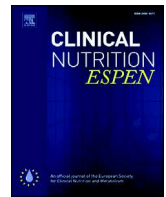


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OR01

EFFECTS OF LOCAL ANESTHETIC AGENTS AND OPIOIDS ON GROWTH AND SUBSEQUENT CHEMOTHERAPY RESPONSE IN OVARIAN CANCER

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Objectives: 1) To investigate the direct effects of local anesthetics and opioid analgesics alone, as well as in combination with chemotherapeutic agents on ovarian cancer cells *in vitro*.

2) To examine possible mechanisms for these effects and make correlations with patient outcomes.

Methods: IC50 curves were calculated for 4 local anesthetics and 4 opioids using 10 cell lines. Cells were then pulsed with local anesthetic or opioid for 24 hours and then drug was removed, followed by incubation with chemotherapy for 72 hours. Changes in cell line sensitivity to chemotherapy were calculated by change in the area under the dose response curve (Δ AUC). The effects of local anesthetics were compared to voltage gated sodium channel inhibitors. Drug responses were then correlated with expression of voltage-gated sodium channels using qRT-PCR. Correlations were made between voltage-gated sodium channel expression and overall survival (OS) using a publicly available dataset.

Results: With bupivacaine, there was a significant Δ AUC for ovarian cancer cells relative to fibroblasts for both carboplatin (-37% vs -16%, $p=0.003$) and paclitaxel (-37% vs -22%, $p=0.02$). Conversely, while opioids had no significant effects on the sensitivity of fibroblasts to chemotherapy, morphine, hydromorphone, and fentanyl each reduced the efficacy of chemotherapy for at least one ovarian cancer cell line. This effect was most pronounced for fentanyl, with a greater Δ AUC for ovarian cancer cells compared to fibroblasts for both carboplatin (20% vs 4.4%, $p=0.03$) and paclitaxel (20% vs 1.6%, $p<0.001$). The effects of local anesthetics were partially reproduced using high concentrations of voltage gated sodium ion channel inhibitors. High expression of sodium channel SCN3B was specifically noted in ovarian cancer cell lines most sensitive to local anesthetic effects; in a publicly available dataset, high expression of SCN3B was associated with improved median OS (59 months vs. 45 months; HR=0.71; $p=0.001$).

Conclusion: Opioids do not increase cell proliferation alone but may reduce the efficacy of chemotherapy in ovarian cancer. Local anesthetics are synergistic with carboplatin and paclitaxel. These actions are mediated at least in part by acting through voltage gated sodium ion channels, and expression of at least one of these channels, SCN3B, is associated with improved overall survival.

Disclosure of interest: None declared.

OR02

IMPACT OF ERAS INTERACTIVE AUDIT SYSTEM ON COMPLIANCE AND OUTCOMES AFTER ONE YEAR OF ERAS IMPLEMENTATION

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Objectives: Standardized and easy-to-access audit capability is critical to sustaining an Enhanced Recovery after Surgery (ERAS) program. This study aims to assess one year of outcomes and compliance in pancreatotomy procedures performed within an officially implemented ERAS framework, utilizing data available from the ERAS Interactive Audit System (EIAS).

Methods: ERAS guideline compliance, and surgical and cost outcomes were assessed for Pre-ERAS (n=99) and Post-ERAS (n=82) pancreatotomy procedures (left pancreatotomy and pancreaticoduodenectomy). Data were exported from the EIAS, and analyzed using Chi-square and Mann-Whitney statistics.

Results: Operative cost, in-hospital DGE, 30-day readmission, and 30-day reoperation rates were numerically lower in the Post-ERAS patients and would require only an additional 29, 108, 117, and 154 patients respectively to reach significance, while LOS and in-hospital pancreatic fistula showed little difference. Intraoperative, Postoperative, and Total Compliance rates were significantly higher in the Post-ERAS group.

| All Pancreas Pre and Post ERAS (Left Pancreatotomy and Pancreaticoduodenectomy) | Pre-ERAS (n=99) | Post-ERAS (n=82) | p-value |
|---|---------------------------|---------------------------|---------|
| Age median (range) | 62.0 (15-87) | 66.5 (19-85) | .108 |
| Direct supply cost USD\$ median (range) | 3784.79 (1375.71-9371.62) | 3120.40 (943.52-16894.64) | .076 |
| EBL median (range) | 425 (0-5500) | 425 (50-5000) | .108 |
| Surgical LOS median (range) | 7.0 (3-62) | 7.5 (3-48) | .087 |
| In hospital pancreatic fistula (B&C) n (%) | 16 (38.7) | 12 (38.7) | .307 |
| In hospital DGE (B&C) n (%) | 4 (50.0) | 5 (31.3) | .371 |
| 30-day readmission** n (%) | 25 (53.2) | 20 (35.1) | .064 |
| 30-day reoperation** n (%) | 9 (20) | 5 (8.8) | .102 |
| Pre-Admission compliance mean (SD) | 85.4 (17.1) | 87.2 (18.9) | .269 |
| Pre-Operative compliance mean (SD) | 74.6 (12.5) | 92.7 (10.8) | .000* |
| Intra-Operative compliance mean (SD) | 76.2 (10.9) | 68.0 (15.4) | .000* |
| Post-Operative compliance mean (SD) | 50.1 (8.7) | 52.1 (7.0) | .024* |
| Compliance, total mean (SD) | 64.9 (4.6) | 68.9 (5.8) | .000* |

** indicates missing data

Conclusion: Utilizing only EIAS data, one-year experience analysis showed promising reductions in key outcome metrics, as well as increased compliance in the Post-ERAS population. With 29 more patients included in analysis - obtainable in three months – we will begin to observe significance in key metrics.

Disclosure of interest: None declared.

OR03

CAN HYDROGEN BREATH TEST PREDICT POSTOPERATIVE ILEUS FOLLOWING LAPAROSCOPIC COLORECTAL SURGERY AND WITHIN ERAS PROGRAMME?

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Objectives: Despite implementation of enhanced recovery after surgery (ERAS) and laparoscopic techniques for colorectal cancer, the risk of postoperative ileus (POI) remains invariably high. POI can significantly impact upon recovery and prediction of those likely to develop POI could allow a modified ERAS pathway. Hydrogen breath testing has been successfully used to diagnose intestinal bacterial overgrowth. The aim of this exploratory study was to investigate the feasibility and predictive role of measuring hydrogen levels to predict POI following colorectal surgery within ERAS.

Methods: After ethical approval, patients undergoing laparoscopic colorectal resection between January 2015 to December 2016 within a fully implemented ERAS programme were recruited. Patients provided breath tests pre-operatively and on the first three post-operative days. Samples were captured in sealed bags and analysed using a GastroCheck™ instrument (Bedfont Scientific®). Outcome measures included hydrogen levels and ileus score, which was defined as presence of nausea and vomiting (with or without insertion of NGT) but without passage of flatus or bowel movement in the first three days after surgery.

Results: 43 patients were recruited in this pilot study. 14 patients developed POI (32%) within the first 72 hours of surgery. Cohort length of stay was 6 days (IQR 5-9). Samples and data were successfully collected from all patients. The mean preoperative level of hydrogen was 8.51 ppm. The mean hydrogen level increased in patients with POI but reduced in those without POI with a fourfold difference observed between the two groups (19.23 vs 4.96 ppm respectively).

Conclusion: This study has confirmed the feasibility and the possibility of a potential bedside screening test to predict postoperative ileus. A large-scale study is required to validate these findings.

Disclosure of interest: None declared.

OR04

A COST COMPARISON OF RESOURCE UTILIZATION BEFORE AND AFTER IMPLEMENTING AN ENHANCED RECOVERY AFTER SURGERY (ERAS) PROGRAM-A SIGNIFICANT IMPACT ON THE 'BOTTOM LINE'

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Objectives: Adoption of enhanced recovery after surgery (ERAS) programs have demonstrated decreased length of stay, and improved patient outcomes after surgery. We have previously demonstrated no significant

difference between the patient cohorts before and after our ERAS program with regards to age, indication for surgery, readmission rates, surgical time, surgical complexity, comorbidity or ASA status. Previous work described improved patient centered outcomes within the ERAS cohort. The objective of this study was to compare all surgical-related costs and charges from surgery to 30 days postoperatively.

Methods: All itemized cost and charge data (technical and professional) were obtained for patients in the historical control (5/14-10/2014) and the first year (11/14-11/15) after initiation of ERAS. This included surgical, inpatient, outpatient and emergency services. Patients who had dual procedures (second surgical service) were excluded. Charges and costs for adjuvant therapy (chemotherapy and radiation) were excluded. Because the histograms of total costs and charges were right skewed, a Wilcoxon rank-sum test (Mann-Whitney U test) was utilized. The median and mean charges and costs were compared.

Results: 271 patients were included (58 historical control, and 213 ERAS). In total, 70,867 technical charges and 6,775 professional charges were reviewed. A statistically significant difference between the underlying distributions of the total costs of ERAS patients and the total costs for non-ERAS patients was identified, with lower average costs associated with the ERAS cohort ($z = -2.957$, $p = 0.003$). A similar outcome was demonstrated for the total charges ($z = -2.674$, $p = 0.008$). The historical control group had a higher rank than the ERAS group for both total costs and total charges. The ERAS cohort had a 13.2% decrease in total median costs and a 15.6% decrease in total median charges compared to the group of historical controls.

Conclusion: Value is defined as the health outcomes achieved per dollar spent. In our cohort, we have demonstrated significantly lower perioperative resource utilization in the ERAS cohort. Successful adoption of ERAS principles may enhance health care value for patients undergoing gynecologic surgery.

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OR05

COMPARISON OF ADAPTED ENHANCED RECOVERY AFTER SURGERY PATHWAY VERSUS STANDARD CARE FOLLOWING SIMPLE CLOSURE OF PERFORATED DUODENAL ULCER-A RANDOMIZED CONTROLLED TRIAL

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Objectives: To evaluate the feasibility and efficacy of ERAS pathways in patients undergoing emergency simple closure of perforated duodenal ulcer (PDU).

Methods: This was a single-center, prospective, open-labeled, parallel arm, superiority, RCT carried out in a tertiary-care hospital between September 2014 & May 2016. Patients of PDU undergoing open simple closure were randomly assigned preoperatively in 1:1 ratio into standard care & adapted ERAS group. Patients with refractory shock, ASA class ≥ 3 , perforation size ≥ 1 cm were excluded. Adapted ERAS pathway was based on pre, intra & postoperative ERAS components. A sample size of 100 was calculated (effect size: reduction in LOH by 2 days; power: 90%). Primary outcome was length of hospital stay (LOH). Secondary outcomes were functional recovery parameters & morbidity.

Results: 102 patients were included, 52 in standard care & 50 in ERAS group. Of the 52, three patients were excluded from the study intra-operatively. All demographic & clinicopathological characteristics were comparable. Patients in ERAS group had a significantly early functional recovery (Table). LOH in ERAS group was significantly shorter (4.41 ± 0.64

days; $p < 0.001$, CI 3.14–5.68). There was a significant reduction in post-operative morbidity such as superficial SSI (RR 0.35, $p < 0.02$, CI 0.08–0.8), incidence of postoperative nausea & vomiting (RR 0.28, $p < 0.0001$, CI 0.15–0.51) & pulmonary complications (RR 0.24, $p < 0.04$, CI 0.06–0.95) in the ERAS vs. standard care group. The leak rates were similar (1/50 vs. 2/49).

Conclusion: In the PROFAST intermediate analysis, ERAS appears to be a safe and effective in reducing the median length of Hospitalization, readmission rates and hospitalization related costs in advanced ovarian cancer surgery.

Disclosure of interest: None declared.

| Outcome (in days) | ERAS group | Standard care group | Mean Difference | p value | CI |
|------------------------------|-------------|---------------------|-----------------|--------------|-----------|
| Day of withdrawal of NG tube | 1.22 ± 0.42 | 3.37 ± 0.97 | 2.15 ± 0.15 | $p < 0.001$ | 1.85–2.45 |
| Time to first bowel sounds | 1.46 ± 0.54 | 2.02 ± 0.59 | 0.56 ± 0.11 | $p < 0.001$ | 0.33–0.79 |
| Time to first flatus | 2.0 ± 0.78 | 3.47 ± 1.02 | 1.47 ± 0.18 | $p < 0.001$ | 1.11–1.83 |
| Time to first stool | 3.52 ± 0.79 | 5.78 ± 1.26 | 2.27 ± 0.21 | $p < 0.001$ | 1.84–2.67 |
| Duration of ileus | 1.4 ± 0.07 | 2.02 ± 0.09 | 0.62 ± 0.12 | $p < 0.001$ | 0.38–0.86 |
| Time to first fluids | 1.52 ± 0.76 | 4.24 ± 2.64 | 2.72 ± 0.39 | $p < 0.001$ | 1.95–3.50 |
| Time to first solids | 2.64 ± 1.08 | 4.24 ± 2.64 | 3.71 ± 0.45 | $p < 0.001$ | 2.82–4.60 |
| Time to first walk | 0.76 ± 0.14 | 2.80 ± 0.12 | 2.04 ± 0.18 | $p < 0.0001$ | 1.68–2.40 |
| Need for extra analgesia | 12% | 35% | RR: 0.26 | $p = 0.007$ | 0.09–0.69 |
| Need for NG tube reinsertion | 4% | 6% | RR: 0.63 | $p = 0.629$ | 0.11–3.25 |

Conclusion: Adapted ERAS pathways are safe and feasible in select patients undergoing emergency simple closure of PDU.

Disclosure of interest: None declared.

OR06

PROFAST: CLINICAL AND COST RELATED BENEFITS OF ERAS IN ADVANCED OVARIAN CANCER, A RANDOMIZED TRIAL

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Objectives: Enhanced Recovery After Surgery (ERAS), has been shown to reduce hospitalization without increasing the rate of complications or readmissions. However, information on its benefits when applied to Advanced Gynecological cancer patients is sparse. Our hypothesis is that ERAS in the management of patients with advanced Ovarian Cancer may improve the postoperative recovery, allowing for an early discharge, without increasing the number readmission or surgery related complications.

Methods: We developed the PROFAST trial, ([ClinicalTrials.gov](https://clinicaltrials.gov/ct2/show/study/NCT02172638) Identifier: NCT02172638) a prospective randomized clinical trial. Patients diagnosed with an ovarian or primary peritoneal cancer in Barcelona's Vall d'Hebron Hospital, with clinical or radiological suspicion of advanced disease (IIb,III, IV) or relapses are randomized to an specifically designed ERAS protocol or to conventional management (CM). Reduction in the median length of hospitalization is considered as primary outcome, incidence of perioperative complications and readmissions rates up to 28 days after surgery, and related costs differences are considered as secondary outcomes.

Results: From July 2014 to August 2016, 59 patients had been included, 29 in the ERAS group, and 30 in the CM Group. Epidemiological characteristic, surgery indication (primary or Interval), stage at diagnosis and surgical procedures were similar in both groups with no statistically significant differences. In the ERAS group compliance with ERAS protocol was > 90% for all the items except for avoidance of abdominal drainage (64%). Both median length of hospitalization (9 vs 7 days, $p = 0.0391$) and readmission rates (28% vs 0%, $p = 0.096$) were markedly reduced in the ERAS group. There were no statistically significant differences between complication rates. Overall the ERAS protocol represented a cost reduction of 680 euros per patient.

OR07

THE INFLUENCE OF AN ENHANCED RECOVERY PROGRAMME ON CLINICAL OUTCOMES AND QUALITY OF LIFE AFTER ROBOTIC ASSISTED RADICAL CYSTECTOMY

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Objectives: Quality of life is an important outcome of complex cancer surgery. Our aim was to analyse the impact of robotic assisted radical cystectomy (RARC) and urinary diversion with multimodal enhanced recovery protocol on postoperative health-related quality of life (HRQOL) at multiple prospective time points.

Methods: A total of 175 consecutive patients underwent RARC after the establishment of a new tertiary cystectomy service in April 2013. HRQOL was prospectively assessed preoperatively, after 6 and 12 months, using the QLQ-C30 questionnaire. Prospectively collected demographic, operative and perioperative data from institutional database were analysed.

Results: The median age at treatment was 71 years old, 77.3% were males, 73% had a BMI <30 kg/m², 27.4% a CPET anaerobic threshold <11 and 84.3% an ASA score ≤2. The median LOS was 5 days (1st–3rd IQR: 4–7 days). Post-operative day 4 was the most frequent day of discharge from hospital. The incidence of post-treatment complications was 40% (70 of 175) for minor (Clavien-Dindo grade ≤II) and 8% (14 of 175) for major (grade ≥III) complications. Major complications led to reduced physical functioning (PF) levels after 6 months ($p = 0.050$) without effect on global health status (GHS) ($p = 0.825$). HRQOL seems to improve to similar or better levels compared to baseline after 1 year. Subgroup analysis revealed greater improvement in PF in intra vs extra corporeal diversion ($p = 0.05$) but no differences between neobladder and ileal conduit.

Conclusion: Perioperative complications and complicated recovery after RARC can affect HRQOL subdomains but do not significantly influence the GHS. QOL is comparable after either continent or incontinent urinary diversion. Totally intracorporeal minimal invasive approach is ensuring better short and long term overall HRQOL outcomes. Selection of diversion should be tailored to patient's preference since there is no demonstrable benefit of continent reconstruction.

Disclosure of interest: None declared.

OR08

DOES THE RISK OF POSTOPERATIVE COMPLICATIONS AFFECT THE ADHERENCE TO ENHANCED RECOVERY PATHWAYS AFTER PANCREATODUODENECTOMY?

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Objectives: Prognostic scores to predict the occurrence of clinically-relevant pancreatic fistula (Callery score, CS) and major complications (Braga Score, BS) following pancreatoduodenectomy (PD) may be used to identify patients at risk of failure within an enhanced recovery pathway. The objective of the present study was to verify if CS and BS may identify patients with poor compliance and postoperative outcomes within an ERP for PD.

Methods: Prospectively collected data for 164 consecutive patients from January 2015 were analyzed. Patients with CS>3, and BS>5, as identified by the scores' median value in our cohort, were considered at higher risk for postoperative clinically relevant pancreatic fistula and major complications, respectively. Low risk patients were compared to high risk patients for adherence to 14 ERP elements, postoperative recovery measures and outcomes.

Results: Sixty-nine (42%) patients had a CS>3, and 76 (46%) patients a BS>5. Patients with higher CS had similar adherence to preoperative items (63% in both groups), but significantly lower adherence for post-operative items (57% vs. 69%, $p=0.009$) compared to lower CS patients. Patients with higher CS had delayed tolerance of oral diet (median 7 vs. 5 days, $p=0.002$), pain control with oral analgesia (median 6 vs. 5 days, $p=0.02$), and were discharged later (median 11 vs. 8 days $p<0.001$) compared with low CS patients. Patients with higher BS had similar adherence to preoperative items (62% vs. 64%) but significantly lower adherence for postoperative items (59% vs. 70%, $p=0.003$) compared to lower BS patients. Patients with higher BS had delayed recovery of gastrointestinal function (median 4 vs. 4 days, $p=0.005$), tolerance of oral diet (6.5 vs. 5 days, $p=0.03$), and were discharged later (median 11 vs. 9 days, $p<0.001$) compared with low BS patients. Clinically significant pancreatic fistula occurred in 22 (13%) patients and was significantly more frequent in patients with high CS (25% vs 5%, $p<0.001$). Major complications occurred in 28(17%) patients and were significantly more frequent in patients with high BS (26 vs 9%, $P<0.001$).

Conclusion: High Callery and Braga scores identify a group of patients undergoing PD with lower adherence to ERP items, delayed recovery and increased risk of complications. They should be considered valid tools to flag patients at higher risk of failure within an ERP for PD.

Disclosure of interest: None declared.

OR09

ERAMOS: EFFECTS OF REGIONAL ANALGESIA ON SERUM MICRORNA AFTER ONCOLOGIC SURGERY

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Objectives: 1) To examine the impact of epidural analgesia on circulating microRNA (miRNA) profiles following primary cytoreductive surgery for ovarian cancer. 2) To correlate epidural-related miRNA changes with overall survival.

Methods: This was a prospective, observational study of treatment-naive women undergoing primary surgical management for known or

suspected ovarian cancer. All patients were enrolled between March 29, 2013 – May 8, 2015. The primary study endpoints were: 1) serum miRNA expression change from the pre-operative sample to the post-operative samples; and 2) overall survival stratified according to significantly altered miRNAs. Serum blood draws in red top tubes were collected from patients preoperatively, post-operative day 1, and post-operative day 3 and quantified using a custom panel of 68 miRNA probes using the Fireplex assay from Firefly Bioworks, Inc. (Cambridge, MA). Patients subsequently diagnosed with cancer were then followed prospectively. Kaplan-Meier curves were constructed and compared using a log-rank test. Hazard ratios for overall survival were constructed using the Mantel-Haenszel test.

Results: The final cohort comprised 60 patients; 16 (27%) had benign disease, 7 (12%) had borderline tumors, and 37 (62%) had invasive cancer. 23 (38%) patients received volatile anesthesia alone while 37 (62%) patients also received a bupivacaine thoracic epidural. 13/68 (19%) serum miRNAs were found to be significantly altered in the perioperative period; three miRNAs (mir-191-5p, mir-30c-5p, and mir-181a-5p) were specifically altered only among patients using epidural analgesia. Levels of mir-191-5p correlated with length of epidural utilization. In subsequent follow-up, high expression of serum mir-191-5p was associated with improved overall survival (HR=0.18; $p=0.04$).

Conclusion: Use of bupivacaine epidural analgesia at the time of primary cytoreductive surgery for ovarian cancer is associated with an increase in circulating levels of mir-191-5p. In this population, higher post-operative expression of mir-191-5p, a known tumor suppressor, was associated with improved overall survival. This suggests a novel biologic mechanism for improved cancer outcomes using epidural analgesia.

Disclosure of interest: None declared.

OR10

THE IMPACT OF GOAL DIRECTED INTRAOPERATIVE FLUID ADMINISTRATION DURING PANCREATODUODENECTOMY ON PANCREATIC LEAKS AND DELAYED GASTRIC EMPTYING

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Objectives: In patients undergoing pancreatoduodenectomy (PD), optimal fluid balance is critical in minimizing intraoperative anastomotic edema. In this study, we examine the effects of decreased fluid administration, prior to the PD reconstructive phase, on the rate of postoperative pancreatic leak and delayed gastric emptying (DGE).

Methods: 83 consecutive patients that underwent PD from January of 2015 through July of 2016 at a single institution were retrospectively reviewed. Patients with vascular reconstruction were not included. During each case, non-invasive monitoring was performed with Edwards Vigileo™ system and anastomoses were performed within 2 hours of abdominal closure. Median stroke volume variation (SVV), SVV up to the last 2 hours of the operation (SVV1), and SVV for the last 2 hours of the operation (SVV2) were recorded. A comparative analysis of postoperative complications was performed between patients with a SVV ≥ 12 and those with a SVV < 12 .

Results: Out of 83 patients, 51 (61.4%) patients had a SVV < 12 and 32 (38.6%) had a SVV ≥ 12 . As the average SVV and SVV2 increased, there was a trend towards decreased fluid administration ($p = 0.57$ and $p = 0.07$, respectively). Compared to patients with SVV1 < 12 , those with a SVV1 ≥ 12 demonstrated numerically less postoperative pancreatic leaks (23.2% vs. 11.1%, $p = .190$) and numerically less DGE (48.2% vs. 33.3%, $p = 0.200$).

Conclusion: Goal directed restricted fluid administration before the reconstructive phase of PD decreases incidence of pancreatic leak and delayed gastric emptying.

Disclosure of interest: None declared.

OR11 DIFFUSION EFFECT OF PANCREATODUODENECTOMY ERAS ADHERENCE TO LEFT PANCREATECTOMY OUTCOMES AND COMPLIANCE

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Objectives: Compliance to ERAS guidelines in one procedure can be expected to trickle-down to other procedures not on an ERAS guideline program, provided the patients are within close proximity and/or cared for by the same clinicians. This study aims to assess this diffusion effect on outcomes and compliance in left pancreatectomies (LP) during a period of strict guideline adherence to another pancreatectomy procedure, pancreatoduodenectomy (PD).

Methods: Surgical and cost outcomes, and ERAS guideline compliance were assessed for two LP groups: Diffusion LP (LPs occurring during a period of strict PD guideline adherence), and Non-Diffusion LP (LPs occurring prior to strict PD guideline adherence). Data were obtained from the ERAS Interactive Audit System (EIAS), and analyzed using Chi-square and Mann-Whitney statistics.

Results: Operative cost and anastomotic leak were numerically lower in the Diffusion LPs and cost would require only an additional 122 patients to reach significance, while LOS and 30-day readmission showed little difference. Preoperative and Total Compliance rates were significantly higher in the Diffusion LP group.

guidelines for enhanced recovery after gastrectomy; transverse abdominis plane block, antithrombotic prophylaxis, and fluid balance were excluded. The primary end point was the length of postoperative hospital stay. Secondary end points were the postoperative complication rate, admission costs, weight loss, and amount of physical activity measured using triaxial accelerometry.

Results: From July 2013 to June 2015, we randomized 148 patients into an ERAS protocol group ($n = 73$) and a conventional protocol group ($n = 69$); six patients withdrew. The completion rates of the protocol were 87.7 % for the ERAS group and 81.2 % for the conventional group. Postoperative hospital stay in the ERAS group was significantly shorter than that in the conventional group (9 vs. 10 days; $P = 0.037$). The ERAS group had a significantly lower rate of postoperative complications grade III or higher (4 % vs. 15 %; $P = 0.042$) and reduced costs of hospitalization (€11 252 vs. €11 492; $P = 0.045$). The ratio of body weight to preoperative weight at postoperative week 1 and at 1 month was higher in the ERAS group (0.962 vs. 0.957, $P = 0.020$; and 0.951 vs. 0.937, $P = 0.021$, respectively). Patients in the ERAS group performed significantly more steps and more exercise for the first week after surgery compared with the conventional group.

Conclusion: The ERAS protocol shortened the postoperative hospital stay after gastric cancer surgery, reduced the rate of complications, decreased admission costs, and accelerated the recovery of good physical condition. These findings indicate that the ERAS protocol can help to improve the postoperative course of patients with gastric cancer.

References: Mortensen K, Nilsson M, Slim K, Schafer M, Mariette C, Braga M, et al. Consensus guidelines for enhanced recovery after gastrectomy: Enhanced Recovery After Surgery (ERAS(R)) Society recommendations. *Br J Surg.* 2014;101:1209-29.

Disclosure of interest: None declared.

| Left/Distal Pancreatectomy | Non-Diffusion LPs(9/25/2014-8/31/2015)(n=51) | Diffusion LPs(8/16/16-11/8/16)(n=14) | P value |
|---|--|--------------------------------------|---------|
| Age median (range) | 63 (15-83) | 67.5 (19-81) | .598 |
| Gender (male) | 23 (45.1) | 3 (21.4) | .109 |
| Direct Supply Cost USD\$ median (range) | 4016.43 (2112.27-7480.26) | 3338.45 (943.52-6635.28) | .148 |
| EBL median (range) | 200 (0-2000) | 175 (50-2400) | .962 |
| Surgical LOS median (range) | 5 (3-33) | 5.5 (3-21) | .641 |
| In hospital DGE (B&C) n (%) | 1 (100) | 0 | .157 |
| Combined Anastomotic Leak | 6 (11.8) | 1 (7.1) | .528 |
| 30-day readmission** n (%) | 13 (40.6) | 4 (40.0) | .972 |
| Pre-Admission compliance mean (SD) | 88.7 (16.1) | 91.1 (15.8) | .576 |
| Pre-Operative compliance mean (SD) | 65.5 (8.2) | 93.9 (10.8) | .000* |
| Intra-Operative compliance mean (SD) | 75.7 (12.8) | 74.3 (12.2) | .925 |
| Post-Operative compliance mean (SD) | 55.3 (8.6) | 55.1 (8.6) | .810 |
| Compliance, total mean (SD) | 65.6 (4.9) | 72.1 (6.9) | .001* |

** indicates missing data

Conclusion: Even in relatively small sample sizes, the diffusion effect of ERAS can be demonstrated in compliance, operative cost, and anastomotic leak rates. While diffusion isn't a substitute for ERAS protocol adherence, it may help in achieving better outcomes for surgical procedures not yet on a mandated protocol.

Disclosure of interest: None declared.

OR12 PROTOCOL FOR ENHANCED RECOVERY AFTER SURGERY IMPROVES SHORT-TERM OUTCOMES FOR PATIENTS WITH GASTRIC CANCER: A RANDOMIZED CLINICAL TRIAL

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Objectives: The feasibility of using the enhanced recovery after surgery (ERAS) protocol in patients with gastric cancer remains unclear. We aimed to clarify the clinical relevance of the ERAS protocol by evaluating peri-operative course in such patients.

Methods: This study was a single-center, prospective randomized trial on patients with gastric cancer undergoing curative gastrectomy. The ERAS protocol included 22 of 25 items recommended in the consensus

P001 IMPLEMENTATION OF CLINICALLY MEANINGFUL LAB PROTOCOL TO REDUCE UNNECESSARY TESTS AND CHARGES TO PANCREATODUODENECTOMY PATIENTS

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Objectives: Utilize pre-operative predictive analytics to rank patients as Low, Moderate, or High-risk for mortality, serious complications, and 30-day readmission.

Place patients identified as Low risk on Clinically Meaningful (CM) Lab Protocol to reduce the patient burden and cost associated with unnecessary lab orders.

Methods: Implementation of ERAS® guidelines for pancreatoduodenectomy (PD) patients led to development of new initiatives. Beginning March 2016, patient data was entered into the REDCap™ based predictive analytic platform prior to surgery to determine risk level. Data included demographics, health and family history, medications, and pre-operative lab values. Patients categorized as low risk for mortality, complications, and 30-day readmission were placed on the CM Lab Protocol. A protocol that places patients in color categories according to

severity: green, yellow, or red. Green patients receive full labs on POD#2 and creatinine level on POD#5. Yellow patients receive limited labs dependent on individual case, e.g. patients with possible infection would receive daily CBC. Red patients receive full daily labs based on comorbidity or surgical complication, e.g. blood loss. Complications during hospital stay may elevate patients to yellow or red. Once elevated, patients do not return to green.

The ERAS Nurse communicated to clinicians which patients qualified for CM Lab Protocol and color category. Orders were continuously updated to reflect lab status. Simultaneously, CM compliance was monitored to track color changes, reason for change, lab costs, and savings. While it took approximately two months to fully acclimate permanent staff, the ERAS Nurse is responsible for continuous education to clinicians rotating through the service.

Results: Since CM Lab Protocol implementation, 67.6% of (46/68) patients scheduled for PD qualified for green labs protocol. 24% (11) remained green, 13% (6) changed to yellow, 43% (20) changed to red, and 20% (9) were aborted. To date, \$185,193.55 of patient charges have been saved.

Conclusion: Utilizing predictive analytics to assess patient risk level is a beneficial tool in planning patient care. Eliminating unnecessary and costly labs reduces burden and better utilizes resources while sustaining positive outcomes. The CM Lab Protocol can easily be adapted and applied to other surgeries and ultimately other institutions.

Disclosure of interest: None declared.

P002

THE INCREMENTAL VALUE OF AN ESTABLISHED ENHANCED RECOVERY AFTER SURGERY PROTOCOL IN OPEN RADICAL CYSTECTOMY FOR BLADDER CANCER

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Objectives: This study determines the incremental value of ERAS in open radical cystectomy (ORC) in primary bladder cancer.

Methods: Between August 2013 and December 2016, all consecutive patients who underwent ORC with ERAS were identified. As a historical matched control, those who underwent ORC with conventional post-operative protocols (CS), in the similar time duration preceding August 2013, were identified from a prospectively maintained cancer registry.

Results: There were n=30 patients identified and none excluded, comprising n=15 patients each in CS and ERAS cohorts. The median age (years) was CS 66 (mean 64.2, range 51-75) and ERAS 67 (mean 66.3, range 51-75) (p-value 0.39). There were 12 (80%) male patients in CS and 11 (73%) in ERAS.

The pathological stage comprised: pT1 or less (CS:3, ERAS:5), pT2 (CS:5, ERAS:3), pT3 (CS:5, ERAS:6) and pT4 (CS:2, ERAS:1) (p-value 0.62). Urinary reconstruction comprised orthotopic bladder substitute (CS:4, ERAS:2) and ileal conduit (CS:11, ERAS:13). The rate of complications rated Clavien-Dindo \geq 3 was CS:1(6.7%) and ERAS:1(6.7%). They comprised laparotomy for bowel perforation (CS) and percutaneous nephrostomy insertion for urine leak (ERAS). The median estimated blood loss (ml) was CS:500 (mean 625, range 200-2000) and ERAS:700 (mean 860, range 500-3000) (p-value 0.09). The median time of ileus (defined as time to tolerating solid food) (days) was CS:5 (mean 5.8, range 3-9) and ERAS:4 (mean 4.4, range 3-6) (p-value 0.01). The median length of stay (LOS) (days) was CS: 10 (mean 13, range 6-39) and ERAS: 7 (mean 8, range 6-16) (p-value 0.01). The readmission rate was CS: 5 (33.3%) and ERAS: 3 (20%) (p-value 0.41). The causative conditions were CS: inadequate oral intake-3, ileus-1, sepsis-1, and ERAS: inadequate oral intake-1, lymphorrhoea-1 and sepsis-1. As a cohort, readmissions accounted for additional 23 (CS) and 8 (ERAS) days respectively.

Based on Ministry of Health (Singapore) published figures of S\$2,788/day cost, the average cost per patient amounts to S\$40,426 (CS) and S\$23,698 (ERAS), inclusive of readmission episodes. The adoption of ERAS is associated with a reduction of \$16,728 per patient per encounter.

Conclusion: ERAS significantly reduces duration of ileus and hospital stay without compromising safety or readmission rates. It also substantially reduces overall healthcare costs.

Disclosure of interest: None declared.

P003

ERAS FOR OPEN LIVER RESECTION SURGERY IMPROVES TWO-YEAR SURVIVAL BUT NOT FIVE-YEAR SURVIVAL

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Objectives: The benefits of ERAS for short-term clinical outcomes has been well demonstrated¹. The evidence for longer-term outcomes is emerging with a recent study showing a positive correlation between compliance with ERAS elements and five-year cancer-specific survival following colorectal cancer surgery². In 2013, an RCT comparing ERAS with standard care following liver surgery showed a significant reduction in LoS and postoperative complications. Here we present the five-year survival data for patients enrolled in this trial³.

Methods: Data was obtained from medical records for all patients who underwent liver resection for cancer in the original trial and any deaths within five years of surgery were recorded. Data were analysed to assess any statistical difference between survival at three time intervals (one, two and five years).

Results: Five-year follow-up data was collected for 81 patients from the original trial, 36 in the standard care group and 45 in the enhanced recovery group. Patient survival at one, two and five years is displayed below:

| Time (years) | Survival standard care | Survival enhanced recovery | p value (χ^2 test) |
|--------------|------------------------|----------------------------|--------------------------|
| One | 94.5% | 97.7% | 0.179 |
| Two | 66.7% | 91.1% | 0.025 |
| Five | 44.4% | 53.3% | 0.649 |

Conclusion: Patients undergoing open liver resection with an ERAS programme had significantly improved survival at two-years compared with those treated with standard care. Although at five years the survival was still greater following ERAS, this was no longer statistically significant. This study provides further scientific evidence to support the theory that the benefits of ERAS can extend beyond the immediate perioperative period and may translate to improved long-term patient survival. This finding is even more remarkable given the small sample size in this study and larger-scale studies are needed to further elucidate this promising area of perioperative research.

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P004 COMPLIANCE WITH ENHANCED RECOVERY AFTER SURGERY (ERAS) PATHWAYS IMPROVES OUTCOME IN PATIENTS UNDERGOING BOTH OPEN AND LAPAROSCOPIC COLORECTAL PROCEDURES

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Objectives: Implementation of ERAS pathways improves outcome in patients undergoing open colorectal surgery (OS), but there remains uncertainty whether patients having laparoscopic surgery (LS) benefit from care in an ERAS program. The objective of this study was to determine the impact of ERAS on outcome in LS and OS patients, focusing on whether compliance with postoperative ERAS recommendations influenced post-surgical recovery.

Methods: All patients having colorectal surgery at 15 academic hospitals were enrolled in a government-supported ERAS implementation program. Outcome data and compliance to ERAS guidelines were collected prospectively. Patients were considered compliant if they adhered to >75% of the predefined guidelines for postoperative ERAS.

Results: Between 2012 and 2015, 2,876 patients (48% female; mean 60 yrs old) were enrolled. Of 1520 LS patients (53%), 78% had a neoplasm and 11% had IBD compared with 58% and 25% respectively in OS patients. 41% of patients in the LS group had a right colon resection compared to 18% in the OS group. For the overall patient population, length of stay (LOS), % patients with LOS <5d, and readmissions were better in the LS group compared to OS (Table 1). Compliance with postoperative ERAS guideline recommendations was associated with decreased LOS (RR 0.66, 95% CI 0.61–0.72, $p<0.001$), and more patients with LOS < 5d (RR 1.68, 95% CI 1.45–1.95, $p<0.001$). ERAS also exerted significant improvements in LS patients, reducing LOS (RR 0.79, CI 0.72 to 0.86, $p<0.001$) and increasing the percentage of patients discharged within 5 days (RR 1.95, CI 1.51 to 2.51, $p<0.001$). Importantly, ERAS in both settings had no effect on readmission rates.

| | LAP Surgery n=1520 | | | OS/converted n=1356 | | |
|----------------------|--------------------|-------------|-------------|---------------------|-------------|-------------|
| | LOS (days)* | LOS <5d (%) | Readmit (%) | LOS (days)* | LOS <5d (%) | Readmit (%) |
| All patients | 4 (3–6)† | 72.0† | 6.5† | 7 (5–9) | 34.2 | 10.0 |
| ERAS compliant** | 4 (3–5) | 78.4 | 6.0 | 6 (4–7) | 49.4 | 9.5 |
| ERAS non-compliant** | 5 (3–7) | 65.4 | 7.1 | 7 (5–10) | 28.1 | 10.3 |

* median and interquartile range

†: $p<0.05$ vs OS for each parameter measured

** RR values and 95% CI are in text.

Conclusion: Patients having colorectal surgery have reduced LOS when treated with LS, compared to OS. The addition of an ERAS pathway further benefits patients, whether undergoing OS or LS surgery. Broad application of ERAS following colorectal surgery appears to improve surgical outcomes.
Disclosure of interest: None declared.

P005 IS 4 DAYS HOSPITAL STAY POST ROBOTIC RADICAL CYSTECTOMY FEASIBLE; A MULTIDISCIPLINARY ENHANCED RECOVERY PROGRAM AFTER MINIMAL INVASIVE SURGERY CHALLENGE

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Objectives: Radical cystectomy is the standard surgical treatment for muscle-invasive bladder cancer associated with inherent surgical morbidity, prolonged hospital stay and mortality. Our aim was to evaluate enhanced recovery after surgery protocol (ERP), focusing on length of stay (LOS), complication and readmission rates, as objective measures of quality of care after robotic assisted radical cystectomy (RARC).

Methods: After the establishment of a tertiary referral centre in April 2013, 175 (142 male and 33 female) patients underwent RARC with newly devised multimodal ERP. Our multidisciplinary pathway adopted the core published 20 elements of ERAS in colorectal surgery along with the addition of procedure-specific elements, as well as individualising fluid and analgesia management for RARC. On discharge patients are expected to return to their homes, support by family and friends is encouraged, however special nursing services are not provided. Prospectively collected demographic, operative and perioperative data from institutional database were analysed.

Results: The median age at treatment was 71 years old, 73% had a BMI <30 kg/m², 27.4% a CPET anaerobic threshold <11 and 84.3% an ASA score ≤2. The median LOS was 5 days (1st-3rd IQR: 4-7 days). Post-operative day 4 was the most frequent day of discharge from hospital. Age ($p=0.003$) and complications ($p<0.001$) were the only factors that showed a statistically significant association with a 4-day LOS. The incidence of post-treatment complications was 40% (70 of 175) for minor (Clavien-Dindo grade ≤II) and 8% (14 of 175) for major (grade ≥III) complications. There was one death (0.67%) within 30 days of surgery. The incidence of readmission to hospital 30 days after operation was 14.8% (26 of 150) and we found complications and intra/ extra corporeal diversion to be significantly associated with readmission.

Conclusion: Four days hospital stay RARC is possible and safe without increasing readmissions or complications as a result of multimodal ERP aimed to maximize the benefits of minimally invasive surgery in a high volume centre. Elderly patients should receive preoperative counselling about their increased risk of longer hospital stay, optimisation through prehabilitation programs and closer perioperative monitoring

Disclosure of interest: None declared.

P006 DOES THE COMBINATION OF ENHANCED RECOVERY AND LAPAROSCOPIC TECHNIQUE IMPROVE LONG TERM SURVIVAL AFTER ELECTIVE COLORECTAL CANCER SURGERY?

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Objectives: The impact of the attenuation of surgical stress response by ERAS (Enhanced Recovery After Surgery) on short term outcomes is well proven. The application of laparoscopic techniques has also proven to provide additional benefits to short term outcomes after colorectal cancer surgery. There is very little research investigating the long-term outcome of combining the two modalities on managing colorectal cancer. The objective of this study was to investigate the long-term impact of laparoscopic colorectal cancer resection within ERAS programme.

Methods: A prospectively populated colorectal cancer surgery database at one unit from 2002 to 2015 was reviewed. Compliance with ERAS protocol in 16 areas was measured. The outcome measures included the mode of surgery (laparoscopic, conversion to open and open surgery). Median follow up was 48 months (range 0–168). Overall survival (OS) at 5 years was calculated using Kaplan-Meier method.

Results: 844 patients underwent elective colorectal cancer resections. ERAS compliance was measured at a median of 93% (Range 53–100%). 481 patients underwent laparoscopic resection (56.3%), 69 of which were converted to open surgery. Length of stay (LOS) was significantly shorter in the laparoscopic group compared to converted/open (median 7 vs 9, $p=0.003$). Five-year overall survival was superior in the laparoscopic group compared to converted and open cases (77% vs. 63% vs. 62% respectively, $p<0.0001$).

Conclusion: The combination of laparoscopic surgery with enhanced recovery appears to improve long term survival after colorectal cancer resection.

Disclosure of interest: None declared.

P007

EVALUATION ON PATIENT-CONTROLLED ANALGESIA FOR LAPAROSCOPIC COLORECTAL SURGERY WITHIN AN ENHANCED RECOVERY PATHWAY

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Objectives: To compare epidural analgesia (EDA) to intravenous patient-controlled opioid-based analgesia (IV PCA) in patients undergoing laparoscopic colorectal surgery. EDA is mainstay of multimodal pain management within enhanced recovery pathways (ERPs). For laparoscopic colorectal resections, the benefit of epidurals remains debated.

Methods: A total of 62 patients undergoing elective laparoscopic colorectal resections within ERPs were retrospectively examined to compare the extent of pain relief using EDA (n=28) versus iv PCA (n=34) with the transverse abdominis muscle plane (TAP) and Rectus sheath (RS) block. All patients additionally received acetaminophen 1800-3600 mg/day. Use of both procedures for analgesia was routinely discontinued on postoperative day (POD) 3. Pain was assessed once daily on mobilization with the visual analog scale (VAS) (0-100) until POD 7.

Results: Both groups were similar regarding baseline characteristics. Although both groups showed similar medical recovery in terms of oral intake, mobilization, and bowel movement, the IV PCA+TAP/RS block group had significantly shorter hospital stay than EDA group [7 days (4-47) vs 9 days (4-16); P=0.003]. Median VAS pain scores while mobilization on POD 1-7 in the IV PCA+TAP/RS block group were less than 40, while the EDA group showed less than 50, each gradually decreasing with time. The VAS score of the IV PCA+TAP/RS block group on POD 1 showed significantly better pain relief than that of the EDA group. But otherwise, no statistical difference in postoperative pain scores was noted.

Conclusion: IV PCA with TAP/RS block delivered almost similar pain relief to EDA within ERPs. EDA prolonged the hospital stay after laparoscopic colorectal resections without adding obvious benefits in terms of medical recovery.

Disclosure of interest: None declared.

P008

THE IMPACT OF PATIENT FOCUSED PRE-OPERATIVE EDUCATION ON HOSPITAL LENGTH OF STAY (LOS) AND PATIENT PREPAREDNESS IN PATIENTS UNDERGOING PANCREATODUODENECTOMY (PD).

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Objectives: We sought to improve patient's preoperative knowledge and consequently the post-operative readiness with complex abdominal surgical resections. Further, we hypothesize that patients would have improved satisfaction with increased readiness in surgery, and matching patient and physician expectations would improve hospital LOS.

Methods: The Preoperative Learning and Readiness in Surgery (POLaRiS) program is a one hour, patient-focused preoperative learning course designed for patients undergoing PD at a high volume hepatopancreaticobiliary (HPB) surgery center. This is a multidisciplinary course including both visual and written materials generated by Advanced

Care Providers (ACP) with specialty training in the care of HPB surgery patients. POLaRiS provides a comprehensive review of the surgical team, procedure details, potential complications, expectations for postoperative recovery, and hospital discharge. Patient comprehension of the surgical encounter was assessed prior to, and following the POLaRiS course. Following PD, patients were also offered a discharge questionnaire to assess readiness and expectations for discharge.

Results: From 09/2015-05/2016, 86 PD were scheduled. Forty-four patients participated in the pre- and post-test. Fifty patients participated in an additional discharge questionnaire; 17 did not attend the preoperative class while 33 did (52%). The pretest mean was 6.2/10 questions. The posttest mean of 8.5/10 questions. Seventy three percent of POLaRiS participants completely agreed with the statement, "I felt prepared for my surgery before coming to the hospital" compared to 47.1% of non-participants. The hospital LOS decreased from 14.3 to 13 days post POLaRiS implementation.

Conclusion: After implementation of a focused preoperative learning course for PD, participants showed a higher degree of comprehension of the surgery as evidenced by a large increase in readiness for surgery and a decrease in LOS. In our experience facilitating congruence between patients and provider expectations following PD improves clinical outcomes including LOS and patient satisfaction.

Disclosure of interest: None declared.

P009

ENHANCED RECOVERY AFTER SURGERY PROTOCOL IN IVOR LEWIS ESOPHAGECTOMY: 3 YEARS EXPERIENCE

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Objectives: Ivor Lewis esophagectomy is a high morbidity and mortality operation. Application of Enhanced Recovery After Surgery (ERAS) protocols in esophageal surgery is debated. Our first experience demonstrated its feasibility and safety. Aim of this study was to assess the impact of experience in the adherence of our ERAS protocol in Ivor Lewis patients.

Methods: Ninety-one patients underwent esophagectomy at our Institution from December 2013 to December 2016. In this paper we considered only 57 patients treated with an Ivor Lewis esophagectomy. All the patients were treated according to our ERAS protocol. The protocol included goal directed fluid therapy, early extubation, discharge from ICU, optimization of analgesia, early removal of drains and early oral intake recovery. Patients were divided into two groups: group OLD included patients operated until December 2015 (33 patients), group NEW the latter 24 patients. Adherence to the pathway steps and morbidity and mortality were compared between the two groups. We performed a linear regression analysis in order to define the impact of experience in the postoperative steps application.

Results: The two groups were comparable in terms of preoperative parameters (age, sex, comorbidities, tumor histotype, neoadjuvant treatment). The two groups had the same adherence in terms of early extubation, ward transfer, fluid restriction and removal of nasogastric tube, thoracic drainage, urinary catheter and central line. Patients in group NEW had a higher adherence in carbohydrate load administration, resume of liquid diet and early mobilization. Linear regression evidenced significant improvement along the three years in ward transfer, liquid and soft diet resume and early mobilization.

Conclusion: Experience of the group leads to a higher adherence to the different steps. It is difficult to find a precise cut off in the ERAS team learning curve for esophagectomy. A linear regression evidenced a continuous improvement of the ERAS group in some steps.

Disclosure of interest: None declared.

P010

A MULTICENTER QUALITATIVE STUDY ASSESSING IMPLEMENTATION OF ENHANCED RECOVERY AFTER SURGERY PROGRAM

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Objectives: The existence of guidelines is not enough to change practice and many barriers exist to successfully implement enhanced recovery protocols (ERAS). The present survey aimed to assess reasons as well as difficulties for implementation.

Methods: A qualitative multicenter study was conducted among surgeons, anesthesiologists and nurses from all implemented ERAS centers in Switzerland and Sweden. An online survey (31 closed questions) was sent by email, with reminders at 4, 8 and 12 weeks later, encouraging completion. Data were collected between August and December 2016.

Results: Seventy-seven out of 146 participants completed the survey (response rate 53%). Main motivations for ERAS implementation were reduced complications (91%), patient satisfaction (73%) and shorter hospital stay (62%). The most important barriers to implementation were time (69%), colleagues (68%) and logistical reasons (combination of organization, action and execution, 66%). The application of ERAS program represented major changes in clinical practice for 57% of participants and minor changes for 39%. Major changes were stated by 63% of the surgeons, 58% of the nurses and 35% of the anesthesiologists. The 3 most frequently cited patient-related barriers to implementation were personality (52%), co-morbidities (49%) and language barriers (31%). Concerning co-morbidities, the 3 most frequently reported were mental illness (64%), cardiovascular (38%) and physical aspects (27%).

Conclusion: Implementing evidence-based ERAS care into practice is challenging and requires important changes of clinical practice for all involved specialties. Main motivation to invest time, money and “nerves” is the expectation to reduce complications and hospital stay and to improve patients’ satisfaction.

Disclosure of interest: None declared.

P011

INSTITUTION OF A PATIENT BLOOD MANAGEMENT PROGRAM TO DECREASE BLOOD TRANSFUSIONS IN ELECTIVE KNEE AND JOINT ARTHROPLASTY

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Objectives: In this study, we instituted a Patient blood management (PBM) program as a component of our Perioperative Surgical Home with the goal of improving patient outcomes and reducing the incidence of perioperative anemia in joint arthroplasty patients.

Methods: Preoperative, intraoperative and postoperative PBM protocols were implemented for patients undergoing elective knee and hip arthroplasty. Preoperatively, patients were seen approximately 30 days prior to surgery for clinical evaluation and assessment, which comprised of screening for bleeding and coagulation risk as well as anemia. Patients were treated with one or more of the following: IV iron, vitamin supplementation or erythropoietin stimulating agents. Autologous blood donation was eliminated. Intraoperatively, the use of cell salvage, hemostatic agents and anti-fibrinolytics was instituted. Post operatively, post-surgical anemia was assessed and treated with IV iron. Post-operative blood products ordered for joint arthroplasty patients required approval from anesthesia prior to transfusion. Transfusion triggers dropped to 7g/dl in non-cardiac patients and at 8g/dl in cardiac patients.

Results: In 2013, the average rate of transfusion (ART) in total knee arthroplasty (TKA) was 12.4%. In 2014 7.9 % and 3.2 % in 2015 (p<0.001). In

total hip arthroplasty (THA), the ART was 12.8% in 2013, 8.3% in 2014 and 6.1% in 2015 (p<0.001). At the beginning of our PBM for joint arthroplasty patients the ART was 15.6%. Our current overall ART is 6.5% (p<0.001). For our TKA patients, in 2013, the average length of stay (ALOS) was 3.3, 3.2 in 2014 and 3.0 days in 2015 (p<0.001). For THA patients ALOS in 2013 was 3.5, 3.4 in 2014 and 3.2 in 2015 (p=0.036). More patients were discharged home from 47.7% in 2013, 50.4% in 2014 and 52.4% in 2015 for TKA (p=0.554). In THA, 47.1% of patients in 2013, 50.7% in 2014 and 58.7% patients were discharged home in 2015 (p=0.062). There was statistical reduction of the direct cost for both knee and hip arthroplasty, however, the amount was marginal (\$300, p<0.001).

Conclusion: Implementation of a PBM program is an effective way to treat preoperative anemia, reduce allogenic blood transfusions and improve patient outcomes and risk, while reducing length of stay and reducing cost.

Disclosure of interest: None declared.

P012

IMPLEMENTATION OF AN ENHANCED RECOVERY AFTER SURGERY (ERAS) PROGRAM IN GYNECOLOGIC SURGERY: THE ROLE OF THE ANESTHESIOLOGIST IN OPIOID SPARING

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Objectives: Multimodal analgesia has been proposed as a potential strategy in enhanced recovery after surgery (ERAS) programs. Our aim was to determine whether implementation of an ERAS protocol in gynecologic surgery resulted in a reduction in intra-operative opioid administration.

Methods: Data was evaluated prospectively on consecutive patients undergoing open gynecologic surgery between 11/2014 and 12/2016. Morphine equivalent dose (MED) and length of stay (LOS) were compared with main anesthesia technique [volatile anesthetics, total intravenous anesthesia (TIVA) with propofol and ketamine, or a combination of both], as well as with the use of pre-operative multimodal analgesia medications (pregabalin, celecoxib, and tramadol). Logistic regression methods were used to model the association between the Charlson Comorbidity Index (CCI) and 30-day post-operative complications, readmission and reoperation. The Spearman rank correlation was used to estimate the relationship between hospital LOS and the CCI. LOS was also analyzed based on the use of peri-operative nausea and vomiting medications (aprepitant, dexamethasone, metoclopramide, ondansetron, promethazine, and scopolamine).

Results: A total of 539 patients were analyzed. There was a significant decrease in intra-operative MED with the use of TIVA versus a combination of TIVA and volatile anesthetics (37.5 vs 62.5; p=0.0034), and an even greater decrease of MED with the use of TIVA compared with volatile anesthetics alone (37.5 vs 72.5; p<0.0001). There was no significant difference between the different anesthesia techniques and LOS. A significant decrease on both intra and post-operative MED was associated with the use of pre-operative multimodal analgesia medications (p<0.05). There was a significant association between higher CCI and 30-day post-operative complications (OR 1.23, 95% CI 1.10-1.38; p=0.0004). The Spearman correlation between LOS and the CCI was 0.1345 (p=0.0017) suggesting that a lower CCI is associated with shorter LOS. The use of intraoperative dexamethasone was associated with a shorter length of stay (4 +/- 4 days; p=0.0103).

Conclusion: The use of TIVA and multimodal analgesia in an ERAS program was associated with a decrease in the rate of postoperative opioid use.

Disclosure of interest: None declared.

P013 CONSENSUS ON IMPLEMENTATION AND TRAINING FOR ERAS: DELPHI STUDY

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Objectives: The successful implementation of ERAS is challenging and patchy with wide variations in compliance to ERAS elements across disciplines. Several ERAS teaching programs and courses exist but there is no consensus regarding the optimal training curriculum or course structure. We aim to draw consensus from a selected expert panel regarding the ideal curriculum for ERAS training.

Methods: A Delphi technique using three rounds of online questionnaires was sent to 58 peer selected experts across multiple specialities, representing the whole multidisciplinary team, between February 2016 and January 2017. We interrogated expert opinion regarding 4 main topics: (i) the optimal framework for successful implementation of ERAS including a guide for data collection and data entry; (ii) elements for a training curriculum including the preferred structure and delivery of training courses; (iii) criteria to define ERAS 'training centres' and a framework for a 'training the trainers' curriculum and (iv) a framework of assessment of training and education in ERAS.

Results: Response rates for round one and two were 60.34% and 56.9%, including experts from 11 countries. Criteria for successful implementation of ERAS include MDT working, collaborative learning, audit and data collection and having an ERAS nurse or facilitator. Data collection should include readmission rates, length of stay, time to normal diet and mobilisation. Data collection support involves a tailored approach and includes dedicated data entry personnel, automation of medical records and training for administrative staff. Training curriculum objectives include audit education and the evidence based principles of ERAS. Training courses should combine didactic and interactive learning based on MDT principles with ERAS component scenarios. Criteria for recognition of an ERAS training centre should include a willingness to teach, regular audit and data collection, demonstrable team working and high ERAS compliance rates. 'Training the trainers' curriculum should include how to empower a team and introduce change. Assessing the validity of training should include ERAS compliance rates and outcomes, course feedback and audit. Third round results are awaited and will be presented at the conference as the final consensus.

Conclusion: An international expert consensus is completed to provide a framework for successful implementation, data collection, training and assessment of ERAS.

Disclosure of interest: None declared.

P014 COMPLIANCE WITH AN ENHANCED RECOVERY AFTER SURGERY (ERAS) PROGRAM IN GYNECOLOGIC SURGERY: IMPACT ON LENGTH OF STAY AND COMPLICATIONS

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Objectives: Enhanced Recovery after Surgery (ERAS) programs aim to improve the perioperative outcomes of patients undergoing gynecologic surgery. One of the greatest challenges when implementing such programs is strict adherence to the items on the protocol. Measuring compliance has proven to be a key factor in the success and sustainability of ERAS programs. The aim of this study was to analyze the compliance to the ERAS protocol and its impact on postoperative outcomes in patients undergoing major gynecologic surgery.

Methods: Data was collected prospectively on consecutive patients undergoing open gynecologic surgery between 11/03/14 and 03/03/16 in a single center. We analyzed the following: adherence to 20 individual ERAS components, incidence of postoperative complications within 30 days, reoperation, readmission, and length of stay (LOS).

Results: In total, 381 patients were included in the analysis. The mean overall compliance rate was 67.2% (95% CI:66.4–67.9), with 204 patients (53.5%) with $\geq 70\%$ compliance (95% CI:48.4–58.6). The Spearman correlation between overall compliance and LOS (days) was found to be -0.32 ($p < 0.0001$) suggesting higher compliance was associated with shorter LOS. Increasing ERAS compliance was associated with lower incidence of postoperative complications (OR=0.95, $p=0.0002$). The ERAS items found to be protective against postoperative complications within 30 days were: avoidance of salt and water overload (OR=0.37, $p < 0.0001$) urinary catheter removal within postoperative day 1 (POD1) (OR=0.38, $p < 0.0086$), ambulation within POD1 (OR=0.20, $p < 0.0004$) and tolerance of regular diet within POD1 (OR=0.32, $p < 0.0001$). There was no relationship between overall compliance and rate of readmission ($p=0.6609$, OR=0.99, 95% CI:0.95–1.03) or reoperation ($p=0.1248$, OR=0.94, 95% CI:0.86–1.02).

Conclusion: Increased compliance with an ERAS protocol is associated with a reduction in LOS and postoperative complications. Avoiding fluid overload, fast catheter removal, early ambulation and feeding may have the strongest association with reduced complications. Additional studies are needed to determine where the gaps lie to assure improved compliance in the future.

Disclosure of interest: None declared.

P015 IS THERE A ROLE FOR LOCAL ANAESTHETIC WOUND INFUSION CATHETERS IN THE ENHANCED RECOVERY OF GYNAECOLOGY LAPAROTOMIES?

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Objectives: To evaluate the use of local anaesthetic wound infusion catheters in reducing post-operative pain and opioid use, in comparison to low thoracic epidurals in patients undergoing gynaecology laparotomies.

Methods: We carried out a retrospective notes review of patients undergoing gynecology laparotomies over the last six months from June 2016 till December 2016 at The Royal Sussex County Hospital in Brighton. We reviewed 40 patients in total: 27 patients who had spinals and local anaesthetic wound catheters, 12 patients who had epidurals only and 1 patient who only had a spinal with a Morphine PCA (Patient Controlled Analgesia). We defined gynecology laparotomies as any elective open surgery in our enhanced recovery programme, for example, total abdominal hysterectomies, salpingo-oophorectomy, or debulking of tumour. We collected data for the type of anaesthesia received, the analgesia used in recovery, the analgesia used two days' post op, day 1 and 2 pain scores and mobilisation, duration of local anaesthetic infusion and length of stay.

Results: Our results have shown that local anaesthetic wound catheters required slightly greater post-operative opioid requirements compared with using a low thoracic epidural. We have also shown that our pain scores were equivalent to patients undergoing thoracic epidurals, with 75% of patients receiving spinals and local anaesthetic catheters having pain scores of 0–2 compared with 67% in the epidural group. We have also noted that the spinal and local anaesthetic catheter groups had a shorter length of stay of 4 days versus epidurals that had an average of 5.5 days. We also noted that the local anaesthetic group had greater mobilisation on Day 1

and 2, with 90% mobilising out of the bay compared to 58% on Day 2 with a thoracic epidural.

Conclusion: We conclude that our preliminary data is promising, further research is required in larger studies. We recommend that the local anaesthetic wound catheters can give equivocal pain scores to thoracic epidurals with a slight increase in opioid consumption as compared with thoracic epidurals. We also showed length of stay was reduced with local anaesthetic catheters and mobilisation was quicker.

Therefore, with the reduced risks associated with local anaesthetic catheters compared to low thoracic epidurals; means they may have a significant role to play in enhanced recovery pathways.

Disclosure of interest: None declared.

P016

INTRAVENOUS LIDOCAINE + KETAMINE INSTEAD OF TRAMADOL FOR POSTOPERATIVE ANALGESIA IN LAPAROSCOPIC COLON SURGERY. DOES IT DECREASE POSTOPERATIVE NAUSEA, VOMITING AND ILEUS WITHOUT WORSENING ANALGESIA CONTROL?

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Objectives: ERAS guidelines recommend the use of multimodal strategies with paracetamol and NSAIDs for management of postoperative pain in laparoscopic colorectal surgery (CRS). Opioid based therapies provide better analgesia but they may increase the incidence of postoperative nausea and vomiting (PONV) or ileus. Other drugs as intravenous lidocaine and ketamine may be added at these therapies. Our hypothesis is that changing a weak opioid like tramadol by intravenous lidocaine + ketamine perfusion decreases the incidence of PONV and ileus without increasing postoperative pain in laparoscopic CRS.

Methods: We developed a cohort study comparing two groups of postoperative analgesia in laparoscopic CRS. We compared a new therapy based on a lidocaine (1 mg/Kg/h) + ketamine (0,07 mg/Kg/h) infusion + paracetamol (1g/6h) + dexketoprophen (50 mg/8h) named as LKPD with our previous strategy with tramadol (1 mg/Kg/8h) + paracetamol (1g/6h) + dexketoprophen (50mg/8h) named TPD. Both strategies were administered for the first 24h postoperative. We collected demographic and intraoperative data (age, gender, BMI, ASA status and type of surgery). We recorded incidence of PONV (yes/no) and ileus (yes/no). We also recorded maximum and average pain referred by the patient at 24 hours postoperative. Pain was assessed with a numeric scale (0-10). Statistical analysis: We compared postoperative nausea-vomiting and ileus with a Fisher test and maximum and average pain with a student t test.

Results: We analyzed 121 patients (TPD Group=58 and LKPD Group=63). No differences found between the two groups regarding demographic and intraoperative data. Incidence of PONV in the first 48 hours was 17% in LKPD group vs 43% in TPD group (p<0,005). Incidence of postoperative ileus was 21% in LKPD group vs 32% in TPD group (p=0,38). No statistical differences found in mean maximum pain (LKPD 4.56 ± 1.76 vs TPD 4.27 ± 2.42) or mean average pain (LKPD 2.45 ± 0.42 vs TPD 2.59 ± 1.68) referred at 24h.

Conclusion: Using intravenous lidocaine + ketamine instead of tramadol decreases the incidence of PONV without worsening pain control. A lower incidence of postoperative ileus is seen in LKPD group without reaching statistical differences.

Disclosure of interest: None declared.

P017

NUTRITIONAL STATUS FOLLOW-UP AFTER LAPAROSCOPIC SURGERY FOR ENDOMETRIAL CANCER

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Objectives: Recently, the number of endometrial cancer diagnoses has increased up to 25.4/100.000 women per year. Minimal invasive surgery (MIS) is considered the standard treatment for these patients, whose nutritional status is proposed to concern surgical results. The purpose of our study was to assess pre and postoperative nutritional status comparing different sorts of laparoscopic surgeries to treat endometrial cancer patients.

Methods: A retrospective analysis over 40 patients undergoing laparoscopic surgery in Hospital del Mar Barcelona was recruited between 2015 and 2016. The study included 14 low-risk endometrial cancer cases submitted to total hysterectomy and bilateral salpingo-oophorectomy (LHBSO), and 26 high-risk endometrial cancer patients endured additional pelvic and paraaortic lymphadenectomy (LHBSO-L), according to our protocol. Body mass index (BMI) and laboratory data of hemoglobin (Hb) (ref>11.8 g/dL), serum total protein (ref>6.0 g/dL) and albumin (ref>3.8 g/dL) were reported before and 2-3 days after surgery to evaluate nutritional status.

Results: The mean age of patients was 66.5 ± 12.2 years (range 40-90) whose mean BMI was 32.6 ± 7.9 kg/m² (range 19.3-50.4), independently of the surgery performed. Preoperatively, no patient was malnourished according to total protein and albumin parameters. The mean time for LHBSO-L was 259.4 min vs 138.6 min for LHBSO (p<0.001). Comparing nutritional items after surgery in LHBSO-L vs LHBSO groups, 80.8% vs 42.9% patients showed decreased total protein levels (p=0.015), and 92.3% vs 57.1% decreased albumin levels (p=0.008). Moreover, 80.8% vs 35.7% cases presented postoperative anemia (p=0.004). The nutritional status due to surgery is about the double in LHBSO-L vs LHBSO group, being 1.61 (22.8%) vs 0.81 (11.7%) of total protein reduction (p<0.001); and 1.12 (25.6%) vs 0.57 (11.4%) of albumin loss. Hb decline was of 3.26 in LHBSO-L vs 1.31 in LHBSO group (p<0.001).

Conclusion: Laparoscopic surgery significantly decreases postoperative total protein, albumin and Hb levels in previously well-nourished patients with endometrial cancer. Furthermore, those undergoing LHBSO-L were subjected to double loss of measured nutritional parameters compared to who submitted LHBSO; correlatively to time of surgery. In addition, although MIS cause less inflammatory damage, nutritional status has shown to be compromised and its assessment should be taken into account.

Disclosure of interest: None declared.

P018

ROBOTIC SURGERY AS A PART OF ERAS TECHNOLOGY IN PANCREATICODUODENECTOMY

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Objectives: To improve results of surgical treating patients after pancreaticoduodenectomy.

Methods: 113 PD's were performed during 2014 – 2016. ERAS protocol of perioperative care was used. Indications for PD were ampullary or periampullary tumors and chronic pancreatitis (duodenal dystrophy). In 96 cases (85%) laparotomy was performed, while in 17 (15%) cases the DaVinci robotic system was used. There was no difference in mobilization, lymph node harvest and reconstruction principles in two groups. The results are performed by median with 25 and 75 percentiles.

Results: Duration of traditional PDs was 300 min (251;368), robotic - 408 min (368; 511). Intraoperative blood loss 225 ml (138;500) and 250 ml (200;400) in traditional and robotic groups respectively. Length of postoperative stay was 15 days (11; 20) after traditional PDs and 15,5 (14; 21) after robotic. Narcotic analgesics were used in all cases after laparotomy and in 73% after robotic surgery. Average duration of narcotic analgesics use was lower in robotic patients - 0,9 vs. 1,7 days. Specific postoperative complications were classified according ISGPS classification. There were no significant differences in specific complications. In 26 (23%) of 113 cases there were postoperative pancreatic fistulas: type A - 16 (14,2%), type B 10

(8.9%). 17 patients (15%) had delayed gastric emptying, 10 (8.8%) patients had postpancreatectomy haemorrhage which required reoperation. There were complications typical for open surgery after traditional PD: eventration – 1, adhesive bowel obstruction – 1, wound infections – 9.

Conclusion: Using of robotic surgery for PD helps in early patient activation after surgery, reduction of postoperative wound pain, better cosmetic effect. There is no difference in specific complications rate. Robotic technology can become a part of ERAS ideology for pancreatic surgery. Using of protocol helps to standardize perioperative care and to make appropriate analyze of treatment results.

Disclosure of interest: None declared.

P019

COMPARING THE ACS NSQIP RISK CALCULATOR TO A CUSTOMIZED PREDICTIVE MODEL FOR MAJOR HEPATECTOMY PROCEDURES AT A HIGH-VOLUME CENTER

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Objectives: The American College of Surgeons (ACS) NSQIP[®] Risk Calculator is designed to estimate postoperative risk. At our institution, a member of the collaborative, we too developed predictive models for assessing postoperative risk in major hepatectomy. We aimed to compare our institution-specific risk calculator to the NSQIP calculator for patients undergoing major hepatectomy.

Methods: ACS defined outcomes were recorded for 136 major hepatectomies performed at our institution (2008-2015). In parallel, novel predictive models for seven postoperative outcomes were constructed and probabilities calculated. Brier score and area under the curve (AUC) were employed to assess predictive accuracy.

Results: Brier scores showed no significant difference in the predictive ability of the ACS and institution-specific models. However, significant differences in the discriminative ability of the ACS and institution-specific models were identified at the individual level. The institution-specific model was a stronger predictor of individual postoperative risk for 6/7 outcomes (AUC: 0.912–0.969, $p < 0.05$) compared to the ACS model (AUC: 0.523–0.619, $p > 0.05$) including surgical site infection, renal failure, and urinary tract infection.

Table 1

Comparison of predictive capacity of ACS-NSQIP[®] and Institution-specific risk-prediction models for postoperative complications of major hepatectomy performed at a high-volume center

| | ACS model | | | Institution-specific model | | |
|--|-----------|------------------------|----------------|----------------------------|------------------------|----------------|
| | AUC | AUC <i>p</i> -value | Brier score | AUC | AUC <i>p</i> -value | Brier score |
| Surgical site infection | 0.619 | 0.234 | 0.030 | 0.969 | 0.003 | 0.015 |
| Renal failure | 0.523 | 0.411 | 0.029 | 0.958 | <0.001 | 0.021 |
| Urinary tract infection | 0.597 | 0.218 | 0.028 | 0.912 | 0.002 | 0.035 |
| Discharge to nursing/rehabilitation facility | 0.601 | 0.092 | 0.090 | 0.892 | 0.000 | 0.060 |
| Serious complication | 0.568 | 0.101 | 0.189 | 0.764 | 0.000 | 0.151 |
| 30-day mortality | 0.858 | <0.001 | 0.067 | 0.815 | 0.001 | 0.047 |
| 30-day readmission | 0.520 | 0.345 | 0.156 | 0.755 | 0.000 | 0.128 |

Abbreviations: ACS-NSQIP, American College of Surgeons National Quality Improvement Program; AUC, Area under the curve.

Conclusion: Institution-specific models may provide superior outcome predictions for individual perioperative risk following major hepatectomy and, if properly developed/validated, may be used to generate more accurate, patient-specific delivery of care.

Disclosure of interest: None declared.

P020

ERAS PATHWAY IN RADICAL CYSTECTOMY: WHAT DO WE LEARN AFTER 2 YEARS OF EXPERIENCE?

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Objectives: The development of enhanced recovery after surgery (ERAS) pathways in the perioperative setting of colorectal surgery showed a reduction of both postoperative complications and length of stay. Using this background, we aimed to assess perioperative outcomes after the implementation of a multimodal rehabilitation programme for radical cystectomy in patients with bladder cancer¹.

Methods: From January 2012 to July 2016, a retrospective study of 81 consecutive patients who underwent radical cystectomy was performed (40 with the ERAS pathways vs. 41 non-ERAS). We had the local Ethical Committee approval and patient's informed consent. In the ERAS group different items were included: stoma education, preoperative medical optimization, preoperative carbohydrates loading, laparoscopic approach, multimodal postoperative analgesia, nasogastric tube removal and early mobilization. We compared length of stay, time to first bowel movement, complication rate following Clavien-Dindo classification, bleeding, transfusion rate, and mortality between both groups. The statistical analysis was performed with SPSS, with t-Student and Chi squared test.

Results: Median age was 70.49 ± 7.59 years, 82.90% were men, and ASA grade III-V 53.10%. No demographic differences were found between both groups. Length of stay was 14.70 ± 8.90 days in the ERAS group vs. 15.20 ± 8.90 days in the traditional protocol group ($p = 0.69$). Time to first bowel movement was 6.05 ± 5.68 days vs. 7.31 ± 4.57 days ($p = 0.20$), and major complication rate was 16.20% vs. 23.00% ($p = 0.28$). Bleeding was 493.9 ± 322.44 ml vs. 785.83 ± 711.03 ml ($p = 0.002$), and transfusion rate 32.50% vs. 65.85% ($p = 0.002$). Mortality in the ERAS group was 5.20% vs. 8.60% in the non-ERAS group ($p = 0.40$).

Conclusion: ERAS group had a significant decrease in intraoperative bleeding and transfusion rate.

Despite not statistically significant differences were found between both groups, a slight reduction in length of stay, time to first bowel movement, perioperative complications and mortality was observed in the ERAS group. Future trials with a greater sample could provide new evidence.

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Disclosure of interest: None declared.

P021

PRE AND POSTOPERATIVE CORRELATION BETWEEN TIMED UP AND GO AND 6-MINUTE WALKING TESTS IN PATIENTS UNDERGOING ABDOMINAL AND THORACIC ELECTIVE SURGERY

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Objectives: Timed Up and Go Test (TUG) and 6-Minute Walking Test (6MWT) are two measures widely used to assess functional performance in surgical patients. Both of them have shown to predict postoperative complications^{1,2}.

To evaluate the correlation between TUG and 6MWT in patients undergoing abdominal and thoracic elective surgery throughout the perioperative period.

Methods: A total of 155 patients enrolled in a Prehabilitation program and Enhanced Recovery (ERAS) protocol for elective surgery were recruited between 2012-2016; 50 patients were scheduled for lung surgery and 105 for abdominal surgery. TUG and 6MWT were measured at baseline (BL), preoperative (Preop) and 4 week after surgery (4WP). Pearson correlation

analysis was performed to determine the correlation between 6MWT and TUG at every measurement.

Results: There was a negative correlation between TUG and 6MWT that was maintained throughout the perioperative period. Pearson Correlation at BL was $r = -0.79$ [CI 95% (-0.84) - (-0.72) $p < 0.0001$], $r^2 = 0.62$; at Preop $r = -0.76$ [CI 95% (-0.83) - (-0.66) $p < 0.0001$], $r^2 = 0.57$; at 4WP $r = -0.90$ [CI (-0.93) - (-0.86) $p < 0.0001$], $r^2 = 0.81$. There were no significant correlation differences between the lung surgery and the abdominal surgery group throughout all measurements.

Conclusion: These preliminary findings suggest that there is a good correlation between 6MWT and TUG in patients undergoing elective abdominal and thoracic surgery and receiving prehabilitation, implying that TUG can be a useful and quick measure of functional capacity in the prehabilitation setting, although further analysis is needed.

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Disclosure of interest: None declared.

P022

MYOCARDIAL ISCHEMIA AND CARDIAC COMPLICATIONS AFTER PERIOPERATIVE HYPEROXIA

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Objectives: Perioperative hyperoxia (intraoperative $FiO_2 > 80\%$) appears to reduce the incidence of surgical site infection in colorectal surgery (CRS)¹. For this reason, the Spanish Enhanced Recovery After Abdominal Surgery guidelines strongly recommend hyperoxia². Despite of this benefit, potential increased risk of coronary event has been observed by several authors^{3,4}. Due to the controversy of this topic, the goal of the study was to assess myocardial ischemia and cardiac complications in patients receiving hyperoxia during CRS.

Methods: A prospective observational study was conducted in patients scheduled to elective CRS in 2016 with perioperative hyperoxia. Demographic and surgical variables were recorded. The main outcome was myocardial ischemia (intraoperative elevation or decline of ST segment in DII or V5 > 1 mm from basal) or necrosis (increase in postoperative troponin T value compared to preoperative). We also recorded the incidence of cardiac events during hospitalization.

Results: 46 patients were recruited.

Demographic data: 63% men, age 70 ± 14 years, BMI 26 ± 4 , ASA (II=57%, III=41%, IV=2%), preoperative coronary heart disease 9%, preoperative haemoglobin 13 ± 2 g/dL and postoperative haemoglobin 11.8 ± 1.7 g/dL.

Intraoperative Data: Surgical procedure: Right hemicolectomy 37%, Sigmoidectomy 37%, Rectal anterior resection 17%, other 9%. Laparoscopy 80%. Duration of surgery 228 ± 67 minutes.

There was no evidence neither of Troponin T value increase nor changes in the ECG during surgery. During hospitalization, no patient was diagnosed with acute coronary syndrome or myocardial infarction.

Conclusion: Intraoperative hyperoxia in CRS appears to be safe in relation to myocardial ischemia in our small sample size. Further studies are needed to confirm our results.

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Disclosure of interest: None declared.

P023

FACTORS ASSOCIATED WITH DELAYED DISCHARGE IN PATIENTS UNDERGOING PANCREATIC SURGERY WITHIN AN ENHANCED RECOVERY PATHWAY

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Objectives: The use of standardized discharge criteria is advocated as it may prevent hospital readmission due to premature discharge and decrease medically unnecessary hospital stays. The objective of the study was to determine factors associated with delayed patient discharge despite use of discharge criteria within a well-established ERP, in a high-volume Italian center for pancreatic surgery.

Methods: Prospectively collected data for 284 consecutive patients discharged home following pancreatic resection was reviewed. Time to readiness for discharge (TRD) was defined as the number of postoperative days needed to reach standardized discharge criteria (i.e. tolerance of oral intake, recovery of GI function, adequate pain control with oral analgesia, ability to mobilize and self-care, no evidence of untreated complications). Delayed discharge was defined as spending 2 or more extra postoperative days in the hospital after reaching TRD. Multivariate analysis was performed to identify factors independently associated with delayed discharge. Values are reported as mean(SD) or median(iqr).

Results: Median TRD was 7 (6–11) days, and length of hospital stay was 9(7–12) days. 112(39%) patients were discharged 2 or more days after reaching discharge criteria. Delayed discharge patients were older (median age 68 vs. 62, $p = 0.007$), more likely to be females (61 vs 45%, $p = 0.009$), have a pre-existing cardiovascular disease (15 vs. 4%, $p = 0.001$), and have undergone a major pancreatic resection (78 vs. 59%, $p = 0.001$). Delayed discharge patients had lower mean overall adherence to ERP elements (73 vs 77%, $p = 0.008$). Occurrence of CR-PF was higher in delayed discharge patients (20 vs. 11%, $p = 0.018$), while there was no difference in overall complications (62 vs. 59%, $p = ns$), and readmissions (9 vs. 11%, $p = ns$). Multivariate analysis found that female gender (RR 1.61, $p = 0.002$), cardiovascular disease (RR 1.52, $p = 0.020$), major pancreatic resection (RR 1.99, $p = 0.001$), and occurrence of postoperative CR-PF (1.78, $p = 0.001$) were independently associated with increased chance of delayed discharge, while early postoperative mobilization was a protective factor (RR 0.62, $p = 0.007$).

Conclusion: Despite the use of discharge criteria, delay in hospital discharge is common. Patients at risk for delayed discharge should be identified and counselled early during postoperative recovery to limit unnecessary hospital stay.

Disclosure of interest: None declared.

P024

IMPACT OF AN ENHANCED RECOVERY AFTER SURGERY (ERAS) PROGRAM ON POSTOPERATIVE RENAL FUNCTION

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Objectives: Acute renal compromise (ARC) after surgery may impact overall recovery in patients with gynecologic malignancy. Perioperative

fluid restriction is a key component of an enhanced recovery after surgery (ERAS) program. Our goal was to identify correlations between intraoperative fluid volume and the rate of ARC defined by the Riffle criteria. We also aimed to determine the impact of ARC on postoperative length of stay (LOS).

Methods: Data was evaluated prospectively on consecutive patients undergoing open gynecologic surgery between 11/03/14 and 12/12/16. ERAS patients were compared with historical control patients treated under conventional pathways (pre-ERAS). The following was analyzed: intraoperative fluid balance, LOS, intraoperative transfusions, readmission, reoperation, renal and genitourinary complications, and postoperative ARC. The incidence of ARC was estimated (RIFLE criteria: Acute Renal Risk, Acute Renal Injury, or Acute Renal Failure) for each patient group with an exact 95% confidence interval. We used logistic regression methods to model the logic of the probability of ARC as a function of patient groups and other factors found to be differential between the patient groups. We started with a saturated model including all factors found on univariate analysis with $p < 0.25$ and then used backward elimination until all remaining factors were significant with $p < 0.05$.

Results: There were a total of 582 ERAS patients and 74 pre-ERAS patients. The incidence of ARC (by RIFLE) was 9.6% for the ERAS group [95% CI: 7.4–12.3] and 9.5% for the non-ERAS group [95% CI: 3.9–18.5 ($p = 0.9999$)]. Patients in the ERAS group with ARC had median LOS of 6 days (range; 2–57), while those without ARC had median LOS of 3 days (range 1–25) ($p < 0.0001$). Patients in the non-ERAS group with ARC had median LOS of 6 days (range 3–29), while those without ARC had median LOS of 4 days (range 2–29) ($p = 0.0754$). Patients in the ERAS group received less fluids ($p = 0.0062$) and blood products ($p = 0.0028$) compared to non-ERAS patients.

Conclusion: The implementation of an ERAS program and perioperative fluid restriction did not result in an increased rate of ARC. Postoperative renal function compromise increases length of stay. Further studies are needed to determine cause of ARC in patients treated in an ERAS program.

Disclosure of interest: None declared.

P025

PREHABILITATION REDUCES THE EXTENT OF FUNCTIONAL DETERIORATION ASSOCIATED WITH NEOADJUVANT CHEMOTHERAPY (NAC) AND SURGERY IN PATIENTS WITH OESOPHAGO-GASTRIC CANCER

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Objectives: Patients with OG cancer are 'high-risk' surgical patients; they are often elderly, frail and require major surgery. This is compounded by the introduction of neo-adjuvant chemotherapy (NAC). The aim of this study is to assess if prehabilitation prevents or reduces the extent of post-operative functional and health-related quality of life (HRQoL) deterioration in patients with resectable oesophago-gastric (OG) cancer.

Methods: PREPARE for surgery is a multi-modal, personalised prehabilitation programme that starts prior to the commencement of NAC. Data is collected for functional, psychological and nutritional measures at 4 time points: diagnosis, completion of NAC, immediate pre-operatively and 6 weeks post-surgery. Validated measures of functional capacity are converted into a metabolic equivalent of task score (METS). Quality of life (QoL) is measured using the validated EORTC QLQ C30 questionnaire.

Results: 59 patients have enrolled into the PREPARE programme from Jan 2015 to Dec 2016. The mean age of the patients was 66 years old. There was no significant deterioration in functional capacity (METS 4.6 vs 4.2; $p = 0.361$), overall HRQoL (75.5 vs 69.6, $p = 0.353$) and QoL physical function (90.5 vs 82.7, $p = 0.117$) during NAC (T1-T2). There was a significant improvement in METS from completion of NAC to immediately pre-operatively (T2-T3) (4.2 vs 5.1, $p = 0.001$). The extent of post-operative functional decline as compared to baseline was much less than that found in the published literature: METS (4.0 to 4.3), overall HRQoL (75.5 to 71.1), and physical function QoL (90.5 to 77.4) (T1-T4).

Conclusion: Our is the first study that shows that a programme of prehabilitation can protect against the deterioration of QoL and functional capacity in OG cancer patients undergoing NAC followed by radical surgery. Prehabilitation leads to an improvement in functional capacity in the immediate pre-operative period which potentially contributes to an accelerated post-operative recovery.

Disclosure of interest: None declared.

P026

RETURN TO INTENDED ONCOLOGIC THERAPY (RIOT) AFTER SURGERY FOR GYNECOLOGIC CANCER IN AN ENHANCED RECOVERY AFTER SURGERY (ERAS) PROGRAM

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Objectives: Return to intended oncologic therapy (RIOT) has been proposed as a novel quality indicator in oncology. Resumption of such therapies is often limited by the time to full recovery. Our goal is to measure the impact of demographic, clinical, and operative factors on RIOT in an ERAS program.

Methods: Patients who underwent open surgery for a gynecologic malignancy in an ERAS program 11/3/2014 to 10/31/16, and adjuvant therapy at MD Anderson Cancer Center were enrolled. Baseline clinical, demographic, and surgical data were measured. The impact of each covariate on the RIOT time in days was measured using non-parametric statistical tests.

Results: A total of 305 patients were identified with median age 60 years (range; 26–79) and median Charlson comorbidity index (CCI) 3 (range; 1–4). Stage III ovarian cancer was most common (28%). Median RIOT time was 29 days (range; 5–138). Age, BMI, and CCI did not have any impact on RIOT. Factors that lessened RIOT time were lower ECOG score, advanced surgical stage, and ovarian cancer. Those with earlier stage disease, less complex surgeries, and any postoperative complications were found to have the longest RIOT times.

Table 1

Baseline covariates and effect on RIOT

| | Cohort N=305 | Effect on RIOT score (p-value) |
|---|---------------------|--------------------------------------|
| Age, median years (range) | 60 (26–79) | 0.52 |
| BMI, median kg/m ² (range) | 27.4 (18.2–57.1) | 0.10 |
| Charlson Comorbidity index, median (range) | 3 (0–6) | 0.88 |
| Chronic pain diagnosis, n=yes (%) | 24 (7.87) | 0.03* |
| ECOG score, median (range) | 0 (1–3) | 0.04* |
| Hispanic ethnicity, n=yes (%) | 37 (12.13) | 0.75 |
| LOS, median days (range) | 3 (1–19) | 0.08 |
| Married/partnered, n=yes (%) | 204 (66.89) | 0.32 |
| Race, n=Caucasian (%) | 80.66 | 0.47 |
| Primary cancer site, n = Ovary/Peritoneum/Fallopian tube (%) | 175 (57.37) | <0.001* |
| Stage at time of surgery, median (range) | III (I–IV) | <0.001* |
| Surgical complexity score, median (range) | 1 (1–3) | <0.001* |
| Surgical complication, n=any (%) | 176 (57.70) | 0.03* |

Conclusion: Early stage disease and lower surgical complexity was associated with the longest RIOT times. We were not able to find an association between age, BMI, or CCI and RIOT.

Disclosure of interest: None declared.

P027 CUSTOMIZED PREDICTIVE ALGORITHMS FOR OUTCOMES OF CHOLECYSTECTOMY AT A HIGH-VOLUME CENTER

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Objectives: The American College of Surgeons NSQIP® Risk Calculator is designed to estimate postoperative risk. Using the NSQIP model for patients undergoing cholecystectomy, we identified significant discrepancies compared to data at our high-volume center. The aim of this study was to develop/validate an institution-specific predictive outcomes model for cholecystectomy.

Methods: From 2008–2015, 143 patients deemed too high risk for acute care surgery (ACS) had cholecystectomies performed by Hepatopancreatobiliary Surgery (HPB). Outcomes for HPB were matched against 126 cholecystectomies by ACS. Novel predictive models for 6 postoperative outcomes were constructed. Brier score and area under the curve (AUC) were used to assess predictive accuracy.

Results: HPB performed cholecystectomy on a higher acuity population with poorer predicted outcomes compared with ACS. Brier scores showed little difference in the predictive ability of NSQIP and our models. For ACS, our model better predicted mortality, surgical site infection, and cardiac complication (AUC: 0.945–0.978, $p < 0.05$). For HPB, our model better predicted 5/6 postoperative outcomes versus NSQIP (NSQIP AUC: 0.574–0.764, $p > 0.05$; institute-specific AUC: 0.779–0.982, $p < 0.01$).

Table 1

Comparison of predictive capacity of ACS-NSQIP® and Institute-Specific risk-prediction models for cholecystectomy

| | NSQIP calculator | | | CMC model | | |
|--|------------------|-------|-------|-----------|-------|-------|
| | AUC | AUC | Brier | AUC | AUC | Brier |
| | p value | | score | p value | | score |
| Cholecystectomy performed by CMC Acute Care Surgery | | | | | | |
| Serious complication | 0.612 | 0.155 | 0.036 | 0.978 | 0.001 | 0.024 |
| 30-day readmission | 0.677 | 0.047 | 0.052 | 0.589 | 0.187 | 0.051 |
| 30-day mortality | 0.890 | 0.023 | 0.016 | 0.945 | 0.014 | 0.016 |
| Cardiac complication | 0.629 | 0.125 | 0.015 | 0.960 | 0.013 | 0.015 |
| Cholecystectomy performed by CMC Hepatopancreatobiliary Surgery | | | | | | |
| Serious complication | 0.764 | 0.000 | 0.117 | 0.887 | 0.000 | 0.094 |
| Discharge to nursing facility | 0.759 | 0.001 | 0.063 | 0.916 | 0.000 | 0.049 |
| Renal failure | 0.833 | 0.008 | 0.023 | 0.774 | 0.031 | 0.017 |
| 30-day readmission | 0.574 | 0.120 | 0.110 | 0.779 | 0.000 | 0.113 |
| 30-day mortality | 0.661 | 0.000 | 0.202 | 0.861 | 0.000 | 0.121 |
| Cardiac complication | 0.761 | 0.001 | 0.069 | 0.982 | 0.000 | 0.021 |

Conclusion: For higher acuity patients undergoing cholecystectomy, customized models are superior for predicting individual perioperative risk and allow more accurate, patient-specific delivery of care.

Disclosure of interest: None declared.

P028 EARLY ORAL NUTRITION AFTER ESOPHAGECTOMY

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Objectives: There evidence of positive effect of early gastric tube nutrition and routine feeding jejunostomy after esophagectomy. Although early per oral nutrition (1–2 days after surgery) isn't studied enough. Our Goal - to

study the possibility of early per oral nutrition in patients after esophagectomy.

Methods: Single-center, prospective randomized study. A total of 34 patients underwent transthoracic or transhiatal esophagectomy during period between March and December of 2016. 10 patients were excluded from the study for different reason (severe somatic diseases - 4, swallowing disorder on the first day - 2, severe bleeding - 1, intestinal tube - 2). 24 patients were randomized into 2 groups. In the 1st group (12 patients) early per oral nutrition was resumed on 1st day after esophagectomy. In the 2nd group (12 patients) there was traditional parenteral nutrition until the 4th day after surgery. The day of the first stool, length of hospital stay, rate of anastomotic leakage, laboratory analysis of nutritional status (prealbumin, transferin), 6-minute walk test on the 1st, 3rd and 7thdays, total rate of complications and 30-day mortality were assessed.

Results: There were significant differences in the first stool (3 days [2;3,5] in the 1stgroup and 6 days [4; 6,5] in the 2nd group, $p=0,004$) and 6-minute walk test on the 7thday (435 m [380;470] in the 1st group and 300 m [270;400] in the 2nd group, $p=0,037$). In both groups there was no anastomotic leakage and mortality. In the 1st group there were 3 complications (25%) compared to 5 complications in the 2nd group, although statistically insignificant. There was no difference in prealbumin and transferin.

Conclusion: In our opinion, early (the 1st day) per oral nutrition after esophagectomy is safe and could decrease rehabilitation time and time to recovery of gut function, but our trial is underpowered about complications and more multicenter trials are required.

Disclosure of interest: None declared.

P029

IS THERE A GREATER BENEFIT FOR ERAS AFTER A RADICAL CYSTECTOMY FOR PATIENTS OVER 70 YEARS OR POLYPATHOLOGICAL?

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Objectives: In urologic surgery, the benefits for early rehabilitation programs on the follow-up post-operative and lengths of stay after a radical cystectomy have been shown in several studies, according to ERAS guidelines (Enhanced Recovery After Surgery) in 2013. This protocol seems to benefit mostly to elderly people, since the risk of post surgery complications increases.

The objective of this study is to compare the benefits for the ERAS protocol for patients over 70 versus younger ones.

Methods: Since February 2016, a monocentric comparative study has been carried out over patients who had a radical cystectomy (laparotomy or laparoscopic) for bladder cancer associated with a urinary diversion whether continent or not, and subjected to ERAS protocol. Four groups were formed: patients aged 70 or more and those under 70 years, before and after the implementation of ERAS program.

The main judging criteria are: the median length of stay, the rate of paralytic ileus post-surgery that required a nasogastric tube reinsertion and the rate of major complications.

Results: Among the 81 patients included, 25 patients have been operated according to ERAS since February 2016: 12 patients over 70 years, including 75% with an ASA score 3–4, and 13 patients under 70. 56 patients before ERAS implementation have been analyzed: 31 of them aged 70 or more, including 65% with a score ASA 3–4, and 25 under 70. The groups are comparable before and after implementation. The total compliance in ERAS groups was similar for both (66% versus 67% respectively). The median length of stay is reduced from 19 to 14 days for patients over 70, and from 33 to 17 days for the ASA 3–4. The number of patients having a post-surgery paralytic ileus decreases (23% versus 29%), with nevertheless a more frequent reinsertion of a nasogastric tube (31% versus 26%) for patients over 70.

The rate of major complications decreases (25% versus 35%) in the group of patients over 70. For patients under 70, there is no difference before and after implementation. All these results are not significant ($p < 0,05$).

Conclusion: After a radical cystectomy, ERAS seems more beneficial for polypathological (ASA 3-4) and older patients (≥ 70 years) than for younger patients (< 70 years) with a similar compliance to the protocol.

Disclosure of interest: None declared.

P030

HOW ENDURING IS OUR ENHANCED RECOVERY? – A 5 YEAR FOLLOW-UP AUDIT

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Objectives: The success of enhanced recovery in colorectal surgery¹ has led to intense interest in developing this model of care for other patient groups. In 2011, we published the results of an RCT conducted at our centre demonstrating the benefits of an enhanced recovery programme for liver resection surgery². 5 years on, this audit aims to evaluate the current compliance rates with the ERP & determine whether adherence continues to confer the benefits demonstrated in the original study.

Methods: Adherence to ERP elements & postoperative length of stay was established from the retrospective review of case-notes for 21 consecutive patients undergoing open liver resection in early 2016. Results were compared with data from the original 2011 RCT.

| Element of ERP | % Compliance | | |
|---|-----------------------|----------------------------|---|
| | 2016 Audit n=21 | 2011 RCT ERP n=46 | 2011 RCT Standard Care n=45 |
| Preop. information & education | 52 | 100 | - |
| Preop. fasting + carbohydrate drink | 63 | 100 | - |
| Avoid premedication, avoid NG, prevent hypothermia | 100 | 100 | 100 |
| VTE & antimicrobial prophylaxis | 100 | 100 | 100 |
| PONV—multimodal approach | 100 | 100 | 100 |
| Periop. fluid management- GDFT | 83 | 100 | - |
| Avoid routine surgical drainage | 95 | 100 | - |
| Urinary drainage: 1-2 days only | 62 | 65 | - |
| Thoracic epidural (avoid iv opiates) | 81 | 100 | 98 |
| Periop. nutritional care | 71 | 100 | - |
| Early mobilization | 52 | 100 | - |
| Overall compliance (%) | 83 | 98 | n/a |
| Median length of stay (days) | 5 | 4 | 7 |

Results: There is not a statistically significant difference in LOS in the 2016 audit group compared to the 2011 ERP trial group ($p \geq 0.05$). Comparison of the audit group with the pre-ERP standard care group shows a statistically significant increased length of stay in the standard care group ($p \leq 0.01$)².

Conclusion: This audit revealed there has been a decrease in overall compliance with the ERP, in particular with the pre & postoperative elements. Whilst length of stay has not significantly increased, there is a trend toward this, highlighting the importance of compliance for maintaining clinical outcomes. This project illustrates the usefulness of audit in maintaining clinical standards & demonstrates why audit is a key element in any successful ERP.

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Disclosure of interest: None declared.

P031

A QUALITATIVE STUDY FOR IDENTIFYING SYMPTOM BURDEN POST LIVER SURGERY: MDASI-HEP DEVELOPMENT

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Objectives: Measuring a patient's most critical symptom burden and functional status on a desirable clinical schedule could be a critical part of patient-centered perioperative care. However, the immediate post-operative and postdischarge recovery experience of patients with cancer who have undergone a major liver procedure has not been well documented. Currently, no patient-reported outcome (PRO) tool with a 24-hour recall period has been developed specifically for use in perioperative care in this particular patient cohort. This qualitative study, which uses a standardized method to delineate patient outcomes that is recommended by the FDA for PRO tool development, aims to define most impactful symptoms experienced by this patient cohort, in order to generate a procedure-specific module of the MD Anderson Symptom Inventory (MDASI-Hep).

Methods: Patients with liver cancer or metastatic liver cancer (N=30) enrolled before or after liver surgery participated in a face-to-face, semi-structured qualitative interview. Interviews were conducted before surgery, during hospitalization post-surgery, or post follow-up. Qualitative analysis generated a list of symptoms that patients reported. To refine the list, surgeons, nurses, and patients and their caregivers commented on the relative importance of these symptoms during and after surgery. Final candidate items formed a MDASI-Hep module.

Results: The qualitative study identified 38 symptoms. The most frequently reported disease and procedure symptom was pain; most of the 13 core MDASI symptom items were mentioned as well. After input from all parties (5 surgeons, 6 RNs, 9 patients, 9 caregivers), 7 candidate module items were selected: abdominal bloating/tightness/fullness, incisional tightness, malaise (not feeling well), muscle weakness/instability/vertigo, constipation, abdominal cramping, fear/anxiety.

Conclusion: This study produced a set of symptoms for inclusion in the MDASI-Hep, now ready for psychometric validation in the same patient cohort. The validated MDASI-Hep will be a concise but adequate assessment applicable to most cancer patients undergoing liver surgery. The validated PRO tool could be used for routinely monitoring patients and rapidly evolving ERP programs, along with conventional perioperative-care outcomes.

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P032

CONUT SCORE AS A SURVIVAL BIOMARKER IN MUSCLE INVASIVE BLADDER CANCER- PILOT STUDY WITHIN THE ERAS PROTOCOL IMPLEMENTATION

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Objectives: Host immunity plays an important role in cancer's progression. Current data supports improved responses of Muscle Invasive Bladder Cancer (MIBC) to PD-1 inhibitors. Nutritional condition has been identified as an independent predictor of survival in MIBC. The Controlling

Nutritional Status (CONUT) score has been postulated as an indicator of PFS and OS in several cancers.

The objective of the present study is to investigate CONUT score in MIBC patients undergoing radical cystectomy (RC) and its correlation with tumor recurrence/progression.

Methods: We retrospectively reviewed 126 patients from our prospectively maintained MIBC database. CONUT score was calculated based on serum Albumin concentration, lymphocyte count and total cholesterol concentration preoperatively. The cut-off score for high and low-CONUT score was calculated with a ROC curve. RFS and OS were analyzed for both groups.

Results: For CONUT score, the AUC was 0.7 (0.61–0.78) and the optimal cutoff value was 2. 50 patients (37%) were classified as high-CONUT (≥ 2) and 76 patients (56.3%) as low-CONUT (< 2). The patients with high-CONUT presented with worse ASA score (72% ASA 3–4) and advanced disease at path report (88% pT3–4, 46% N1). Neoadjuvant chemotherapy was administered to 6 (12%) patients with high-CONUT, only 5 completed the 3 cycles. 38 (30%) patients were enrolled in the ERAS Prehabilitation protocol. Similar rates of major complications were observed (5-low; 5-high). The patients with high-CONUT score had shorter 2-y PFS than the ones with low-CONUT scores (PFS 46% vs 63%; $p < 0.05$). Multivariate analysis after adjustment for pT stage, pN stage, ASA score, age at surgery and Clavien-Dindo classification revealed that CONUT score is an independent predictor of bladder cancer specificity survival (HR 1.84; IC del 95% 1.01–3.39; $p = 0.048$).

Conclusion: Preoperative CONUT score in MIBC patients undergoing radical cystectomy should be taken into consideration to predict oncological outcomes. No differences were observed in terms of major complications in the ERAS subgroup. Further studies are required to validate the current findings.

Disclosure of interest: None declared.

P033

THE ROLE OF SELF-EFFICACY IN PREHABILITATION AND ITS IMPACT ON POST-OPERATIVE RECOVERY

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Objectives: Self-efficacy (SE) describes one's confidence in achieving a particular goal and is not only a predictor of exercise behaviour but also an outcome in its own right. The aim of this study is to establish how self-efficacy impacts on prehabilitation and post-operative recovery.

Methods: Our PREPARE programme collects functional, psychological and nutritional measures, at 4 time points; diagnosis (T1), completion of neoadjuvant treatment (T2), immediately pre-operatively (T3) and 6 weeks after discharge post-surgery (T4). Validated tests of functional capacity are converted into a metabolic equivalent of task score (METS). Lorig's six-item questionnaire is used to evaluate SE. Health Related Quality of life (HRQoL) is measured using the validated EORTC QLQ C30 questionnaire. Post-operative outcome data, such as length of stay, is collected for each quarter.

Results: 59 patients enrolled into the PREPARE programme from January 2015 to October 2016. The mean age of the patients was 66 years old. We found an increase in METS over the period from T1 to T3 (4.6 vs 4.2 vs 5.1; $p = 0.001$) and a parallel increase in SE (8.1 vs 7.7 vs 9.2, $p = 0.003$). METS and SE were higher at T4 as compared to T1.

Patients who had an increase in self-efficacy during prehabilitation were more likely to have a higher global HRQoL score at T4 than at T1 in comparison to patients with no change or a fall in self-efficacy during prehabilitation (45% vs 7.7%, $p = 0.023$).

Between the first quarter of 2015 and the third quarter of 2016 the median length of stay decreased from 12 to 8 days.

Conclusion: Our results show parallel improvements in self-efficacy and functional capacity during prehabilitation. Despite the impact of chemotherapy and surgery, self-efficacy and functional capacity were higher at T4 than T1. Achievement of exercise goals leads to improved self-efficacy, which in turn leads to improved self-management. This contributes to accelerated post-operative recovery. Improving self-efficacy during

prehabilitation is associated with a higher global QoL after surgery than at diagnosis. Strategies to improve self efficacy are likely to improve the impact of prehabilitation on post-operative outcomes.

Disclosure of interest: None declared.

P034

PATIENT-REPORTED PHYSICAL FUNCTIONING IMPAIRMENT PREDICTS DELAYED BOWEL MOVEMENT AND FLATUS AFTER ABDOMINAL SURGERY

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Objectives: Delayed bowel movement (BM) and flatus are both indicators for postoperative ileus (POI), a surgery-induced stress response that impairs intestinal motility after abdominal surgery. We investigated whether patient-reported impairment of daily functioning in the first 48 hours after surgery could predict delayed BM and flatus.

Methods: This prospective study enrolled patients with cancer scheduled for abdominal surgery. The MD Anderson Symptom Inventory (MDASI) was administered daily after surgery. The MDASI "interference with walking" item was used to represent impairment of postoperative physical functioning. Delayed BM or flatus was assumed if time to first post-operative BM or flatus was ≥ 72 hours. Logistic regression modeling determined the predictive effect of interference with walking on delayed BM or flatus. Potential confounders (age, sex, race, cancer stage, and surgery type (open surgery vs. laparoscopy)) were controlled in all models.

Results: Of the 80 patients with digestive cancer (53 colorectal cancer) included in this analysis, 56 underwent open surgery and 24 had laparoscopic surgery. Time to first BM was 66.1 ± 24.7 hours (35 patients had delayed BM). Time to first flatus was 64.0 ± 23.3 hours (31 patients had delayed flatus). Patients with delayed BM reported significantly greater walking interference than did those without delay (7.9 ± 3.0 vs. 5.0 ± 4.2 on day 1, 6.1 ± 2.9 vs. 3.1 ± 3.2 on day 2, all $p < .0001$). Similar results were found for delayed flatus (7.9 ± 3.2 vs. 5.3 ± 4.3 at day 1, 5.8 ± 2.9 vs. 3.6 ± 3.5 at day 2, all $p < .01$). Logistic regression revealed that, at day 1, every 1-unit increase (on a 0–10 scale) in walking interference related to a 23% higher risk of having delayed BM (odds ratio (OR) 1.23, 95% confidence interval (CI) 1.05–1.44, $p = .01$) and 19% higher risk for delayed flatus (OR 1.19, 95% CI 1.02–1.39, $p = .02$). At day 2, a 1-unit increase in walking interference related to a 46% higher risk for delayed BM (OR 1.47, 95% CI 1.17–1.84, $p = .001$) and a 29% higher risk for delayed flatus (OR 1.29, 95% CI 1.06–1.57, $p = .01$).

Conclusion: Patient-reported impairment of physical functioning in the first 48 hours after abdominal surgery may predict the incidence of delayed BM and flatus, indicators for POI. Frequent patient-reported outcome assessment after surgery will help identify possible POI and promote its management.

Disclosure of interest: None declared.

P035

COMPLIANCE THE ERAS RECOMMENDATIONS FOR PRE AND INTRAOPERATIVE CARE IN LAPAROSCOPIC SURGERY FOR ENDOMETRIAL CANCER

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Objectives: In 2017 we aim to implement the Enhanced Recovery After Surgery (ERAS) Guidelines for perioperative care in gynecologic/oncology surgery¹.

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The goal of the study is to analyze the compliance with ERAS® recommendations in the pre and intra-operative care in the patients operated of endometrial cancer in 2016 before starting the multidisciplinary protocol.

Methods: A retrospective analysis of patients undergoing surgery for endometrial cancer resection in Hospital del Mar (Barcelona) during 2016. We reported:

- Age, BMI and ASA status

- Preoperatives ERAS items: smoking and alcohol cessation recommendation, mechanical bowel preparation, fasting for liquids and solids, carbohydrates loading 2h before surgery and antibiotic profilaxys 30-60' before surgery.

- Intraoperative ERAS items: total intravenous anesthesia (TIVA), fentanyl dosis, administration >2 antiemetic agents for prevention of postoperative nausea and vomiting (PONV), restrictive ventilatory strategy, minimally invasive surgery (MIS), nasogastric intubation, normothermia (>36°C) and fluid therapy regimes (ml/kg/h).

Results: 30 patients included.

- Age (66.5 ± 12.2 years). BMI (32.6 ± 7.9). ASA status (I 14%, II 60%, III 20%, IV 6%)

- Preoperatives ERAS items: smoking and alcohol cessation recommendation (5%), mechanical bowel preparation (0%), fasting for liquids and solids (100% >8h), carbohydrates loading 2h before surgery (0%) and antibiotic profilaxys 30-60' before surgery (100%).

- Intraoperative ERAS items: TIVA (36%), fentanyl dosis (2,51 ± 1,3 µg/Kg/min), administration >2 antiemetic agents for prevention of PONV (5%), restrictive ventilatory strategy (90%), minimally invasive surgery (90%), nasogastric intubation (0%), normothermia (40%) and fluid therapy regimes (5,8 ± 3,6 ml/kg/h).

Conclusion: Auditing the compliance of the ERAS items before starting the new protocol helped us to detect the points where we should improve the accomplishment.

References: 1. Nelson G. et al. Guidelines for pre- and intra-operative care in gynecologic/oncology surgery: Enhanced Recovery After Surgery (ERAS®) Society recommendations — Part I. *Gynecologic Oncology* 140 (2016) 313–322

Disclosure of interest: None declared.

P036

IS INTRAOPERATIVE RESTRICTIVE FLUID THERAPY IN COLORECTAL SURGERY RELATED TO ACUTE KIDNEY INJURY?

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Objectives: Optimal perioperative fluid management in colorectal surgery within an ERAS program remains controversial. Intraoperative goal directed fluid strategies have not been shown to be superior to restrictive therapies.

The goal of this study is to determine if our restrictive fluid therapy based on Chappell's approach regime¹, contributes to acute kidney injury (AKI).

Methods: Observational, prospective study in 75 consecutive patients scheduled to elective colorectal resection. An intravenous balanced solution (Plasmalyte®) was used as the election fluid. Intraoperative fluid therapy regime was 1 ml·kg⁻¹·h⁻¹ in laparoscopic surgery and 2 ml·kg⁻¹·h⁻¹ in open surgery with the addition of fluids to compensate urinary output and bleeding loss. In case of preoperative mechanical bowel preparation 500cc of Plasmalyte® was administered before incision. Intraoperative hypotension (< 20% of basal value) was treated with ephedrine (heart rate < 80bpm) or phenylephrine (heart rate>80bpm). Demographic and intraoperative data (age, gender, ASA, type of surgery, laparoscopic or open approach, duration of surgery and postoperative Hb) were recorded. Preoperative and postoperative levels of creatinine were used to assess AKI. Patients were classified according to AKIN criteria. Intraoperative urinary output was also recorded.

Results: 75 patients (66% male, 34% female) with an average age of 70 ± 13 years and an average BMI of 26 ± 4 kg were included. Most of the patients were ASA II (59%) and ASA III (35%). The most frequent surgery was right hemicolectomy (47%) followed by sigmoidectomy (40%) and rectal

resection (13%). 70% of patients underwent laparoscopic surgery. The mean duration of surgery was 209 ± 57 minutes. Mean postoperative Hb was 12.9 ± 2 g/dL. 66% of patients needed intraoperative vasoactive drugs. Mean intraoperative urinary output was 0.84 ± 0.47 ml/kg/h but 35% of patients didn't reach an urinary output higher than 0.5 ml/kg/h. Only 5 patients (6.6%) develop any kind of renal injury classified as AKIN 1 (Risk).

Conclusion: Although 35% of patients with our restrictive fluid therapy didn't achieve an urinary output higher than 0.5 ml/kg/h only 6.6% develop risk of renal injury (AKIN 1).

References: 1) Chappell D, Jacob M, Hofmann-Kiefer K, Conzen P, Rehm M. A rational approach to perioperative fluid management. *Anesthesiology*. 2008;109(4):723-40.

Disclosure of interest: None declared.

P037

ADHERENCE TO PREHABILITATION IN OESOPHAGO-GASTRIC CANCER PATIENTS

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Objectives: Home-based exercise is a central component of a sustainable prehabilitation programme but monitoring adherence is challenging. Research on adherence in other clinical settings has demonstrated the association between self-efficacy, the confidence of a person to undertake behaviour change, and adherence. The aim of this study is to gain an understanding of adherence to prehabilitation exercise and to determine how this is affected by changes in a person's self-efficacy over time.

Methods: Patients undergoing neoadjuvant chemotherapy (NAC) followed by surgery for oesophago-gastric cancer resection were prescribed a personalised prehabilitation exercise programme, based on FITT principles (frequency, intensity, type and time). They completed weekly activity cards to monitor adherence. Self-efficacy was assessed using Lorig's six-item questionnaire. Validated measures of functional capacity were converted into a metabolic equivalent of task score (METS). Data was collected at three time points: diagnosis, completion of NAC and immediately prior to surgery.

Results: 20 patients were studied. The median adherence to preoperative exercise was 30% (interquartile range 13.5%>100%). 30% of the patients had 100% adherence to their programme. Patients whose self-efficacy increased during prehabilitation achieved higher adherence than patients whose self-efficacy did not increase (median adherence 100% vs 22%, p=0.007). Patients whose adherence was high (>66%) were also more likely to improve their self-efficacy (83% vs 43%; p=0.09) and METS (80% vs 40%; p=0.109) in comparison to patients with lower adherence although these trends did not reach statistical significance.

Conclusion: Our findings show that further work is needed to understand the factors that influence adherence. This will contribute to higher adherence and enhance the impact of prehabilitation on post-operative outcomes. Our findings confirm that self-efficacy has a dual role in prehabilitation just as in other healthcare settings. Improvements in self-efficacy during prehabilitation are associated with improved exercise adherence, which in turn leads to improved self-efficacy. Higher adherence also leads to improved functional capacity. Interventions to improve self-efficacy should be a focus of prehabilitation programmes

Disclosure of interest: None declared.

P038

MAXIMIZING PATIENT ADHERENCE TO PREHABILITATION: WHAT DO THE PATIENTS SAY?

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Objectives: Multimodal prehabilitation programs (exercise, nutrition and anxiety reduction) have been shown to be successful for enhancing patient

physical function prior to surgery, although adherence remains a challenge. Given the short pre-operative period, patient participation is critical to maximize program effectiveness. This study was designed to better understand the needs and preferences of cancer patients participating in prehabilitation in an effort to improve adherence and optimize program benefits.

Methods: Colorectal and lung cancer patients (n = 52) enrolled in prehabilitation were asked to complete a questionnaire during their pre-operative assessment (at the end of prehabilitation, prior to surgery). The questionnaire was designed to evaluate various potential factors that relate to patient adherence to prehabilitation. The multimodal prehabilitation program is an exercise-based intervention complemented with nutritional counselling and anxiety reducing strategies that is approximately 4–8 weeks in duration (from cancer diagnosis until time of surgery).

Results: All patients perceived improvements following the prehabilitation program. The main motivating factor for participation was to be as physically prepared for the surgery as possible (62%). The most challenging exercise component was resistance training (35%), while the most enjoyed was the aerobic training (38%). Approximately 50% would prefer group fitness classes as opposed to supervised individual training sessions. The patients felt well supported by the multidisciplinary team (81%). The biggest barrier to their participation in the program was related to transportation (58%).

Conclusion: These findings highlight the need to make prehabilitation programs more client-based by involving patient feedback. This is critical when designing more effective therapeutic strategies and tailoring interventions to meet patients' specific needs while overcoming program non-adherence.

Disclosure of interest: None declared.

P039

INSTITUTING AN ERAS PROTOCOL FOR COLORECTAL SURGERY IN A LARGE TEACHING COMMUNITY HOSPITAL DECREASES LENGTH OF STAY AND COST WHILE IMPROVING FUNCTIONAL STATUS ON DISCHARGE

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Objectives: To design, implement, and analyze outcomes of an Enhanced Recovery After Surgery (ERAS) protocol designed for patients undergoing colorectal surgery (CRS) at a large teaching community hospital. The program aimed to optimize patient outcomes and experience by reducing the perioperative stress response. Primary endpoints were length of stay (LOS) and rate of discharge to skilled nursing facilities (SNF).

Methods: The Comprehensive Recovery Pathway (CRP) is an ERAS protocol driven by a multidisciplinary team of physicians, nurses and ancillary staff. Components include patient education, perioperative nutritional support, multi-modal pain management focusing on non-narcotic modalities, early ambulation and early feeding. Surgeons place patients on the pathway by utilizing a CRP order set. A prospective comprehensive analysis was done of the outcomes for patients undergoing CRS, stratified by CRP enrollment and type of surgical approach.

Results: 219 patients underwent elective CRS from April 2015 - March 2016. Baseline characteristics did not differ in terms of age, gender, comorbidities, primary diagnosis, smoking status and BMI for CRP and non-CRP patients ($p>0.05$). 104 patients underwent minimally invasive surgery, with 59 enrolled in CRP. 115 patients underwent open surgery, with 54 enrolled in CRP. Overall, CRP patients had a 1.3 day reduction in LOS regardless of surgical approach ($p=0.001$) and about a 2-day reduction for those undergoing open procedures ($p=0.003$). CRP patients had better functional status at discharge, with increased rates of discharge home ($p=0.005$), and decreased discharge to SNF ($p=0.05$). Lower rates of post-

operative infection ($p=0.037$), 30-day ($p=0.023$) and 90-day ($p=0.002$) readmission were observed for CRP patients. There was a \$3,000 reduction in direct costs per admission for CRP patients undergoing open procedures ($p=0.043$).

Conclusion: Implementation of a CRP for patients undergoing CRS improves patient outcomes while simultaneously reducing LOS and costs associated with admission. The CRP was more effective in open surgical cases, and utility of the CRP was more pronounced for colorectal fellowship trained surgeons. Further analysis by minimally invasive approach and level of CRP compliance will be performed in future investigation.

Disclosure of interest: None declared.

P040

IMPACT OF A PREHABILITATION PROGRAM ON FUNCTIONAL STATUS AND LENGTH OF STAY FOLLOWING MAJOR PANCREATIC SURGERY WITH AN ERAS PATHWAY

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Objectives: Preoperative optimization is a fundamental element of ERAS programmes. Whilst prehabilitation programmes have been shown to improve parameters of functional capacity¹, the lack of evidence for a beneficial effect on clinical outcomes means they are yet to be recommended in ERAS guidelines². We sought to evaluate the impact of a pilot prehabilitation program on patients undergoing major open pancreatic surgery in conjunction with our existing ERAS pathway.

Methods: A total of 19 patients undergoing major open pancreatic resections took part in the study. Each participant underwent a 5 week prehabilitation program consisting of two 1 hour supervised exercise classes a week, combining aerobic and resistance training. In addition, patients were also given a home-based exercise program to supplement this. Functional capacity was measured with 6-minute walk test (6MWT), number of sit-to-stands in 1 minute (STS) and grip strength (GS) before and after the prehabilitation program.

Results: 16 patients had Whipples procedure, 3 had distal pancreatectomies. There was mean improvement of 32m in 6MWT and 3 reps on STS following prehabilitation. GS was unchanged. The mean length of hospital stay was 12.6 days (compared to our existing mean of 13.2 days). Patient satisfaction with the program was very high with 100% of participants reporting beneficial effects on their feelings of health and wellbeing.

| Age (yrs) Median (IQR) | Mean 6MWT (m) | | Mean STS (reps) | | Mean GS (kg) | |
|------------------------|---------------|------|-----------------|------|--------------|------|
| | Pre | Post | Pre | Post | Pre | Post |
| 66 [32-84] | 406 | 438 | 22 | 25 | 29 | 29 |

Conclusion: In this pilot study there was an overall improvement in functional capacity following prehabilitation, with high satisfaction levels and a small reduction in hospital length of stay. A larger-scale study is warranted to assess the significance of these findings.

References: 1: Effect of prehabilitation on objectively measured physical fitness after neoadjuvant treatment in preoperative rectal cancer patients: a blinded interventional pilot study. M. A. West et al. Br J Anaesth 2015;114 (2): 244–51.

2: Guidelines for Perioperative Care for Pancreaticoduodenectomy: Enhanced Recovery After Surgery (ERAS®) Society Recommendations. K Lassen et al. World J Surg 2013;37(2):240-258

Disclosure of interest: None declared.

P041 REDUCTION IN CARDIAC COMPLICATIONS WITHIN AN ENHANCED RECOVERY AFTER SURGERY PROGRAM

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Objectives: Enhanced Recovery After Surgery (ERAS) is a multimodal perioperative care pathway designed to achieve early recovery by preserving preoperative organ function and minimizing the stress response following elective surgery. This study evaluates the impact of ERAS on post-operative cardiac complications.

Methods: A single institution, retrospective review was performed of individuals who underwent elective colorectal surgery (N=815). Patients enrolled into an ERAS program (N=395) were compared to patients treated in calendar year 2013 prior to any ERAS practice (N=420). Patient demographics including age and gender were captured including history of pre-operative coronary artery disease (CAD). Post-operative cardiac events including atrial fibrillation (AF), tachycardia/bradycardia and myocardial infarction were analyzed. Fluid status was assessed intra-operatively and in the 24-hour post-operative period. Chi square tests were used for bivariate analyses of categorical variables (Fisher's exact test for <5) and Student's T-tests were used for continuous variables. A logistic regression model was created to assess the impact of preoperative CAD on risk of post-operative cardiac events adjusting for fluid status.

Results: The ERAS group received significantly lower average total intravenous fluids (control=5.0L vs. ERAS = 3.4L; p< 0.001). The ERAS group had significantly higher average per os intake (control=290 mL vs. ERAS=832mL; p<0.001). Post-operatively there were significantly higher rates of AF (control=5.24% vs. ERAS=1.77%, p=0.008) and tachycardia/bradycardia (control=12.79% vs. ERAS=6.08%, p=0.003) in the control group compared to the ERAS group. Ischemic events were low in both groups with no significant difference (control=0.48% vs. ERAS=0.76%; p=0.61). Adjusting for history of CAD and total 24-hour intravenous fluid received, odds of postoperative arrhythmia were significantly lower in the ERAS group compared to the control group (OR=0.31, 95%CI 0.10 – 0.93; p=0.037). Neither the 24-hour intravenous fluids nor the intraoperative fluid volumes were significant independent predictors of atrial fibrillation.

Conclusion: Enhanced recovery after surgery (ERAS) has a protective effect significantly reducing post-operative atrial fibrillation and tachy/brady arrhythmias.

Disclosure of interest: None declared.

P042 ERAS PROTOCOL IMPLEMENTATION IN RADICAL CYSTECTOMY: SURGICAL PREHABILITATION

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Objectives: We aimed to describe the major surgical outcomes after the implementation of our ERAS protocol within the department for radical Cystectomy (RC).

Methods: Initial implementation of ERAS protocol started on May 2014. Since then a total of 42 consecutive cases have been included. A pair-matched comparison of 42 cases has been performed. Briefly, in the pre-operative domain, an anesthesia assessment including a 6 minutes Walking Test (6MWT); MUST nutritional assessment and anxiety management training were performed. Primary outcomes were major complication rate (described as Clavien 3 or more), readmission within 30 days and time to oral intake. We have compared our results with previous RC series.

Results: No differences were found between the two groups in terms of age, BMI, or comorbidities (ASA). On the ERAS group a total of 8 (21%) patients received neoadjuvant chemotherapy. 30 (79%) cases were performed laparoscopically within the ERAS group. An improvement in nutritional status (albumin 3.97 vs 4.29; p=0.018) was observed in the latest group (one patient had MUST score 3 preop). The mean 6MWT was 556 ± 70 m (range 380–782 m). On average, the subjects walked 133 m more after the training session and 66 m less in the 3m postoperative test compared with the first (p=0.001). Regarding oncological outcomes; the rate of surgical margins ranged from 18 (44%) in the non-ERAS group vs. 7 (13%) in the ERAS group (p=0.015). In the ERAS group the transfusion rate decreased to 12 (31%). Major complications in the ERAS group were reported in 5 patients (11%) vs 8 (20%) in the pre ERAS group (p<0.001). There were no differences in the rates of bowel impairment (16 (39%) vs. 14 (36%); p=0.842) or readmission within 30 days (21 (51%) vs 13 (34%); p=0.12).

Conclusion: ERAS protocol implementation improves RC functional and oncological outcomes. Implementation of these protocols requires a team effort involving urologists, anesthetists, nutritionists, psychologists and nurses. In our protocol, the preoperative domain seems to strengthen the functional outcomes (major complications and readmission rates), however, data is uncertain regarding which of the three domains provides better results.

Disclosure of interest: None declared.

P043 HOW DOES THE DOSE OF INTRATHECAL DIAMORPHINE IMPACT OUTCOMES IN ROBOTIC-ASSISTED RADICAL CYSTECTOMY WITHIN AN ENHANCED RECOVERY PROGRAMME?

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Objectives: Robotic-assisted radical cystectomy (RARC) has been shown to improve outcomes compared with the open approach (ORC)¹. ERAS guidelines recommend thoracic epidural analgesia (TEA) for ORC but do not comment on optimal analgesia for RARC. Evidence from colorectal surgery supports spinal analgesia over TEA in minimally invasive surgery². We have established an enhanced recovery programme (ERP) for our RARC patients which includes intrathecal diamorphine (ITD) for perioperative analgesia, however, the optimal dose of diamorphine is unknown. We compared outcomes between RARC patients given either high or low dose ITD as part of an ERP.

Methods: Case notes were reviewed for patients who underwent RARC between 09/15 - 02/16. Patients were divided into two groups: low dose (LD) (0.5-0.6mg) and high dose (HD) (0.8-1mg) ITD. Outcomes were compared between groups.

Results:

| | LD group (n=16) | HD group (n=18) | p value |
|-----------------------------------|-----------------|-----------------|--------------|
| Age (yrs) | | | |
| Median (IQR) | 73(67.0-81.5) | 65(59.0-73.0) | 0.005 |
| BMI | | | |
| Median (IQR) | 27(23.6-30.1) | 26(35.2-32.3) | 0.254 |
| Blood Loss (ml) | | | |
| Median (IQR) | 150(100-250) | 200(150-300) | 0.294 |
| Operating Time (mins) | | | |
| Median (IQR) | 389(373-411) | 390(360-430) | 0.639 |
| Intraop Fluids (L) | | | |
| Median (IQR) | 2(1.5-2) | 2(1.5-2) | 0.682 |
| Recovery Morphine | | | |
| % pts | 18.8 | 5.9 | 0.323 |
| Time to 1st Morphine (hrs) | | | |
| Median (IQR) | 4(1-21) | 17(8-24) | 0.129 |
| Mobilising Day 1 | | | |
| % pts | 87.5 | 83.3 | 1.000 |

(continued)

| | LD group (n=16) | HD group (n=18) | p value |
|-------------------------------|-----------------|-----------------|---------|
| Eating Day 1 | | | |
| % pts | 93.8 | 88.9 | 1.000 |
| Bowels open (day) | | | |
| Median (IQR) | 4(4–4.5) | 3(3–4) | 0.116 |
| ITU LoS (days) | | | |
| Median (IQR) | 3(2–3.5) | 3(2–3) | 0.984 |
| PONV | | | |
| % pts | 62.6 | 83.3 | 1.000 |
| Itching | | | |
| % pts | 0 | 0 | - |
| Respiratory Depression | | | |
| % pts | 0 | 5.5 (1 pt) | - |

Conclusion: In this small study, apart from age, there was no significant difference between groups for any of the measured outcomes. Although results were suggestive of a prolonged analgesic effect in the HD group, 1 patient in the HD group had respiratory depression requiring CPAP. Overall the hospital LoS for both groups was 5 days, which compares favourably with published data¹. It appears that high dose intrathecal diamorphine confers no additional benefit and may increase risk of complications.

References: 1. Xia L et al. Robotic versus open radical cystectomy: an updated systematic review and meta-analysis. *Cancer Treat Rev* 2012 39(6):551e60

2. Levy BF et al. Randomized clinical trial of epidural spinal or patient-controlled analgesia for patients undergoing laparoscopic colorectal surgery. *Br J Surg* 2011 98(8):1068–78

Disclosure of interest: None declared.

P044

PERIOPERATIVE ENHANCED RECOVERY PROTOCOL FOR ESOPHAGECTOMY WITH SIMULTANEOUS ESOPHAGEAL RECONSTRUCTION: A PROSPECTIVE SINGLE-CENTER NON-RANDOMIZED STUDY

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Objectives: Esophagectomy (EE) with simultaneously esophageal reconstruction is widely accepted procedure for early stages esophageal cancer, extended benign strictures and terminal stages of achalasia. However, it is a high-risk procedure, associated with high morbidity and mortality rates (up to 60 % and 10 % respectively). Hereby we present our results of perioperative ERAS program implementation for patients undergoing EE with simultaneously esophageal reconstruction.

Methods: Single-center prospective non-randomized trial in period from December 2012 to December 2016 years was done. A total of 138 patients were included. Median age was 57 (47; 66) years with male predominance 88 (63,7 %). Patients were operated following esophageal cancer and benign (stenosis and achalasia) diseases in 71 (51,5%) and 67 (48,5%) cases respectively. Transhiatal and Mckeown EE rate was 78 (56,5 %) and 60 (43,5 %) cases respectively with simultaneously esophageal reconstruction using gastric tube (125 (90,6%)) or large bowel (13 (9,4%)). ASA score distribution: I(3) II(56) III(53) IV(26). Protocol description: preoperative - routinely counseling by ERAS team, no fasting; nutrition support, incentive spirometry, fluid and carbohydrates loading; Intraoperative - avoidance of salt and water overload, judicious use of vasopressors, protective lung ventilation, multimodal analgesia, maintenance of normothermia; Post-operative - immediate or early extubation, avoidance of salt and water overload, daily weight measurement, multimodal analgesia, early mobilization and feeding, stimulation of gut motility, audit of outcomes.

Results: Median postoperative stay was 8,5 (7,5; 10) days with median ICU stay 0,7 (0,6; 0,8) days. Overall morbidity rate was 51 (37 %) of 138 [CI: 29,4 % - 45,3 %] with prevalence of mild grades (Dindo-Clavien I-II). There was no anastomotic leakage. 30-day mortality rate was 5 (3,6%) of 138 [CI: 1,6 % - 8,2 %].

Conclusion: Implementation of the perioperative care protocols based on ERAS guidelines promotes decrease of postoperative complication rate even in high risk patients undergoing esophagectomy.

Disclosure of interest: None declared.

P045

A PILOT PREHABILITATION PROGRAM AS PART OF A COMPREHENSIVE ERAS PATHWAY FOR GYNAE-ONCOLOGY SURGERY

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Objectives: Preoperative optimization is a fundamental element of ERAS programmes. Whilst prehabilitation programmes have been shown to improve parameters of functional capacity¹, the lack of evidence for a beneficial effect on clinical outcomes means they are yet to be recommended in ERAS guidelines². We sought to evaluate the impact of a pilot prehabilitation program on patients undergoing major open gynaecology surgery in conjunction with our existing ERAS pathway.

Methods: A total of 12 patients undergoing interval debulking surgery for gynaecological malignancies were invited to take part. Each participant underwent a 5 week prehabilitation program consisting of two 1 hour supervised exercise classes a week, combining aerobic and resistance training. Patients were also given a home-based exercise program to supplement this. Functional capacity was measured with 6 min walk test (6MWT), number of sit to stands in 1 minute (STS) and grip strength (kg) before and after the prehabilitation program.

Results: There was an average 66m improvement in the 6MWT, a 6 rep increase in STS and a modest 0.7kg improvement in GS. The average length of hospital stay was 7.2 days compared to our average 6.5 days. There was a high level of satisfaction with the program with 100% of participants reporting beneficial effects on their feelings of health and wellbeing.

| Age (yrs)Median [Range] | Mean 6MWT (m) | | Mean STS (reps) | | Mean GS (kg) | |
|-------------------------|---------------|------|-----------------|------|--------------|------|
| | Pre | Post | Pre | Post | Pre | Post |
| 67 [51-81] | 487 | 553 | 24 | 30 | 24 | 30 |

Conclusion: In this small pilot study, there was an overall improvement in functional capacity, with high satisfaction levels but with no change in hospital length of stay. A larger scale study is warranted to assess the significance of these findings.

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2: Nelson et al. Guidelines for pre- and intra-operative care in gynecologic/oncology surgery: Enhanced Recovery After Surgery (ERAS®) Society recommendations — Part I Gynecol Oncol 2016;140:313–322

Disclosure of interest: None declared.

P046

“DECONSTRUCTED” COORDINATOR ROLE OF AN ENHANCED RECOVERY AFTER SURGERY (ERAS) PROGRAMME IN TAN TOCK SENG HOSPITAL, SINGAPORE: A NOVEL CONCEPT

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Objectives: The ERAS Programme is a multi-disciplinary approach to peri-operative management of patients undergoing major surgery. Dedicated ERAS coordinators play a critical role in seeing the patient through the entire peri-operative journey. At Tan Tock Seng Hospital, in the face of limited resources, our ERAS program introduced a novel concept of a deconstructed ERAS coordinator role. This study aims to describe this concept and our preliminary results.

Methods: Our unique deconstructed ERAS coordinator role is divided into 3 areas, pre-operative, inpatient and post-operative phases. The responsibilities of the ERAS coordinator in each phase is taken up by a different lead nurse working in their pre-existing domains.

The pre-operative ERAS counselling is performed by lead nurse at the Pre-operative Counselling and Evaluation Clinic. The inpatient ERAS nursing lead will engage ward nurses in the care of ERAS patients, with training of staff to educate, and ward-based ERAS champions as leaders to guide other nurses. The post-operative ERAS nurse lead performs data entry into ERAS Interactive Audit system.

Nursing leads use the Singapore Healthcare Improvement Network methodology to spread ERAS concepts, perform daily audit of compliance, obtain feedback and perform root-cause analysis when areas of non-compliance are identified.

Weekly nursing huddles allow for continuous feedback from ground staff to the ERAS nursing leads, meetings between nurses from various areas to fine-tune micro-processes workflow when implementing ERAS within our institution.

Results: A retrospective audit on compliance of pre-operative counselling, ambulation on first and second post-operative day, nutritional intake and patient's weight documentation was performed. Pre-operative ERAS counselling achieved 100% compliance. Generally, mobilization and nutrition compliance has improved by 50%.

Conclusion: The deconstructed ERAS coordinator concept is a feasible alternative to the single dedicated ERAS coordinator model. In addition, this novel concept avoids of over reliance on an individual, and hence the advantage of scalability. However, we face multiple challenges in its implementation, as its role is fulfilled by multiple nurses working within their dedicated domains. Communication and feedback is essential for the success of this deconstructed ERAS coordinator concept.

Disclosure of interest: None declared.

P047

EFFECT POSTOPERATIVE ORAL HYDRATION ON NAUSEA AND VOMITING FOR PATIENTS AFTER CYSTECTOMY

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Objectives: The urology department of the University Hospital of Lausanne, introduced a multimodal perioperative care pathways (ERAS: Enhanced Recovery After Surgery) in 2011. While this protocol recommends early oral hydration and nutrition to improve bowel mobility after colorectal operations, it seems that nausea and vomiting is frequently reported by patients after cystectomy. The first aim of this study is to explore if the patient following the ERAS guidelines regarding early oral hydration and nutrition experiences more symptoms of digestive complications after open radical cystectomy. A second aim is to assess if the Apfel score allows to identify these patients.

Methods: Consecutive patients undergoing cystectomy since 2012 were included. Oral hydration and nutrition were estimated by the patient and the nursing team and recorded prospectively through postoperative D3. The Apfel score was calculated to determine the risk of nausea and postoperative vomiting. The occurrence and the intensity of nausea and vomiting was assessed by the patient or nurse using a scale from 0 (no nausea) to 10 (vomiting).

Results: 92 patients (27 women; 29%) were included. Mean age (SD) was 69.5(10.6) years. Mean BMI was 26 (4.7) kg/m². 73% of patients were affected by nausea and vomiting during postoperative care. The Apfel score identified the risk of nausea and vomiting for 78% of the patients. The Apfel scoring system had a sensitivity of 81% and a specificity of 28%. Its

positive and negative predictive values were 75% and 35%, respectively. No link was identified between the occurrence of nausea and vomiting and the volume of clear fluids consumed from D0 to D3. However, the intensity of the nausea and the vomiting was directly related to the total volumes of liquids consumed after surgery.

Conclusion: Nausea and vomiting is frequently observed after cystectomy. Apfel score does not allow to specifically identify the patients concerned. The occurrence of upper GI symptoms is independent from the volume of fluids ingested after surgery. However, the intensity of the nausea and vomiting depends on the total volume of fluids consumed during post-operative care. The patients appear to be compliant to the recommendations of post-operative oral hydration. In the future, they will be educated during preoperative care to adapt the volume of liquids ingested after surgery according to the intensity of postoperative nausea.

Disclosure of interest: None declared.

P048

IMPACT OF ENHANCED RECOVERY PATHWAY ON SURGICAL SITE INFECTIONS AFTER COLORECTAL SURGERY

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Objectives: Enhanced recovery (ERAS) pathways help to reduce complications, length of stay and costs after colorectal surgery. The present study aimed to evaluate a potential effect of ERAS on surgical site infections (SSI).

Methods: All consecutive colorectal surgical patients operated between May 2011 and September 2015 constituted the cohort for this retrospective analysis. Over 100 items related to demographics, surgical details, compliance and outcome were registered in a prospectively maintained database. Risk factors for SSI were identified by univariate analysis and by multinomial logistic regression.

Results: 54 out of 397 patients (14%) developed SSI. Independent and modifiable protective factors for SSI were smoking abstinence (OR 0.29; 95%CI 0.11-0.78, p=0.014), minimally invasive surgery (OR 0.3; 95%CI 0.16-0.56, p<0.001), elective setting as compared to emergency procedures (OR 0.45; 95%CI 0.22-0.91, p=0.026) and renouncement to oral bowel preparation (OR 0.14; 95%CI 0.28-0.66, p=0.013). Compliance to ERAS items of >70% was not retained as protective factor for SSI after multivariate analysis (OR 0.94; 95%CI 0.46-1.92, p=0.86).

Conclusion: Smoking, open and emergency surgery and bowel preparation were risk factors for SSI, while ERAS pathway had no independent impact.

Disclosure of interest: None declared.

P049

DIGITAL LEARNING PLATFORMS IN PERIOPERATIVE CARE INCLUDING ERAS: A SYSTEMATIC REVIEW

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Objectives: Digital learning platforms are becoming more commonplace as an adjunct for the education of healthcare professionals and patients. Enhanced recovery programmes have been adopted across multiple specialities and have been shown to improve patient outcomes. The current use of digital learning platforms within perioperative care and ERAS programmes is not known. We performed a systematic review of published literature interrogating the efficacy of digital learning platforms in perioperative care including Enhanced Recovery After Surgery (ERAS) programmes.

Methods: A systematic search of the MEDLINE, Embase and Cochrane databases was conducted to identify suitable articles published between 2000 and 2017. The search strategy captured terms for perioperative care, ERAS, computer assisted instruction and e-learning.

Results: Twenty-Six studies were included from 10 surgical specialities. Digital platforms included e-learning (31%), website based learning (27%),

online clinical pathways (with an educational theme) (12%), online virtual patients (12%), mobile/tablet learning programs (15%) and interactive DVDs (4%). Targeted learners include patients (65%), surgical multidisciplinary teams (8%), surgical residents (8%), perioperative staff (8%) and medical and nursing students (8%). Outcomes measures of digital learning intervention include knowledge recall (23%), length of stay (8%), anxiety levels (12%), usability (8%) and post-operative pain (12%). One study (4%) investigated the effect of digital learning within an established ERAS programme. Three (12%) other digital learning platforms incorporated whole perioperative clinical pathways separate to ERAS: Variation from clinical pathway, length of stay and patient satisfaction were improved with digital learning interventions in this group.

Conclusion: There are a variety of digital learning platforms currently used within perioperative care. The majority attempt to improve patients' perioperative knowledge. There is only one digital learning platform related to ERAS and none that target multiple specialities. There is much scope for further development of digital learning platforms in ERAS programmes across multiple specialities.

Disclosure of interest: None declared.

P050 PERIOPERATIVE HYPERGLYCEMIA AND INSULIN ORDERING IN PATIENTS WITH AND WITHOUT DIABETES

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Objectives: To evaluate the use of insulin to treat hyperglycemia in surgical inpatients with and without diabetes.

Methods: Patients who underwent surgery during the study period and had glucoses tested pre and postoperatively were considered for inclusion. Hyperglycemia was defined as glucose greater than or equal to 180 mg/dL. Demographic and clinical data was extracted from the electronic medical record. Procedures were approved by the Institutional Review Board. The primary outcome was prescription of insulin in the perioperative period was extracted and compared between groups of patients with euglycemia, surgery related hyperglycemia and those with persistent perioperative hyperglycemia.

Results: 8048 patients met inclusion criteria, 26 percent had diabetes (DM) and 37 percent were female. The average age of patients was 52 years old. Insulin was ordered more frequently for patients with diabetes than for those without. Among patients with persistent hyperglycemia, 98 percent of patients with diabetes were prescribed insulin compared to 69 percent of those without known diabetes. Among those with surgery

related hyperglycemia, 87 percent of patients with diabetes were prescribed insulin compared to 39 percent of those without known diabetes. **Conclusion:** Patients who do not have a known diagnosis of diabetes were less likely to receive insulin despite experiencing perioperative hyperglycemia. A growing body of literature suggests that hyperglycemia among inpatients and surgical patients whom do not have diabetes have higher rates of complications compared to patients with diabetes who have hyperglycemia. Our observation of relative under-prescription of insulin may account for some portion of the worse outcomes observed. Our findings highlight the importance of both identifying and adequately treating those with perioperative hyperglycemia, whether a patient does or does not have known diabetes.

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Disclosure of interest: None declared.

P051 AUDIT OF POSTOPERATIVE NAUSEA IN THE FIRST YEAR POST-IMPLEMENTATION OF ERAS FOR COLORECTAL SURGERY

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Objectives: Postoperative nausea and vomiting (PONV) incidence ranges from 20-70%. It can contribute to delayed oral intake and recovery. The objectives of this study are to evaluate PONV pre- and post-ERAS implementation and factors associated with PONV.

Methods: Audit data is obtained from ERAS Interactive Audit System. GraphPad Prism 7.0 was used for statistical analysis.

Results: The ERAS protocol for colorectal surgery was implemented in 2016. Data for 173 patients over a 10-month period was analysed. Compared to pre-implementation, PONV rates have halved and rates of PONV prophylaxis administration and use of opioid-sparing techniques have increased. Since implementation, 43.93% of patients complained of nausea on the day of surgery with similar incidences in the following three days. In the group with no nausea, more patients received nerve blocks or local anaesthetic techniques. Median length of stay was 6 days for both groups under ERAS.

| | | ERAS | No Nausea (No.) | Pre-ERAS |
|--|--|--------------|-----------------|--------------|
| | | Nausea (No.) | | Nausea (No.) |
| PONV prophylaxis (p=0.4988) | No | 15.58% (12) | 11.34% (11) | 14.58% (7) |
| | Yes | 81.82% (63) | 87.63% (85) | 66.67% (32) |
| | Unknown | 2.60% (2) | 1.03% (1) | 18.75% (9) |
| Opioids intraoperatively (p=0.0162) | No | 7.79% (6) | 1.03% (1) | ? |
| | Yes, short acting only | 10.39% (8) | 21.65% (21) | 4.17% (2) |
| | Yes, long acting | 80.52% (62) | 76.29% (74) | 77.08% (37) |
| Nerve blocks/ Local anaesthetics (p=0.0009) | No | 29.87% (23) | 15.46% (15) | 54.17% (26) |
| | Peripheral nerve blocks | 5.19% (4) | 13.40% (13) | 8.33% (4) |
| | Local infiltration | 24.68% (19) | 16.49% (16) | ? |
| | Transversus abdominus plane blocks (TAP) | 37.66% (29) | 37.11% (36) | 8.33% (4) |
| | IV lignocaine | 1.30% (1) | 16.49% (16) | 10.42% (5) |
| NGT postop (p=0.1260) | No | 90.79% (69) | 81.44% (79) | 56.25% (27) |
| | Yes | 9.21% (7) | 18.56% (18) | 25.0% (12) |
| Opioids postoperatively (p=0.0032) | Oral weak opioids | 18.18% (3) | 20.62% (20) | 4.17% (2) |
| | Adjuvants only | 6.49% (5) | 4.12% (4) | 14.58% (7) |
| | PCA with opioids | 20.78% (16) | 9.28% (9) | 45.83% (22) |
| | Oral strong opioids | 49.35% (38) | 59.79% (58) | 29.17% (14) |

?: no data. IV: intravenous.

p value calculated using Chi²test comparing those with and without nausea under ERAS.

Conclusion: Continuation of anti-emetics for three days postoperatively and intraoperative double or longer-acting anti-emetics may contribute to decreased nausea. Types of analgesia administered could be associated with PONV- patients with no nausea received less long-acting opioids. This study suggests that IV lignocaine may potentially be associated with less nausea.

Disclosure of interest: None declared.

P052 EARLY RECOVERY PROGRAM IN THE RADICAL SURGICAL TREATMENT OF PATIENTS WITH PROSTATE CANCER: EXPERIENCE OF THE SPECIALIZED HOSPITAL

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Objectives: to determine the effect of the enhanced recovery program on the outcome of treatment in patients after radical prostatectomy.

Methods: From May 2015 to February 2016 in N. N. Petrov Research Institute of Oncology we performed 86 radical minimally invasive (laparoscopic or extraperitoneal endoscopic) radical prostatectomies. Patients were divided into 2 groups – in the first group (44 patients) – group of conventional surgery (CS) – fast track elements were not applied or applied partially; in the second group (42 patients; FT group) elements of fast track were applied. We assessed the effect of fast track elements on early postoperative complications, duration of surgery, hospital admission and staying in Intensive Care Unit, frequency of repeated surgical interventions and frequency of rehospitalizations within 30 days after surgery.

Results: Presence and absence of preoperative preparation did not affect the frequency of intraoperative complications. Intraoperative blood loss didn't cause the necessity of transfusions. 30-days complications did not differ significantly between CS and FT groups. We found significant differences between CS and FT groups in pelvis drainage (3.3 vs 0.9 days, $p=0.002$), duration of catheterization (11.2 vs 5.2 days, $p=0.0003$) and duration of hospitalization (15.1 vs 6.5 days, $p=0.0008$), in all cases - in favor of the FT group.

Perioperative indicators

| Perioperative indicators | Groups | | p-value |
|--|-----------------------|-----------------------|---------|
| | CS | FT | |
| Intraoperative | | | |
| Operation duration, min (range) | 186.1 ± 47.2(80-300) | 191,3 ± 41,4(110-275) | 0.53 |
| Pelvic lymph node dissection, n (%) | 33 (75,0%) | 32 (76,2%) | 0.92 |
| Volume of blood loss, ml (range) | 203.4 ± 166.8(50-900) | 209 ± 206,4(50-1200) | 0.93 |
| Complications, n (%) | 4 | 1 | 0.59 |
| Frequency of blood transfusion, n (%) | 0 | 0 | - |
| Postoperative | | | |
| Duration of catheterization, days (range) | 11.2 ± 5.3 (6-28)* | 5.2 ± 3.4 (3-14) | 0.0003 |
| Removing drainage periods, average day (range) | 3.3 ± 3.97 (1-22) | 0.9 ± 1,3 (0-10) | 0.0002 |
| Frequency of reoperation, n (%) | 0 | 2 (4,8%) | 0.87 |
| Duration of hospitalization, days | 15.1 ± 5.1 | 6.5 ± 4.1 | 0.0008 |

Conclusion: Application of principles of fast track of perioperative management in treatment of patients with prostate cancer doesn't affect the frequency of intra- and postoperative complications, however, it is more

economically attractive, first of all due to reduction of period of patient's stay in hospital.

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P053 OPIOID-SPARING ANALGESIA IN PATIENTS UNDERGOING ABOVE AND BELOW KNEE AMPUTATION

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Objectives: Opioids have traditionally been the mainstay of pain management for patients undergoing surgery. However, opioids are associated with adverse, sometimes life-threatening, side effects. Our study goals are twofold: (1) To demonstrate that adequate analgesia can be obtained without intraoperative opioids by providing multimodal analgesia and that (2) postoperative opioid requirements will be reduced.

Methods: The records of 93 patients undergoing above or below knee amputation with general anesthesia from January 2013 through January 2017 at MedStar Georgetown University Hospital were reviewed. Parameters examined included intraoperative and postoperative opioid use, time until administration of first pain medication postoperatively, and the incidence of PONV. Avoidance of intraoperative opioids and use of the ComfortSafe Pyramid® preemergence analgesic checklist were used to separate patients into two groups, ComfortSafe (CS) vs. traditional general anesthesia (non-CS). A two sample t-test was used to test the differences between time until first pain medication and amount of opioid administered postoperatively.

Results: The CS group received significantly less opioid following surgery compared to the non-CS group ($p=0.0167$). The CS group ($n=17$) and non-CS group ($n=76$) showed no difference in time until first pain medication ($p=0.380$). PONV was observed in zero CS patients and 11 non-CS patients. All patients were diabetic; with 3 CS and 24 non-CS having neuropathy.

Conclusion: This study demonstrates the effective control of postoperative pain and reduction in PONV by eliminating intraoperative opioids during general anesthesia for above and below knee amputation. A multimodal analgesic care plan was assured by use of the ComfortSafe Pyramid® preemergence analgesic checklist, completed prior to surgical closure. Infiltrating the wound with liposomal bupivacaine and IV administration of acetaminophen and/or ketorolac provided a timely analgesic effect at emergence. Postoperative opioid requirements and antiemetic administration in the PACU were significantly reduced. Because opioid tolerance and opioid-induced hyperalgesia can manifest within a few hours¹, we recommend further investigation of opioid-free general anesthesia.

References: 1. Hayhurst CJ, Durieux ME. Differential opioid tolerance and opioid-induced hyperalgesia: A clinical reality. *Anesthesiology*. 2016;124(2):483-488.

Disclosure of interest: None declared.

P054 INTRAOPERATIVE HYPOTHERMIA MAY RESULT IN IL-6 DISTURBANCES

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Objectives: Perioperative hypothermia is known to be common during anaesthesia and results in increase in postoperative morbidity. Although well described, the pathophysiological background of these problems are still not clear. Our aim was to find relation between intraoperative hypothermia and interleukin-6 (IL-6) secretion in patients undergoing major abdominal surgery.

Methods: 28 consecutive patients who underwent radical cystectomy have been enrolled in the study. Standard intraoperative care was applied in terms of anaesthesia technique and monitoring, core temperature was measured in distal oesophagus. Blood samples for interleukin-6 levels were drawn at the beginning of surgery and 24 hours later, in the morning of the first postoperative day. Interleukin-6 levels were measured using ELISA kits. IL-6 concentrations at the beginning of surgery and on day 1 were compared in all patients. Patients were arbitrarily divided into groups depending on their intraoperative thermal status: patients with temperature nadir of $\leq 35^{\circ}\text{C}$ (severe hypothermia) and $>35^{\circ}\text{C}$ (normothermia and mild hypothermia). IL-6 concentration, as well as its change and relation of both of these parameters to intraoperative temperature nadir were calculated using student t-test and Pearson's correlation coefficient.

Results: Mean IL-6 concentration before surgery and on day 1 were 17.85 ± 32.94 pg/ml and 221.54 ± 86.92 pg/ml, respectively. Significant differences were found between IL-6 increase between the groups of different intraoperative thermal status: 246.85 ± 66.6 pg/ml in $\leq 35^{\circ}\text{C}$ group and 157.53 ± 77.9 pg/ml in $\geq 35^{\circ}\text{C}$ group ($p=0.003$). A magnitude of the increase was found to be inversely related to the lowest temperature noted during surgery: $r=-0.52$, $p=0.0045$.

Conclusion: These results, in the view of well described common complications of mild perioperative hypothermia may advocate their immunological background. As increased risk of surgical site infection (SSI) is one of the most prominent problems linked to hypothermia, some disturbances of immune system may play the role in their pathophysiology. Our preliminary results suggest that significant changes in immune system mediators secretion may be caused by intraoperative hypothermia. As improving postoperative outcomes is one of the most vital goals of perioperative medicine, preventing thermal disturbances should become a standard of care in the operating room.

Disclosure of interest: None declared.

P055

ENHANCED RECOVERY PROTOCOL FOR ANATOMICAL LUNG RESECTIONS: A PROSPECTIVE SINGLE-CENTER NON-RANDOMIZED STUDY

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Objectives: Effectiveness of the fast-track protocols nowadays are widely accepted in different fields of surgery. In a lot of papers it's made stress on "selected groups" of patients that could be included to ERAS programs. However, protocol for enhanced recovery after thoracic non-cardiac surgery is still under discussion. We present our results in implementation of ERAS protocol for patients undergoing anatomical lung resections.

Methods: Single-center prospective non-randomized trial. A total of 124 patients undergoing lung resections in period between December 2014 and December 2016 were reviewed. After primary revision 58 patients with non-anatomical resections or pneumonectomies were excluded and 66 patients were finally analyzed. In 55 cases lobectomy and in 11 cases segmentectomy was done. Median age was 61 (51; 67) years with male predominance 37 (56,1 %). Patients were operated following lung cancer, metastatic or inflammatory diseases in 53 (80,3%), 8 (12,1%) and 5 (7,6%) cases respectively. Video-assisted (VATS) and conventional approaches ratio: 42 (63,6 %) / 24 (36,4 %). Protocol description: routinely counseling by ERAS team, no fasting; nutrition support, incentive spirometry, fluid and carbohydrates loading; avoidance of salt and water overload, judicious use of vasopressors, protective lung ventilation, randomized high-thoracic epidural or paravertebral block with multimodal analgesia, maintenance of normothermia; immediate or early extubation, avoidance of salt and water

overload, multimodal analgesia, early mobilization and feeding (POD 1), audit of compliance and outcomes.

Results: All patients were informed about all clinical pathways before admission and consent forms were signed. Overall 30-days morbidity rate was 5 (7,6 %) of 66 [CI: 3,3 % - 16,5 %]. Pleural drainage was removed on postoperative day 1 in 49 (74,2 %) cases. In 3 cases prolonged air leak was occurred, conservative treatment was effective in all cases. Mortality rate was 2 (3 %) of 66 [CI: 0,8 % - 10,4 %] following sudden cardiac death and pulmonary embolism. Median postoperative stay was 7 (6; 9) days without significant differences between lobectomy or segmentectomy groups ($p>0,05$).

Conclusion: Implementation of the perioperative care protocols based on ERAS guidelines promotes decrease of postoperative complication rate even in high risk patients undergoing pulmonary anatomical resections.

Disclosure of interest: None declared.

P056

PROVIDER PERCEPTIONS REGARDING ERAS GUIDELINES AS A MEANS OF IMPROVING INTERDEPARTMENTAL COMMUNICATION AND TRANSITIONS IN PATIENT CARE

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Objectives: ERAS protocols have been shown to reduce complication rates and decrease length of hospital stay after surgical procedures. Due to the comprehensive nature of ERAS guidelines, inter-disciplinary communication and preoperative planning could also be improved. The aim of this study was to assess provider perceptions of how ERAS guidelines could affect inter-disciplinary communication and patient care. To our knowledge, this is the first study that queries both surgeons and anesthesiologists regarding ERAS and the domains of communication, preoperative planning, and postoperative transitions in patient care.

Methods: A 12-item survey was created using commercially available software. The survey was emailed to all anesthesiology and surgical gynecology providers at a single institution prior to the implementation of ERAS gynecology orders.

Results: Out of 189 surveys, 95 responded (50.2% response rate). Anesthesiology and gynecology were both adequately represented among responders. Most providers (91%) agreed that the current order set inadequately addressed the planned procedure and did not facilitate communication. Anesthesiologists were more unsatisfied than surgeons (79% versus 53%) with the current order set and inter-disciplinary communication. A majority of providers agreed that the implementation of ERAS guidelines would improve transitions in patient care (89%), preoperative planning (90%), and interdisciplinary communication (82%). Anesthesiologists were more confident than surgeons about the changes that ERAS guidelines could achieve (64% versus 82%).

Conclusion: A significant proportion of both anesthesiology and gynecology believe that the ERAS guidelines would improve preoperative planning, interdepartmental communication, and patient care. Research has shown that poor interdepartmental communication and a resistance to changing the system are barriers to ERAS implementation. Promoting ERAS guidelines as a means of improving these issues may encourage health care providers to endorse the guidelines and assist with their implementation. The results also indicate that collaboration with anesthesiology is integral to successful ERAS planning and implementation. The survey will be repeated following ERAS implementation to assess perceived changes in the domains of interdisciplinary communication, patient care, and preoperative planning.

Disclosure of interest: None declared.

P057
EARLY REMOVAL OF URINARY CATHETER IN POSTOPERATIVE PATIENTS WITH EPIDURAL ANALGESIA

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Objectives: The aim with this study was to examine effects from early removal of urinary catheter during ongoing epidural analgesia.

Methods: This study was conducted as a retrospective cohort study. Patients recovering from a pancreaticoduodenectomy (n=86) between January 2015 and August 2016 who were following the enhanced recovery program were included.

These patients were compared with a historical control group (n=41) receiving traditional care (removal of the urinary catheter the day after discontinuation of the epidural analgesia) between January and December 2014. The urinary catheter was removed provided that patients were hemodynamically stable, were lacking signs of serious postoperative complication, and who did not require treatment with diuretic medication. Residual urine was monitored using ultra sound after voiding or at least every fourth hour after removal.

Results: Patients following the enhanced recovery protocol retained the urinary catheter an average of 5, 5 days (median 4 days), whereas patients in the historical control group were catheterized an average of 12 days (median 8 days). 83% of the cases with early removal were successful while 17% required reinsertion of a urinary catheter due to residual urine. There were more men than women needing replacement of the urinary catheter in the enhanced recovery group. There were no cases of overstretched bladder requiring treatment

Conclusion: Early removal of urinary catheter with ongoing epidural infusion is safe. The duration of urinary catheter use can be considerably reduced.

Disclosure of interest: None declared.

P058
STRATEGIES FOR MINIMIZING BEDREST IN COLORECTAL CANCER PATIENTS: EXERCISING TO ERAS

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Objectives: Perioperative care is under constant evolution to ensure optimization of post-operative recovery. This is needed as the incidence of complications associated with major abdominal surgery remains high, with many patients experiencing a decline in physical function following the intervention. The objective of this study was to assess the feasibility of initiating a progressive in-hospital resistance exercise program within 24-hours of surgery in colorectal cancer patients. It was hypothesized that this would minimize time spent in bed over the hospital stay, supporting patients in attaining the Enhanced Recovery After Surgery (ERAS) guidelines specific to mobilization.

Methods: Subjects who participated in an evidence-based prehabilitation program before surgery (~4 weeks) were guided through a progressive in-hospital resistance exercise intervention within the first 24-hours after surgery based on their ability to exercise. Feasibility was assessed as the primary outcome using compliance as a measure, accounting for all contraindications to exercise and mobility. Secondary outcomes included reducing sedentary time and ability to conform to ERAS mobilization guidelines quantified by time spent out of bed over the hospital stay.

Results: Patient adherence to in-hospital exercise was high, confirming feasibility. All reasons for non-compliance to in-hospital exercise were recorded, yielding an average compliance to the program of 90% on post-operative day one (POD1). Patients were also able to attain the ERAS early mobilization guidelines on POD2 and POD3 with over 70% success rate. At 4-weeks after surgery, 58.6% of patients surpassed their baseline 6-minute walking test result, while 13.8% came within 10 meters.

Conclusion: In-patient exercise initiated within 24-hours of surgery is feasible, minimizes time spent in bed and is effective in helping patients achieve ERAS goals. Based on the small sample size, long term effects can only be postulated, though a return to baseline functional capacity was observed at 4-weeks after surgery, as previously seen in our lab.

Disclosure of interest: None declared.

P059
A QUALITATIVE STUDY EVALUATING THE OUTCOMES OF ENHANCED RECOVERY AFTER SURGERY (ERAS) PROTOCOL IN PATIENTS UNDERGOING ELECTIVE COLORECTAL SURGERY THROUGH AN INTERDISCIPLINARY APPROACH

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Objectives: Enhanced Recovery After Surgery (ERAS) is an established multidisciplinary approach focused on optimal recovery for patients post operation. It has shown to reduce postoperative complications and shorter hospital stays. This has been widely adopted around the world but there is a lack of implementation in Singapore. Hence, we seek to adopt the ERAS protocol and explore its feasibility within the local setting; and evaluate the outcomes in patients undergoing colorectal surgery.

Methods: We recruited 2 groups of patients - patients who are placed under current care paths (n= 52, from 4 March 2015 to 17 May 2015) and patients who underwent care paths with integration of ERAS protocol (n=37, from 4 March 2016 to 17 May 2016). The integration of ERAS includes pre-operative counselling, early post-operative oral feeding and early mobilization with optimal pain control. An interdisciplinary team was formed and a root cause analysis was done to identify possible barriers to the implementation of ERAS protocol. The outcome measures studied were length of hospital stay, readmission rates within 30 days post discharge as well as compliance of staff towards early mobilization of patients.

Results: All eligible patients were mobilized. Patients were sat on chair on the same day of operation and ambulated day one post operatively. This had an impact on the length of stay which showed a reduction by 1.05 days (from 8.90 in pre-ERAS group to 7.95 following the implementation of our ERAS protocol). Our balance measure also showed reduction in readmission percentage from 13.5% to 2.70%.

Conclusion: The outcome of this study is in line with the research evidence. It is important to have an interdisciplinary team approach to empower the ground staff so as to achieve common goals in delivery of care.

Disclosure of interest: None declared.

P060
IMPLEMENTATION OF ENHANCED RECOVERY AFTER SURGERY (ERAS) PROGRAMME FOR ELECTIVE COLORECTAL SURGERY: A SINGLE INSTITUTION'S EXPERIENCE

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Objectives: The Enhanced Recovery After Surgery (ERAS) Programme is a multi-disciplinary approach to peri-operative management of patients undergoing major surgery. When compared to traditional standard care, patients under the ERAS Programme have significantly lower complications rates and hospital stay. Tan Tock Seng Hospital (TTSH) has been a member of the ERAS Society since March 2016, one of the first 2 centres in Asia to fully implement the ERAS Programme. In this study, we examine

the impact of ERAS programme in our institution on patient outcomes after elective major colorectal surgery.

Methods: 180 consecutive patients who underwent elective colorectal surgery under the ERAS Programme from March to Dec 2016 were analyzed from a prospectively-maintained database. They were compared with retrospective data of 335 elective colorectal surgery patients who received standard care, from January 2015 – May 2016.

The primary outcome measure was post-operative length of hospital stay. Secondary outcome measures included post-operative complications, readmission rates, and compliance to ERAS guidelines.

Results: For patients in the ERAS group, the median age is 69.42 (23.3%) hemicolectomies, 69 (38.3%) sigmoid colectomies, 58 (32.2%) anterior resections, 4 (2.2%) abdominoperineal resections and 7 (3.9%) other major resections were performed. Patients who received standard care have similar demographics.

Median length of stay decreased from 7 days to 6 days in ERAS group ($p=0.025$). Paralytic ileus rates also improved from 23.6% to 15% ($p=0.022$). Surgical complications rates decreased from 26.9% in the standard care group to 17.2% in ERAS group ($p=0.017$). Re-admission rates were 7% in both groups. Compliance to ERAS guidelines has increased from 42.4% to 65.6% since its implementation.

Conclusion: Implementation of ERAS Programme is associated with significantly shorter duration of post-operative hospital stay and lower rates of paralytic ileus and overall surgical complications rates. There is no significant difference in hospital re-admissions rates. The difficulties in implementing the full ERAS programme and achieving a high level of compliance were multifactorial. Despite these challenges, the adoption of ERAS protocol can result in improved patient outcomes and should be considered as standard of care in this group of patients.

Disclosure of interest: None declared.

P061

IMPLEMENTATION OF AN ENHANCED RECOVERY AFTER SURGERY (ERAS) PROGRAM: THE MD ANDERSON CANCER CENTER EXPERIENCE

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Objectives: To evaluate perioperative outcomes of patients undergoing exploratory laparotomy for gynecologic indications in an Enhance Recovery after Surgery (ERAS) program and compare to those receiving traditional perioperative care (pre-ERAS).

Methods: All consecutive patients managed under an ERAS program undergoing exploratory laparotomy between 11/3/2014 and 10/26/2016 were compared to historical controls (May to October, 2014). Interventions included, but not limited to, allowing oral intake of fluids up to 2 hours before induction of anesthesia; pre-, intra-, and post-operative euvolemia as well as opioid-sparing analgesia (total intravenous anesthesia); and ambulation and regular diet on the day of surgery. Wilcoxon rank-sum and Fisher's exact tests were used for comparisons

Results: A total of 518 enhanced recovery patients were compared with 74 patients in the control group (pre-ERAS). ERAS resulted in a 73.6% reduction in median postoperative morphine equivalents during the first 3 days after surgery with no significant difference in mean pain scores between the pre- and post ERAS cohorts. Thus far, ERAS has resulted in a 1-day reduction in hospital stay (median LOS pre-ERAS: 4 days [range, 2-27] vs. ERAS: 3 days [range, 1-43], $p<0.01$) with stable readmission rates (pre-ERAS: 14.1% vs. ERAS: 12.9%, $p=0.85$). No differences were observed in postoperative complications between pre-ERAS and ERAS groups respectively (29.6% vs. 25.7%, $p=0.47$; GU: 21.1% vs. 18.3%, $p=0.63$; Hematologic: 16.9% vs. 11.8%, $p=0.25$). Median percentage compliance to the enhance recovery components for the ERAS group was 70% (range, 40-85%)

| | Pre-ERAS Median (range) | ERAS Median (range) | % Reduction | P-value |
|---------|-------------------------|---------------------|-------------|---------|
| POD0 | 49.0 (4.0-637.5) | 7.5 (0-101.3) | 84.7% | <0.001 |
| POD1 | 50.0 (0.0-843.0) | 9.4 (0-200.0) | 81.2% | <0.001 |
| POD2 | 32.0 (1.0-752.6) | 7.5 (0-225.0) | 76.6% | <0.001 |
| POD3 | 22.0 (0.0-481.0) | 7.5 (0-205.0) | 65.9% | <0.001 |
| MED/Day | 28.4 (1.5-253.5) | 7.5 (0-107.0) | 73.6% | <0.001 |

Conclusion: Implementation of an ERAS program was associated with reduced length of stay with stable readmission and perioperative complication rates and reduced overall opioid consumption. Further study is warranted to determine impact on progression free survival.

Disclosure of interest: None declared.

P062

ADHERENCE TO THE ENHANCED RECOVERY AFTER SURGERY (ERAS) PROTOCOL AND OUTCOMES AFTER COLORECTAL CANCER SURGERY IN NORTH ESTONIA MEDICAL CENTRE

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Objectives: In 2015 the Enhanced Recovery After Surgery (ERAS) protocol for management of the colorectal cancer patients was implemented in North Estonia Medical Centre (NEMC). A multidisciplinary team including a colorectal surgeon, anaesthetist, ERAS dedicated nurse, pain management nurse and physiotherapist was formed. The team launched hospital specific guidelines and introduced the programme among all the specialties involved.

The aim of this audit was to evaluate the impact of different adherence levels of ERAS protocol to the outcome after major colorectal procedure.

Methods: The data of 53 patients who underwent radical colorectal cancer surgery between September 2015 and May 2016 was collected retrospectively and analysed.

According to the recent literature 11 most important ERAS elements such as using preoperative carbohydrate drinks, selective bowel preparation, early mobilisation and oral intake, avoiding premedication and fluid overload etc., were selected and measured.

Based on the completion of 11 ERAS elements, the patients were divided in to 5 groups (>90%; 80-89%; 70-79%; 60-69%; <60% of elements completed respectively).

The primary endpoint (postoperative complications, e.g. postoperative ileus, anastomotic leakage, wound infection or dehiscence etc.) and secondary endpoints such as length of hospital stay (LOS), readmissions and 30-day mortality were measured between the different groups.

Results: The overall adherence to the ERAS protocol in NEMC is well above average.

The overall procedure related complication rate was 28%, most common complications being wound infection (28%), wound dehiscence (11%), anastomotic complications (11%), intraabdominal abscess (11%), postoperative ileus (17%) and more rare being sepsis, pulmonary complications, acute kidney injury and gastric ulcer perforation (22% in total). 3 patients were reoperated due to complications.

9 patients (17%) were readmitted to the hospital for various reasons, infection being most common (56%).

The patients with lower adherence to ERAS protocol had longer LOS.

Conclusion: The patients who underwent major colorectal surgery and were treated with higher adherence to ERAS protocol had significantly lower rate of postoperative complications and readmissions as well as reduced LOS. There were no changes in the 30-day mortality rate between the groups according to this audit.

Disclosure of interest: None declared.