Abstract # 1

**Cryoablation reduces Narcotic Use and Length of Stay in Pectus Patients**

Afolayan O, Anyalebechi J, Meehan J

Seattle Children's Hospital

Background

Post-operative pain following the Nuss Procedure for pectus excavatum (PE) requires high levels of opioid use and resultant constipation. Intraoperative cryoablation may reduce pain, thereby reducing opioid use, constipation, and could decrease length of stay (LOS).

Method

A management protocol for Nuss PE patients has utilized at our institution for 5 years. This includes soaker catheters, IV/oral opioid use, pain score evaluations, and a bowel regimen. We substituted cryoablation for the soaker catheters and prospectively collected data on our first 10 consecutive cryo patients from June-August of 2018. Cryoablation was used on 4 intercostal nerves per side (8 total) in patients receiving one bar and 5 per side (10 total) for patients with 2 bars.

Result

All patients were male (age 14-16, Haller Index 4. 2 to 15. 0). Nine patients had one bar and 1 patient had 2 bars. Average op-time increased by 40 minutes. LOS improved from 1-3 days (avg 2.3) for the cryo group compared to 3-11 days (avg 4. 5). Post op opioid use decreased with 2 patients off narcotics before discharge and no opioid use 3 days after discharge in all patients. No cryoablation patients received enemas or suppositories compared to nearly all patients in the historical group. All but three patients had complete return of cutaneous sensation in 4 weeks.

Conclusion

Cryoablation is an effective means of reducing post-operative opioid use, constipation, and decreasing LOS. Operative time is increased and some patients may have dysethesia on anterior chest wall for undetermined time.

Abstract # 2

**A prospective study of opioid use for postoperative pain management after breast operation**

Limbach KE, Pommier SJ, Pommier RF, Naik AM

Oregon Health & Science University

Background: The opioid epidemic has led to increased attention to prescribing practices across surgical specialties, but many studies are limited by their retrospective nature. This study seeks to quantify the postoperative opioid use of patients undergoing breast operations prospectively.

Methods: Consecutive patients undergoing breast operation at a single institution prospectively tracked each dose of postoperative pain medication. Logs were collected at follow up or via telephone, and a survey was conducted of patient perceptions regarding their opioid prescription.

Results: Of 100 patients included, 88 completed the medication log, survey, or both. The median number and interquartile range (IQR) of tabs taken were: Partial mastectomy (PM) 0 (IQR 0-4), PM with sentinel lymph node biopsy (SNLB) 3 (IQR 0-6), PM with bilateral reduction (R) 6.5 (IQR 3-13), total mastectomy (TM) 16 (IQR 2-31.25), and bilateral total mastectomy (BM) 27 (IQR 25.25-73). The number of tabs required to fulfill the needs of 80% of patients was: PM 3, PM+SLNB 6, PM+R 8, TM 34, and BM 47. Of survey respondents, 51.2% felt they had been prescribed too much pain medication. Most (83.0%) had leftover tabs, and 67.9% indicated they kept them in their home. If initial prescriptions had been written to fulfill the needs of 80% of patients, an estimated 954 fewer tabs (43.3%, p<0.001) would have been prescribed.

Discussion: The majority of patients were overprescribed opioids after breast operation, but a reduction in opioid prescription could be achieved by targeting the needs of 80% of the population.

Abstract # 3

**Does Practicing Video Review with an Assessment Rubric Improve Medical Student Clinical Interview Performance of the Outpatient Post-Operative Exam?**

Randall NR, Cooper D, Nandagopal R, Martin C, Kumar A

Elson S. Floyd College of Medicine - Washington State University

Introduction: Medical students are taught clinical skills using various diverse methods. Video review of standardized patient encounters has become a popular method of providing students with personal and detailed feedback on history and physical exam competency. While the benefits of video self-review are well-documented, the effects of pairing video review with an assessment rubric, with the students in the role of assessor, has not been studied.

Methods: Student participants perform a video-recorded interview of a standardized patient suffering from post-operative complications. Training videos played out by surgical attendings depicting examples of poor, intermediate, and excellent performance on clinical skills competencies are presented to students. Students assess the videos using an assessment tool with behavioral anchors based on milestones, competencies, and a supervision scale. After playing the role of assessor, students perform another video-recorded interview of a standardized patient with a different post-operative complication. Blinded examiners assess the performance of encounters; outcomes are compared. Additionally, students are surveyed on the qualitative differences in their self-review before and after the intervention.

Results: This work is actively underway. We aim to present video vignettes from the students’ pre- and post-intervention outpatient post-operative visits and generate a robust discussion. We hypothesize that student performance of patient interviewing skills improves after the intervention of video training and playing the role of assessor.

Discussion: EPA1 of AAMC’s Core Entrustable Professional Activities for Entering Residency integrates several competencies in history-taking. Playing the role of assessor in standardized video self-review will improve student performance in clinical settings.

Abstract # 4

**Enhanced Recovery after Cytoreductive Surgery and HIPEC: A Single Institution Experience**

Siddharthan R, Gilbert E, Billingsley K, Tsikitis VL

Oregon Health and Science University

Background:

Cytoreductive Surgery (CRS) and Hyperthermic Intraperitoneal Chemotherapy (HIPEC) is mainstay treatment for peritoneal carcinomatosis and pseudomyxoma peritonei with reported high incidence of ileus and prolonged length of stay (LOS). We incorporated an enhanced recovery after surgery (ERAS) protocol to examine whether we can reduce the LOS without increasing morbidity and mortality.

Methods:

Patients who were taken to OR for intent to treat with CRS/HIPEC from 2015-2018 both before and after ERAS protocol were identified. The protocol included bowel preparation, epidural and alvimopan on the day of the surgery. Postoperative day 1, the nasogastric tube was removed and diet was advanced. Primary end points were resumption of bowel function and LOS. Secondary endpoints included morbidity and mortality. Statistical significance was set at p<0.05.

Results:

40 patients were identified, thirty-one of which underwent CRS/ HIPEC: 16 before and 15 after ERAS. Median age was 57 years (31-72). Seven patients had colorectal cancer and 24 had appendiceal disease. The median LOS prior to ERAS was 11 days (5-20) and 7 days (5-27) after ERAS (P<0.05). The median time to return of bowel function was 5.5 days (4-8) prior to ERAS and 4 days (3- 10) after ERAS (P<0.05). The 30-day morbidity (Clavien-Dindo ≥2) for patients prior to ERAS was 87.5% and after ERAS was 46.7% (P<0.05). The 30-day mortality was zero for both groups.

Conclusions:

An ERAS protocol can safely be implemented in patients undergoing CRS/HIPEC with earlier return of bowel function and decrease in LOS without increasing morbidity and mortality.

Abstract # 5

**Contemporary Practice Patterns Regarding Approach to Surgical Repair of Esophageal Atresia with Tracheoesophageal Fistula in the Neonatal Period**

Marenco C, Do W, Lammers D, Escobar M, Horton J

Madigan Army Medical Center

Introduction:

The current data regarding the impact of patient factors on surgical approach to the repair of Esophageal Atresia (EA) with Tracheoesophageal Fistula (TEF) is limited. The purpose of this study was to describe and compare patient characteristics for thoracoscopic versus open approach to surgical repair of EA with TEF in the neonatal period using a large, nationwide database.

Method:

Retrospective review of the Pediatric National Surgical Quality Improvement Project Database for all patients ≤30days old with diagnosis codes for EA with TEF that underwent repair from 2012-2015. Patients were stratified by surgical technique. Patient demographics, birth history, and comorbidities were compared between groups.

Results:

We identified 495 cases of surgical repair for EA with TEF in the neonatal period.

In terms of surgical approach, open technique was used far more often (86.9%) than thoracoscopic technique (8.8%). Nearly one-third (32.8%) of thoracoscopic cases required conversion to an open approach.

There were no significant differences between the two approaches in terms of patient demographics, preterm birth, or comorbidities (all p>0.05).

Notably, those patients that underwent thoracoscopic repair were larger at birth (2.8kg v. 2.5kg, p=0.031), and were 1 week older by gestational age at birth (37.7 weeks v. 36.7 weeks, p=0.037) compared to those that underwent open repair.

Conclusion:

This study suggests that weight and gestational age principally influence the surgical technique chosen for repair of EA with TEF. Furthermore, the high rate of conversion from thoracoscopic to open approach implies the challenging nature of such a technique.

Abstract # 6

**Post-operative Opioid Prescribing Patterns, Patient Usage, and Proper Disposal after Common General Surgery Procedures**

Rivera A, Nagamoto T, Peterman K, Pipitone O, Kaiser P

Good Samaritan Regional Medical Center

Introduction: Over prescription of opioids is an upstream driver of opioid abuse, facilitating overuse and improper diversion of leftover narcotics. An understanding of post-operative prescribing practices, patient opioid use, and patient disposal of opioids is essential to develop effective interventions to reduce the burden of opioid abuse.

Methods: Data was collected from a community hospital’s electronic medical record and a telephone questionnaire. Patients who underwent laparoscopic appendectomy, laparoscopic cholecystectomy or hernia repair between August 2017 and February 2018 were eligible for inclusion. Primary outcomes were the quantity of opioids prescribed in morphine milligram equivalents (MME), the amount of opioids consumed, and the disposal method of leftover opioids.

Results: 54 patients completed the questionnaire. 57% were male, average age was 48, and 96% filled their prescription. Opioid prescriptions varied greatly, ranging from 50 to 450 MME. 68% of patients consumed less than half of their prescribed MME, and more than half (56%) had leftover narcotics post-operatively. Greater than 80% of patients with leftover narcotics still had them in their possession at the time of the survey. Knowledge of proper disposal techniques was low (37%).

Discussion: In agreement with other studies, we found that less than 50% of prescribed opioids were consumed. This over-prescription of opioids is even more concerning when considering that most patients kept leftover opioids and did not know how to properly dispose of them. There is substantial room to reduce provider post-operative opioid prescriptions and to improve responsible disposal of opioids though interventions such as education.

Abstract # 7

**Learners’ perspectives on Stop the Bleed, a course to improve survival during mass casualty events**

Zhao KL, Herrenkohl M, Paulsen M, Bulger E, Vavilala M, Moore M, Pham TN

University of Washington School of Medicine

Introduction: In response to increasing mass casualty events nationwide, the American College of Surgeons Committee on Trauma developed a bleeding control course (Stop the Bleed) to teach hemorrhage control techniques to laypeople. There is a high level of public interest in learning about injury mitigation, but no study evaluating learners’ perspectives following bleeding control training. We sought to evaluate the didactic value of the bleeding control course by analyzing learners’ feedback within the framework of adult learning theory.

Methods: We analyzed a total of 720 open-ended surveys from 20 regional bleeding control courses taught by a level I trauma center team over a nine-month period. Major themes expressed by learners were organized into a categorical code structure. Keywords identified from free text responses were used to code comments into sub-themes. These themes were organized into categories within the framework of adult learning theory.

Results: The two primary themes identified from learners’ feedback were empowerment and practicality. Respondents reported an overwhelmingly positive experience; 97% of participants would recommend the course to others. The course design (lecture, didactics, and hands-on activities) was cited as a positive element of the course. Participants felt empowered and prepared to act and help others during mass emergency events. Actionable items for course improvement were identified.

Discussions: Themes from learners’ feedback fit within the framework of adult learning theory. These findings highlight the bleeding control course as an empowering experience and a practical and engaging approach to teaching hemorrhage mitigation to laypeople.

Abstract # 8

**A Rare Case of Gallbladder Agenesis with Concurrent Type I Choledochal Cyst**

Chen E, Helton WS

Virginia Mason Medical Center

INTRODUCTION

Gallbladder agenesis and choledochal cysts are both rare conditions. We discuss a case of a 38 year old Hispanic female presenting with both gallbladder agenesis and type I choledochal cyst (CC) who underwent multiple diagnostic modalities and operations in order to identify and resolve her condition.

CASE

This patient presented with a 2 year history of epigastric and RUQ pain. Ultrasound identified what was considered a contracted bladder with at least one gallstone present. She underwent laparoscopy where she was found to have gallbladder agenesis. Post op MRCP demonstrated a type 1 CC without anomalous pancreaticobiliary junction, and choledocholithiasis which was cleared endoscopically at time of ERCP. She then underwent a robotic-assisted laparoscopic excision of her CC with a hepaticoduodenostomy. There was no evidence of any gallbladder, cystic plate, or cystic duct. Pathology of bile duct showed no cancer. The patient’s epigastric pain resolved.

DISCUSSION

The incidence of gallbladder agenesis is estimated to be 10-65 per 100,000 worldwide; choledochodal cysts occur in 1 in 100,000 live births in the western world. Gallbladder agenesis can present with a clinical picture mimicking biliary colic and standard investigations are often unable to correctly identify the pathology. Choledocholithiasis is common in both gallbladder agenesis and type I CC. The combination of these two rare biliary tract abnormalities in the same patient presented a very unique and interesting case that fortunately resolved with surgery.

Abstract # 9

**Conventional Hepatic Arterial Anatomy? The Facts Behind the Fiction Illustrated in a Multi-Disciplinary Hepatic Arterial Infusion Pump Program**

Walker BS, Billingsley KG, Zarour L, Korngold EK, Guimaraes A, Fung AW, Kolbeck KJ, Bonde A, Mittra ES, Mayo SC

Oregon Heath & Science University

Introduction:

Effective and safe hepatic arterial infusion (HAI) pump therapy for colorectal liver metastases (CRLM) requires thorough operative dissection of the hepatic arterial (HA) system to avoid extra-hepatic perfusion (EHP). Variant HA anatomy is typically reported in 25% of the population, leading to a similar incidence of EHP in HAI patients. We describe the HA anatomy encountered in a newly developed HAI program.

Methods:

Between January 2016-June 2018, n=22 patients were treated with HAI for advanced CRLM. The HA tree was skeletonized and aberrant vessels ligated. Clinicopathologic data were reviewed to classify the HA anatomy identified intraoperatively.

Results:

The majority of patients (n=15;68%) had an HAI pump placed for technically unresectable hepatic metastases. 73% had 10 metastases in a median of 8 segments. N=15(68%) were found to have unconventional HA anatomy. Accessory left HA was the most common variant (n=10;45%) followed by a replaced or accessory right HA (n=5;23%). 33% had other variations that were operatively addressed. Of the 68% with variant anatomy, n=7(47%) were accurately identified on preoperative imaging. There were no cases of EHP on postoperative Nuclear Medicine imaging. One patient (5%) later developed pancreatitis due to EHP from a small collateral vessel which was successfully addressed with IR embolization and HAI therapy was resumed.

Discussion:

We report a significantly higher prevalence of variant HA anatomy in our HAI program than reported in the literature. Our ability to address the true presence of aberrant HA anatomy intraoperatively translated into a low incidence of EHP and uniform hepatic perfusion.

Abstract # 10

**Intraoperative Radiation Therapy in Early Stage Breast Cancer: Presence of Lobular Features Does Not Increase Risk of Requiring Additional Therapy**

Soriano C, Crown A, Weed C, Kaplan SJ, Rocha FG, Simianu VV, Grumley JW

Virginia Mason Medical Center

Introduction: The TARGIT trial reported similar rates of local recurrence when intraoperative radiation therapy (IORT) was compared to whole breast radiation therapy (WBRT). IORT has not been studied in in cancers with lobular features due to the unpredictable nature of this histology. This study evaluates the reliability of preoperative clinical factors used to identify candidates for single-dose IORT.

Methods: This is a nested case-control study of women with all histologic types of invasive breast cancer who underwent breast conservation in combination with IORT from February 2011 to October 2016. Inclusion criteria included preoperative findings of unifocal disease ≤ 3cm on imaging and absence of nodal disease and lymphovascular invasion. Patients whose final pathology did not satisfy inclusion criteria or had inadequate margins were recommended to undergo additional therapy with WBRT and re-excision of inadequate margins.

Results: 243 invasive breast cancers were treated with IORT. 164 cancers met the criteria for single-dose IORT (IORT group) and 79 cancers required additional therapy (AT group). 52 cancers had lobular features. Patient ages and imaging sizes were similar between groups. Lobular histology, high tumor grade, and hormone receptor status were not associated with a need for AT. There was no difference in recurrence or survival after 46 months of follow-up.

Conclusions: No preoperative factors, including the presence of lobular features, were associated with the need for additional therapy. IORT is an effective treatment option for well-selected patients with early breast cancers and can be considered in patients with cancers with lobular histology.

Abstract # 11

**Clinical Implications of Distinct Tumor Microenvironment Signatures between Early and Late-onset Colorectal Cancer**

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Objectives: Early-onset (≤45 years) colorectal cancer (CRC) is rising compared to late-onset CRC (≥65 years) demanding clinical attention. Understanding the relationship between the localized immunity and the tumor known as tumor microenvironment (TME) may hold the key to understanding this notable shift. We hypothesized that there are key TME differences between early and late-onset CRC that may additionally impact clinical outcomes.

Methods: We performed RNA sequencing of 770 known immune markers on tumors (primary and adjacent non-cancerous tissue) from early and late-onset CRC patients matched by stage and treatment using the Nanostring platform. Normal tissue was used as control. qPCR and immunohistochemistry (IHC) were performed for validation on an independent cohort. Patient oncologic outcomes were reviewed.

Results: Sequencing of 24 tumors in each cohort and 10 normal revealed 65 up-regulated and 15 down-regulated genes in early compared to late-onset disease. Highest differential expression included upregulation of CCL19, BLINK, CD1D and downregulation of CXCL3 (p<0.05). qPCR validated significantly lower expression of CXCL3 in early compared to late-onset (p <0.05). We found that in both cohorts Improved disease-free survival (DFS) is associated with increased CXCL3 qPCR expression. (Figure 1, p<0.05). In addition, IHC of an independent cohort (n=17) confirmed similarly improved overall survival with increased CXCL3 expression.

Conclusions: Distinct TME differences were identified between early and late-onset CRC. Increased expression of CXCL3 offers a positive prognostication marker.

Abstract # 12

**Evaluating need for additional imaging and biopsy after oncoplastic breast conserving surgery**

Soriano C, Crown A, Weed C, Laskin R, Simianu VV, Grumley J

Virginia Mason Medical Center

INTRODUCTION: Breast conserving surgery (BCS) using oncoplastic surgery (OS) allows for larger resections and improved aesthetics. The impact of OS on surveillance imaging and need for additional biopsies has not been reported.

METHODS: This is an observational cohort of patients undergoing BCT from 2009-2018. Standard BCS (SS) was the predominant approach until OS was introduced in 2012. We report rates of biopsy and imaging beyond standard diagnostic views following both approaches.

RESULTS: 433 sequential patients (OS=216, SS=217) were identified. Rates of ipsilateral imaging were similar (SS 35 patients, 60.3% vs OS 23 patients, 44.2%, p=0.12). Of the 29 OS patients who had contralateral additional imaging, 14 (48.3%) had contralateral symmetry procedures performed at the time of OS. Although a significant difference existed in re-excision rates, (SS 78 patients, 35.9% vs OS 46 patients, 21.3%, p=0.001), re-excision following partial mastectomy was not associated with increased need for additional ipsilateral imaging (p=0.78). Need for biopsy was higher in the SS group, 41 (18.9%) with 47 biopsies vs OS 20 patients (9.3%) with 22 biopsies, p=0.005. Biopsy findings of malignancy were similar between groups (SS 25, 53.2% vs OS 10, 45.5%). Additional surgery was undertaken based on biopsy results in 22 (10.1%) SS patients compared to 9 (4.2%) OS patients (p=0.03).

CONCLUSION: OS was not associated with increased additional imaging. SS was associated with increased need for biopsy and additional surgery based on biopsy results. Concern for challenges with follow-up imaging should not factor into the decision to offer OS to patients.

Abstract # 13

**Evaluating the Regional Uptake of Robotic Colorectal Surgery: A Report from the SCOAP Collaborative**

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INTRODUCTION

Minimally-invasive surgery(MIS) for colorectal disease has well-known benefits, but many patients undergo open operations. Robotic-assisted technology has been advanced as an enabler for MIS. However, it has not yet been determined if robotics can result in a greater proportion of colorectal surgery approached minimally invasively.

METHODS

A prospective cohort of patients undergoing elective colon and rectal operations at hospitals participating in the Surgical Care Outcomes Assessment Program(SCOAP) was used to describe rates of open, laparoscopic, or robotic surgery, and explore factors associated with increased use of robotics.

RESULTS

Across 17,811 elective colorectal operations, rates for MIS(laparoscopic or robotic surgery) increased from 44.4% in 2011 to 70.4% in 2017(p<0.001). The proportion of colon operations (n=10,184) approached robotically increased from 1.7% to 12.2%, p<0.001 (42.9% to 55.1% laparoscopic; 55.4% to 32.7% open). The proportion of rectal operations (n=7,627) approached robotically increased from 3.4% to 32.6%, p<0.001 (40.8% to 43.9% laparoscopic, 55.8% to 23.5% open). These trends were similar at high-(100+cases/year) and low-volume hospitals and surgeons. By 2017, robotics had surpassed open surgery in frequency used for cancer (21.5% vs 19.9% of cases) and diverticulitis(22.0% vs 19.7% of cases).

DISCUSSION

At SCOAP hospitals, the majority of elective colorectal surgery is now performed minimally invasively. For colon operations, the rise in robotics parallels a rise in laparoscopy, while for rectal operations the rise in robotics has been more pronounced. These data suggest that robotics has filled a need in minimally-invasive colorectal surgery, especially in technically challenging situations like cancer, diverticulitis, and rectal surgery.

Abstract # 14

**Post-Discharge Heparin Prophylaxis Use and Risk of Venous Thromboembolism and Bleeding Following Bariatric Surgery: A Population-Based Study**

Fennern EB, Chen JY, Khandelwal S, Verdial FC, Cook TB, Wolff EM, Farjah F

University of Washington

Introduction: Venous thromboembolism (VTE) is a significant cause of post-discharge morbidity and mortality in bariatric surgery patients. Current practice patterns for post-discharge heparin prophylaxis are unknown. We hypothesized that a minority of patients receive this prophylaxis, which we further hypothesized to be associated with a lower risk of VTE and higher risk of bleeding.

Methods: We performed a retrospective cohort study (2007-2015) of adult patients who underwent laparoscopic sleeve gastrectomy or gastric bypass (open or laparoscopic) using the Truven Health MarketScan database. We determined the rate of prophylaxis from outpatient pharmacy claims, and post-discharge 90-day bleeding and VTE events from outpatient and inpatient claims.

Results: Our cohort included 43,493 patients (median age 45 years; 78% women; 77% laparoscopic gastric bypass, 17% laparoscopic sleeve gastrectomy, and 6% open gastric bypass), of whom 6% received post-discharge heparin prophylaxis. Overall, 224 patients (0.52%) experienced VTEs, and 806 patients (1.85%) experienced bleeding. The unadjusted VTE rate was not significantly different between patients who did and did not receive prophylaxis (0.39% versus 0.52%, respectively; p=0.347). The unadjusted bleeding rate was significantly higher for those with prophylaxis (2.74% versus 1.80%, p<0.001). Using propensity score regression analysis, the association between prophylaxis and VTEs remained non-significant (odds ratio [OR] 0.77, 95% confidence interval [CI] 0.41 to 1.46), and the association with bleeding remained significant (OR 1.47, 95% CI 1.14 to 1.88).

Discussion: In this population, bariatric surgery patients infrequently received post-discharge heparin prophylaxis. These patients do not appear to benefit from this prophylaxis and may experience harm.

Abstract # 15

**Proof of Concept: General Surgery Resident Teaching Assistant Position for Surgery Core Medical Students**

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Oregon Health and Science University

Introduction

At OHSU, medical students have reported mistreatment on their surgery-core rotation, but have not brought concerns forward in real-time. This phenomenon may stem from the misperception that students will face grade reprisal. Further, as the core has been truncated to a 4-week block, there is less time for teaching key non-technical such as palliative care/ethics (PCE).

Methods

General surgery residents were voluntarily asked to participate in a resident-led teaching assistant (TA) program, with oversight provided by the surgery-core director. TAs are assigned 3-5 students/rotation, with the minimum expectation a weekly email check-in with each student; any mistreatment concerns are immediately relayed to the core director. In collaboration with PCE surgical faculty, the TAs moderate a virtual PCE curriculum exploring consent, professionalism, decision-making, and wellness.

Results

The program started 10/2018 with 4 TAs. Average student engagement was 80% (67-100%). Preliminary qualitative analysis of students’ concerns revealed themes including: study optimization, student expectations, dealing with stressful situations, and professional development. Voluntary feedback (n=14/41) showed students found email communication helpful (71/100 on sliding scale), 100 % felt the program should continue. The PCE was implemented 2/2019.

Discussions

We have demonstrated feasibility of a resident TA program and virtual-PCE for the surgery-core rotation, with positive feedback from students. The program permits dual mentorship and professional development, both at the resident level and the medical student level. The program could easily be translated to other institutions.

Abstract # 16

**Endoscopic bipolar cricopharyngeal myotomy for Zenker’s diverticula: a single institution experience and technique**

Carlson E, Bayles S

Virginia Mason Medical Center

Purpose: To evaluate outcomes of endoscopic bipolar cricopharyngeal myotomy at our institution. There is increasing data on use of endoscopic CO2 laser for this purpose, but limited data on use of more commonly available bipolar energy in the literature.

Methods: A retrospective chart review was performed for patients undergoing procedures with CPT codes 43130, 43135, and 43180 between 2005 and 2018. Outcomes, symptoms, and complications as well as some operative markers were abstracted.

Results: 108 patients were identified in this cohort. 37 patients (34.3%) underwent endoscopic cricopharyngeal myotomy with bipolar cautery, all performed by a single provider. Mean follow up in this group is 22 months. Mean operative time was 10.9 minutes. There were no leaks or perforations in this group. 2 patients (5.4%) experienced recurrence of symptoms and required endoscopic revision crycopharyngeal myotomy. 4 patients (10.8%) had post-operative complications including readmission for fever from URI, a lower GI bleed on POD 1, persistent cough ultimately leading to a diagnosis of pulmonary metastases, and ongoing prolonged hospitalization in a complex inpatient. All patients reported improvement in their baseline symptoms.

Discussion: Endoscopic cricopharyngeal myotomy with bipolar cautery appears safe and effective with notably short operative times. Our technique will be presented. Additional data is being compiled to capture patients undergoing this procedure prior to 2015 when there was a change in CPT code. Additionally, comparison to open Zenker’s diverticulectomy will be presented.

Abstract # 17

**Timing of Therapeutic Tacrolimus Level Achievement and Incidence of Early Rejection Following Renal Transplantation: Single Center Results**

Marshall R, Brandenberger J, Cantafio A, Halldorson J, Bakthavatsalam R, Dick A, Rayhill S, Reyes J, Warner P, Perkins J

University of Washington; Virginia Mason Medical Center

Induction therapy followed by calcineurin inhibitor maintenance is the mainstay of post-transplant immunosuppression protocols. However, the optimal timing for maintenance therapy initiation is unclear. This study examines whether delayed achievement of therapeutic tacrolimus (FK) levels was associated with an increased risk of early acute rejection (EAR) episodes following renal transplantation.

This is a retrospective study of single-center results from 2004-2015. The primary outcome was EAR requiring treatment with or without pathologic confirmation within 120 days. Patients were grouped into tertiles based on achievement of therapeutic FK levels. Analyzed variables included demographics, occurrence of delayed graft function (DGF), number of human leukocyte antigen (HLA) mismatches, among others. Cox proportional hazards regression modeling was used.

This study included 1306 patients. Thirty-eight percent of patient achieved therapeutic FK levels within 7 days, 41% between 7-14 days, and 21% beyond 14 days. After multivariate analysis, HLA mismatch >= 5 (RR 1.42; p = 0.03) and DGF (RR 1.47; p = 0.05) were significantly associated with increased risk for EAR. The groups did not differ based on timing of first therapeutic FK level. Sub-group analysis was performed on recipients with post-transplant DGF (16%). Delay beyond 14 days was associated with lower incidence of EAR (RR 0.19; p=0.008).

In this cohort, delay to therapeutic FK levels was not associated with an increased risk of EAR. More caution should be given to early FK initiation in the setting of adequate induction and/or DGF. In patients with DGF, delay in maintenance therapy may be protective against EAR.

Abstract # 18

**Prolonged Partial Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) for Management of a Highly Lethal Aortic Injury Using a Novel pREBOA-Pro Catheter**

Behrens B, Smith S, Murphy J, McCully B, Goodman A, Dewey E, Underwood S, Rick E, Holcomb J, Schreiber M

Oregon Health & Science University

Resuscitative balloon occlusion of the aorta (REBOA) is an alternative to thoracotomy for control of non-compressible torso hemorrhage. However, supraphysiologic hemodynamics and downstream ischemia/reperfusion injury after balloon deflation make weaning from aortic occlusion difficult. Recent work with partial REBOA demonstrates that compared to complete occlusion, partial occlusion dampens proximal hypertension, decreases rebound hypotension, and decreases distal ischemia, however, no guidelines for partial REBOA exist. The goal of this study was to compare the novel pREBOA-Pro catheter to the current ER-REBOA catheter to establish and maintain a state of partial aortic occlusion after a highly lethal aortic injury. Swine were randomized to three groups: control, pREBOA-Pro, or ER-REBOA. Following a 4mm aortic injury and uncontrolled hemorrhage for 30 seconds, aortic occlusion balloons were inflated to full aortic occlusion for 10 minutes. At 10 minutes, partial occlusion was established with the target distal MAP of 40 mmHg with a pulsatile arterial waveform tracing. Once partial occlusion was reached, animals were monitored for 4 hours with every 30 minute data recordings and hourly labs. At 4 hours, the animals were euthanized, blood loss and urine output were recorded, and tissue samples collected. There were no significant differences in physiologic parameters, labs, distal MAP, or survival between groups. The number of adjustments to maintain partial REBOA was significantly lower in the pREBOA-Pro group compared to the ER-REBOA group (3 vs 10, p 0.01). This suggests that the dual balloon system utilized by the pREBOA-Pro catheter produces a more controlled state of distal aortic flow.

Abstract # 19

**Expansion of an Existing ECMO Program for E-CPR**

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Harborview Medical Center

Introduction:

Veno-arterial extra-corporeal membrane oxygenation (VA-ECMO) has been described as a therapy for refractory cardiac arrest (E-CPR), cardiogenic shock, PE, and hypothermia. We present a unique E-CPR program developed on a Trauma / Critical Care surgeon model.

Methods:

Harborview Medical Center first began its respiratory therapist and registered nurse managed ECMO program in 2016. We have expanded this to include resuscitative VA-ECMO. This program was unique as HMC does not have perfusion or cardiac surgery departments. Key changes to the original program included a dedicated ECMO paging system, where a qualified surgeon and support team were immediately deployable to the cardiac catheterization lab for VA cannulation, and protocol for activating UWMC mechanical circulatory support team for transfer of patients who could not be revascularized. We retrospectively reviewed the documented indications for VA-ECMO initiation, along with the survival to hospital discharge and neurological recovery.

Results:

From 2016 to 2018, we placed a total of 25 patients on VA-ECMO, with an overall survival of 48%. Survival was 100% in PE, 75% in hypothermia, 25% in ECPR, 0% in cardiogenic shock following ROSC, 100% in acute cardiogenic shock (no CPR), and 50% in toxic ingestion. Of those that survived to discharge, 100% had full neurological recovery.

Discussion:

At our institution, VA-ECMO is a treatment modality that may improve overall survival and offer the possibility of full neurological recovery in patients presenting with refractory cardiac arrest and/or cardiogenic shock in need of temporary mechanical cardiac support, as well as PE, hypothermia, and toxic ingestion.

Abstract # 20

**Rotational Thromboelastometry (ROTEM) Predicts Mortality And Disability In Pediatric Trauma**

Cunningham AJ, Condron M, Schreiber MA, Azarow K, Hamilton NA, Long WB, Maxwell BG, Jafri MA

Oregon Health & Science University

INTRODUCTION: Traumatic coagulopathy seen on rotational thromboelastometry (ROTEM) is associated with poor outcomes in adults, however this relationship is poorly understood in the pediatric population. We sought to evaluate the prognostic efficacy of ROTEM in injured children.

METHODS: Demographic and clinical outcomes data from severely injured children (age < 18 years) admitted to a level 1 trauma center, with a ROTEM, between 2014 and 2018, were retrospectively analyzed. Conventional coagulation parameters were compared with ROTEM. Wilcoxon Rank-Sum, Fisher’s Exact test, Pearson’s correlation and Youden’s statistic were used to evaluate the results.

RESULTS: Ninety-eight subjects were reviewed. Increased EXTEM (tissue factor-triggered extrinsic pathway) and INTEM (ellagic acid activated intrinsic pathway) clotting time (CT) and decreased EXTEM/INTEM maximal clot firmness (MCF) were associated with mortality (Table 1). EXTEM CT of 73.5 seconds or greater was predictive of mortality by Youden’s analysis. Prolonged EXTEM/INTEM CT (73/171 vs. 64/140 sec, p ≤ 0.002) were associated with disability (n= 32). In turn, EXTEM CT demonstrated strong correlation with international normalized ratio (INR) (r = 0.625, p < 0.001). Traumatic brain injury (TBI, n = 58) was associated with increased EXTEM/INTEM CT (69/155 vs. 64/140 sec, p < 0.02) in the presence of normal INR between groups (1.2 vs. 1.1, p = 0.09).

CONCLUSION: Relative hypocoagulability on thromboelastometry correlates with conventional coagulation parameters and is associated with disability and mortality in children. Use of thromboelastometry can provide guidance for hemostatic resuscitation in pediatric trauma and may be more reliable in patients with TBI.

Abstract # 21

**Perioperative neutropenia does not increase infectious complications of central venous line placement in children**

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BACKGROUND: The infectious risk of central venous line (CVL) placement in neutropenic (absolute neutrophil count [ANC] 30 days) infectious complications of tunneled CVLs placed in neutropenic and non-neutropenic patients.

METHODS: A retrospective review was conducted of all CVLs placed by 15 pediatric surgeons at two institutions from 2010-2016. Demographic, operative, and outcome data were collected. Infectious complication was defined as bacteremia or surgical site infection. Propensity score-matching was used to identify non-neutropenic patients in a 1:1 ratio with those who were neutropenic at the time of CVL placement based on preoperative factors. Wilcoxon rank-sum, chi-square, and log-rank tests were performed.

RESULTS: Review identified 1,102 CVLs placed in 937 patients. Fifty-four patients were neutropenic at the time of placement. The propensity score-matched cohort included 96 patients, 48 from each neutropenic group; 6 neutropenic patients were propensity score outliers and excluded from analysis. Demographic, operative and preoperative clinical data were similar between the groups (p>0.05). Neutropenic patients were no more likely to develop early (4.2% vs. 2.1%, p=0.557) or late (22.9% vs. 14.6%, p=0.296) infectious complications than non-neutropenic patients in our cohort, with similar median time to infection (141 vs. 106 days, p=0.664).

CONCLUSION: A policy of selective CVL placement in neutropenic patients with standardized postoperative line maintenance is safe. Future directions include defining criteria by which neutropenic patients could be prospectively selected for safe line placement.

Abstract # 22

**Aggressive treatment of acute kidney injury and hyperkalemia improves survival in a combat relevant trauma model in swine**

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INTRODUCTION: Our swine model of pulmonary contusion (PC) and hemorrhagic shock (HS) was initially complicated by hyperkalemia and premature death. To study the effects of novel therapies on organ failure, improved survival was necessary.

OBJECTIVE: To design an early and aggressive treatment regimen for acute kidney injury and hyperkalemia to improve survival in a combat relevant injury model in swine.

DESIGN/METHODS: Anesthetized swine sustained either PC or PC with liver injury to induce HS (PC+HS). For 48 hours post-injury, animals received 1) standard care (SC) with resuscitation followed by maintenance intravenous fluids (IVF) (n=7; 3 PC, 4 PC+HS) or 2) aggressive care (AC) with increased initial IVF (7.5 ml/kg/hr), early potassium monitoring, and hyperkalemia treatment with insulin, glucose, and calcium (n=15, 8 PC, 7 PC+HS).

RESULTS: Survival to 48 hours was achieved in 13/15 (87%) in the AC group and 2/7 (29%) in the SC group (p=0.014). Compared to SC, AC improved median survival (48 vs. 18 hours, p=0.008) and lowered potassium (5.0 vs. 7.5 mmol/L), creatinine (2.4 vs. 4.0 mg/dL), BUN (27.5 vs. 39.0 mg/dL), and lactate (0.97 vs. 3.57 mmol/L) at the last observed time-point prior to death. For PC+HS animals, survival to 48 hours was achieved in 6/7 in the AC group and 0/4 in the SC group with an improved median survival in the AC group (48 vs. 18 hours, p=0.011)

CONCLUSIONS: Aggressive fluid resuscitation and early hyperkalemia management prolongs survival and reduces kidney injury and potassium levels in a combat relevant injury model in swine.

Abstract # 23

**Oncoplastic Breast Conserving Surgery (OBCS): Can we reduce rates of mastectomy and chemotherapy use in patients who traditionally require mastectomy?**

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Virginia Mason Medical Center

INTRODUCTION: Traditional indications for mastectomy include multiple lesions and/or disease span ≥5cm. Neoadjuvant chemotherapy increases breast conservation in this setting but does not improve survival. OBCS may allow for breast conservation in addition to providing full staging and profiling information to guide systemic therapy. We hypothesize that OBCS in these patients will reduce the use of mastectomy and chemotherapy.

METHODS: This is an observational cohort of patients with invasive breast cancer with multiple lesions and/or disease span ≥5cm who underwent OBCS from 2012-2017. Clinicopathologic features, mastectomy rate, chemotherapy use, and recurrence were evaluated.

RESULTS: One hundred patients were identified (mean age 58.0±12.2 years). Average disease span was 62.8±20.1mm with an average of 2.9 lesions (range 1-8). “No ink on tumor” was achieved at the index operation in 79 patients; 13/21 patients underwent completion mastectomy to achieve adequate margins. Eighty-one patients completed adjuvant radiation therapy.

Breast conservation was possible in 50/58 patients who did not receive chemotherapy. Forty-two patients received chemotherapy (8 neoadjuvant, 34 adjuvant); of these, 37 achieved breast conservation. Twenty-six patients with high-risk features were offered adjuvant chemotherapy. Oncotype DX testing in 35 ER+, Her2- patients demonstrated the need for adjuvant chemotherapy in an additional 8 patients. After a median follow-up of 36 months, 3 patients recurred locally, including 2 who declined radiation therapy.

CONCLUSION: OBCS can provide breast conservation in patients typically offered mastectomy. Additionally, OBCS may reduce unnecessary chemotherapy, especially in ER+, Her2- patients. Further study is warranted to determine the long-term oncologic impact of OBCS.

Abstract # 24

**Pediatric Trauma Venous Thromboemoblism Prediction Algorithm Outperforms Current Anticoagulation Prophylaxis Guidelines: A Multicenter Pilot Study**

Cunningham A, Hamilton N, Krishnaswami S, Schreiber M, Jafri M

Oregon Health & Science University

INTRODUCTION: Venous thromboembolism (VTE) in injured children is rare, and the variability of its incidence across age and injury severity make prophylactic anticoagulation decisions challenging. Recent guidelines from the Pediatric Trauma Society and the Eastern Association for the Surgery of Trauma (PTS/EAST) suggest that all children over the age of 15 years should receive thromboprophylaxis. These guidelines may over-treat children who are high-risk for bleeding. We sought to validate our previously published VTE prediction algorithm (derived from the National Trauma Data Bank) and compare it to current recommendations.

METHODS: Local trauma registries at two institutions were queried for all pediatric (age5% risk) and 8004 (97%) as low-risk (<1% risk). AUROC was 0.917 (0.867-0.966, 95%CI). In our population, prophylaxis of the ‘moderate-‘ and ‘high-risk’ cohorts would out perform the sensitivity (58% vs. 55%) and specificity (97% vs. 73%) of current guidelines while anticoagulating substantially less patients (267 vs. 2267, p<0.001).

CONCLUSION: A VTE prediction algorithm using limited, easily collected, clinical variables can identify injured children at risk for VTE with more discrimination than current society guidelines. Prospective studies should investigate the validity of this model.

Abstract # 25

**Are Children at Increased Risk of Periorbital Injury Compared to Adults from Dog Bites to the Head, Neck, and Face?**

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University of Washington

Dog bites to the head, neck, and face (HNF) disproportionately affect children. It is unclear if targeting of the eyes or the “central target area” (CTA; nose, lips, cheeks) drives higher rates of HNF injury in children. Research question: Among individuals sustaining a dog bite injury to the HNF, are children, when compared to adults, at greater risk of injury to the periorbital region and CTA?

In a retrospective cohort study, Harborview Medical Center trauma registry was reviewed for patients presenting with HNF dog bite injury between 2000-2015. Primary predictor variable was age category, pediatric/adult. Primary outcome variables were injury to periorbital region and/or CTA.

The pediatric group had greater frequency of periorbital injury, relative risk (RR) 2.1(1.5-3.0[p < 0.0001]), as well as eyelid, canthal, and canalicular injury. The CTA was the most frequently injured HNF region in both children and adults, but no difference between the groups was observed, RR 0.9(0.8-1.1[p = 0.300]). Rates of injury to zygomatic and buccal regions were higher in children. Lip injury was higher in adults. No difference was noted for nasal injury.

Children are 2x more likely to incur a periorbital dog bite, independent of their risk of HNF injury. This may reflect instinctual targeting of children’s eyes contributing to this population’s higher rate of HNF injury. Public health measures should recommend against children being at eye level with dogs, even if familiar or under adult supervision. Educational opportunities include campaigns such as ‘National Facial Protection Month’ and ‘National Dog Bite Prevention Week’.

**SUNDAY, JUNE 16, 2019**

Abstract # 26

**Dumping Symptoms and Health-Related Quality Of Life in Long Term, Disease Free Survivors Following Esophagectomy**

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Introduction

High quality documentation of gastrointestinal symptoms and health-related quality of life (HRQOL) in follow-up after esophagectomy is limited. The aim of the study was to describe the incidence of symptoms associated with dumping syndrome and their relationship with HRQOL after esophagectomy.

Methods

The study cohort was identified from prospective, IRB approved esophagectomy databases from two high volume esophagectomy centers, patients answered the Dumping Symptom Rating Scale, which assesses the severity and frequency of nine symptoms occurring 10-30 minutes after eating, and the HRQOL questionnaires SF36, and EORTC QLQ-C30.

Results

In total 158 patients who underwent esophagectomy between 1995-2017, responded to the questionnaires, corresponding to a response rate of 75.2%. Median age was 66 years, and median time from operation to survey was 5.5 years (range 0.3-23.1). Intraoperative pyloroplasty or pyloromyotomy was performed in 4 (2.5%) patients.

Absent or mild problems, in all nine dumping symptoms, was reported by 94 (59.5%) patients. In total 19 (12.0%) patients reported moderate or severe problems in at least 3 symptoms, the most common severe problems were: “a need to lie down”, “diarrhea”, and “stomach cramps” in 7.6%, 5.7%, and 5.1% of patients respectively. Increased compound dumping symptom score was associated with significantly decreased function scores in all aspects of HRQOL except physical functioning (P<0.005).

Discussion

The majority of patients do not have severe postoperative dumping symptoms after esophagectomy. On the other hand moderate to severe dumping symptoms, which were reported by 12% of patients in this study, is strongly associated with decreased HRQOL.

Abstract # 27

**Helmets Decrease Risk, but not severity, for Bicyclist-related Maxillofacial Injuries**

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Objective: Given increasing bicycle use for transportation, the purpose of this study is to measure the association of wearing helmets on frequency and severity of maxillofacial injuries. The specific aims were to measure and compare the frequencies and severity of maxillofacial injuries between injured bicyclists who did or did not wear helmets.

Methods: We implemented a retrospective cohort study to enroll bicyclists injured between January 4, 2012 and March 31, 2018 who presented to Harborview Medical Center. The primary predictor variable was helmet use (yes/no). The primary outcome variables were 1) presence of a maxillofacial injury (yes/no) and 2) injury severity measured using the Face Abbreviated Injury Scale (FAIS), an anatomic element of the Injury Severity Score (ISS). We computed uni-, bi-, and multiple logistic regressions statistics with statistical significance set at p<0.05.

Results: Our sample included 1379 subjects with a mean age of 39.6±18.9 (1-91) years and 78.4% males. Falls were the most common cause of accidents (60.1%). The frequencies of facial injuries between helmeted and non-helmeted bicyclists were 17.3% and 30.6%, respectively (p<0.0001). The adjusted odds ratio was 0.451 (p=0.002). The FAIS between helmeted and non-helmeted riders was 1.8±0.5 and 1.9±0.6, respectively, (p=0.8).

Discussion: Injured bicyclists wearing helmets were less likely to have maxillofacial injuries. For cyclists with facial injuries, however, injury severity was not different between helmeted and non-helmeted riders. Failure of helmets to protect the face may be due to helmet design, i.e. standard bicycle helmets do not include a mask to protect the maxillofacial region.

Abstract # 28

**The Case for Open Esophagectomy with ERAS Pathway**

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Northwest Surgical Specialists

OBJECTIVE: As trends toward Minimally Invasive Esophagectomy (MIE) increase, our data argues in favor of Open Esophagectomy when implemented with an Enhanced Recovery after Surgery (ERAS) pathway.

BACKGROUND: The ERAS pathway includes, amongst other elements, comprehensive patient education, pre-op carbohydrate loading, epidural catheter, post-op-day-one swallow study and nasogastric tube removal, and resuming liquids on post-op-day-two. We use this pathway as the standard of care for all patients undergoing Transhiatal Esophagectomy.

METHODS: A retrospective review was performed, including 29 Esophagectomy cases after implementation of ERAS from 2016 to present and compared these outcomes to the prior 59 esophagectomy patients.

RESULTS: There were zero anastomotic leaks, no deaths at thirty days and only one unanticipated return to the OR after ERAS implementation. There was also a significant length of stay reduction from a median of eight days to six. Oncologic outcomes remained stable. In the post-ERAS period, 10% fewer patients reported dysphagia. When compared to published MIE case results, the 88 patients examined (2006-present) displayed lower average operative time and post-op mortality rates, while estimated blood loss was equivalent.

CONCLUSIONS: The ERAS pathway has resulted in significant improvements in surgical outcome and recovery time at our institution. As medicine moves toward favoring laparoscopic and robotic methods, it is worth considering all available surgical techniques and the benefits each may impart. Our experience shows that Transhiatal Esophagectomy performed through a limited open-upper-midline incision and a left-neck incision, when managed on a well implemented pathway, yields consistent, excellent outcomes.

Abstract # 29

**Is Open Left Thoraco-Abdominal Esophagectomy a Viable Option in the Era of Minimally Invasive Esophagectomy?**

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Introduction

Left thoracoabdominal esophagectomy (LTE) facilitates complete resection of esophageal cancer particularly for bulky tumors, but there are concerns that this approach is associated with significant morbidity.

Methods

Prospectively entered esophagectomy databases from two high volume North American centers were reviewed for patients undergoing LTE or MIE in the 2012-2018. Patient demographics, tumour characteristics, operative outcomes, postoperative outcomes, and pathologic surrogates of oncologic efficacy (R0 resection rate, and number of resected lymph nodes) were compared.

Results

In total 247 patients were included in the study, LTE was applied in 170 (68.8%) patients, and MIE in 77 (31.2%) patients. LTE patients had more neoadjuvant treatment (LTE=78.2%, MIE=34.2%, P2 - LTE=26.1%, MIE17.0%, P=0.184), pulmonary complications (LTE=31.9%, MIE=20.0%, P=0.085), pneumonia (LTE=15.2%, MIE=13.6%, P=0.768), anastomotic leak (LTE=7%, MIE=10%, P=0.396), or postoperative mortality (LTE=0%, MIE=1.3%, P=0.140). Median length of stay was 7 days in both groups. R0 resection rate was 93.8% and 95.5% respectively (P=0.631). Median number of resected lymph nodes was 24 for LTE and 22 for MIE (P=0.226). LTE had more stage II-IV tumors (LTE=67.8%, MIE=40.7%, P<0.001), and more node positive resections (LTE=52.5%, MIE=31.4%, P=0.003).

Discussion

LTE was used for larger tumors with greater lymph node burden in patients that were more likely to have received neoadjuvant treatment compared to MIE. Despite this the postoperative morbidity was equal to that of MIE, with no difference in short-term or oncological results in this cohort.

Abstract # 30

**Standardized Perioperative Clinical Care Improves Patient Outcomes and Reduces Cost in Below-Knee Amputation**

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University of Washington

Introduction: Standardizing perioperative care using clinical pathways has consistently been shown to improve patient outcomes and reduce costs. Despite their value, there are no published evaluations of clinical pathways for below-knee amputation (BKA). The incidence of lower extremity amputations is increasing and BKAs account for 73% of major lower extremity amputations performed in the United States. It is therefore vital to improve perioperative care to enhance patient outcomes and reduce healthcare costs.

Methods: An evidence-based clinical pathway including guidelines for surgical technique, multi-modal pain control, and early physical therapy intervention was implemented by all surgeons performing BKAs at a level 1 trauma center beginning November 2017. Patient outcomes for a 12-month study period were compared to the 12 months preceding implementation. The primary outcome was length of stay (LOS); secondary outcomes included mortality, cost, and opiate use. Cox proportional-hazards regression was used to compare LOS between study arms while controlling for differences between the pre- and post-pathway patient population.

Results: Controlling for confounders, pathway recipients had a median LOS 1.88 days shorter than non-pathway patients (12.06 vs 13.94, p=0.04). Pathway care was also associated with 31.84% decreased inpatient opiate use by morphine equivalent dosage. No significant difference in mortality was noted. Pathway care for non-urgent BKA patients resulted in a cost savings of 31.6% compared to non-recipients ($19,339 vs $33,204, p=0.03).

Discussion: Despite the diverse nature of causes of amputation, standardized perioperative care for BKA improves patient outcomes through reduced LOS and opiate use, and lowers cost in non-urgent BKA.

Abstract # 31

**Bikeshare Use May Decrease Risk for Maxillofacial Injuries**

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Objective: Implementing bikeshare programs raised concerns for cyclist safety due to low rates of helmet use by users. This study’s purpose was to examine whether implementation of bikeshare programs affected the frequency and severity of maxillofacial injury among cyclists.

Methods: A retrospective cohort study was conducted on patients who presented to Harborview Medical Center for the evaluation and management of bicycle-related injuries between 2012 and 2018. The primary predictor variable was when injury occurred relative to bikeshare implementation and was coded as before or after. The primary outcome variables were the facial injury status (present or absent) and injury severity coded using the Face Abbreviated Injury Scale (FAIS). P-value < 0.05 was considered to be statistically significant.

Results: The sample included 1346 subjects with a mean age of 39.6 ± 18.98 years, and 37.7% were injured after bikeshare implementation. Facial injuries were less common in those injured after bikeshare, 18.1% versus 25.4% (relative risk = 0.7; p = 0.002); adjusted odds ratio was 0.7 (p = 0.04). Subjects injured after bikeshare had lower FAIS than those injured before, 1.8 ± 0.5 and 1.9 ± 0.5, respectively (p = 0.003).

Discussion: Cyclists injured after the implementation of bikeshare were 30% less likely to have a facial injury and had a lower facial injury severity score. This may relate to a modification of cyclist behavior secondary to the presence of bikeshare programs and the current development of improving road infrastructure and bike lanes which are safer for bicyclists.