Results: 304 patients were evaluated. There was no significant difference in patients' demographic and post-operative complications between the groups