Scientific Paper Abstracts
1. POSTOPERATIVE ANTIBIOTICS ARE NOT ASSOCIATED WITH DECREASED WOUND COMPLICATIONS AMONG PATIENTS UNDERGOING APPENDECTOMY FOR COMPLICATED APPENDICITIS

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BACKGROUND: Although postoperative antibiotics are commonly administered for complicated appendicitis, there are limited data regarding their efficacy for preventing complications. The objective of this study was to determine the role of postoperative antibiotics in reducing wound complications in patients undergoing appendectomy for complicated appendicitis.

METHODS: This is a 5-year retrospective cohort study performed at two academic, university-affiliated County hospitals. The study included a consecutive sample of adult patients who underwent appendectomy for acute appendicitis. All patients with complicated appendicitis (perforated or gangrenous) as determined by operative reports were categorized into two groups: those who received postoperative antibiotics and those who did not. The main outcome measures included postoperative wound complications [superficial and deep surgical site infections (sSSI and dSSI)], length of stay (LOS), and re-admission to hospital. Multivariate and linear regression analyses were performed to identify predictors of complications and LOS.

RESULTS: Of 1,479 patients, 410 patients (27.7%) were diagnosed with complicated appendicitis. Postoperative antibiotics were administered to 67% of patients (n=274). Bivariate analysis revealed no difference in the incidence of wound complications among patients who did or did not receive antibiotics postoperatively (13.1 vs. 9.6%, p=0.3). Overall length of stay was increased by 24 hours for the group who received antibiotics (p=0.016), whereas readmission rates were similar between groups (12 vs. 8.1%, p=0.23). On multivariate regression analysis, after controlling for patient demographics, comorbidities, and surgical approach (open versus laparoscopic), postoperative antibiotic use was not associated with a decrease in sSSI, dSSI, or readmission. Linear regression analysis identified postoperative antibiotics (p=0.01) and coronary artery disease (p=0.04) as independent predictors of increased LOS.

CONCLUSION: In this multicenter study, postoperative antibiotic administration in the setting of acute complicated appendicitis was not associated with a decrease in wound complications but did result in an increased hospital LOS. Further studies are required to determine the risk-to-benefit ratio of postoperative antibiotics in patients with acute complicated appendicitis.
BACKGROUND: Perioperative blood transfusion (BT) in patients with colorectal cancer has been associated with increased cost, morbidity, mortality and decreased survival. Five years ago, in 2009, our surgical department instituted a 3-part transfusion reduction initiative (TRI) program that significantly decreased perioperative transfusions in colorectal surgery. We now focus on the 5-year effectiveness of this program and patient outcome differences in the era before TRI vs. after TRI when blood was transfused significantly less frequently.

METHODS: After IRB approval, the medical records of patients who underwent operation for adenocarcinomas before TRI (1/2006 – 10/2009) and after TRI (11/2009-12/2013) were reviewed. Standard demographics, transfusion rates, ASA, age, morbidity, mortality, cancer recurrence, and survival were studied. P<0.05 was considered significant.

RESULTS: A total of 484 cancer patients were included for study, 267 in the Pre-TRI and 217 in the Post-TRI groups. A decrease in overall BT rates was sustained throughout the entire Post-TRI era (17% vs. 28%, P=0.006). Patients who received a transfusion experienced higher 30 day rates of mortality (9% vs. 0.8%, P<0.001), abscess (9% vs. 2%, P=0.001), pneumonia (5% vs. 0.3%, P<0.001), and UTI (7% vs. 3%, P=0.041). Three-year colorectal cancer recurrence rates were similar in the Pre and Post-TRI eras when stratified by stage 1-4 individually and when stage 1-4 was pooled at 88.1% and 85.6% (P=0.267). Five-year survival differences were significant in those getting BT vs. those without BT (39.5% vs. 69.6%, P<0.0001). Patients with low hemoglobin <10 who got BT vs. no BT experienced 5-yr overall survival at 37.8% vs. 59.9% and those with hemoglobin >10 who didn’t get a BT had 5-yr survival of 76.0% (P=0.0001).

CONCLUSION: Perioperative transfusion rates in colorectal cancer surgery significantly decreased after the implementation of a TRI and have remained low over a 5-year study period. Regardless of era, perioperative BTs were associated with increased 30-day mortality, abscess formation, UTI, other complications, and decreased 5-year overall survival. Transfusion Reduction Initiative remains a straightforward, safe, and effective way to reduce blood utilization in colorectal surgery.
**BACKGROUND:** National Comprehensive Cancer Network (NCCN) guidelines (2015) for rectal adenocarcinoma give consideration to routine surveillance with proctoscopy every 6 months for 3 to 5 years for local recurrence at the anastomosis following low anterior resection (LAR). There are no current studies to support this practice, which is based on the high local recurrence rate seen prior to total mesorectal excision (TME) and neoadjuvant therapy. The purpose of this study was to examine the use of rectal surveillance for evaluation of local recurrence in the current treatment paradigm.

**METHODS:** This is a single-center, retrospective review of patients who underwent TME (2004-2011) for rectal cancer (stage I-III). Demographics and follow-up time were collected. The primary endpoint was cancer recurrence. For each recurrence, the detection method(s) were noted: symptoms, physical exam, CEA, CT/PET, or endoscopic examination. The number of procedures was collected: anoscopy, proctoscopy, or flexible sigmoidoscopy.

**RESULTS:** The study included 112 patients who underwent TME with ≥ 1 year of follow-up by a surgeon, oncologist, or gastroenterologist. Of these, 54 (48%) had stage III, 41 (37%) stage II, and 17 (15%) stage I disease. The mean age was 57.7±12, with 67% male. The median follow-up time was 3.9 years (1 – 10). Neoadjuvant therapy was given to 77% of patients. There were no local recurrences identified by rectal surveillance. There were 18 recurrences (16%), 1 local, 17 distant, with the majority found in stage III patients (78%), with the median time of 1.6 years (0.7-5.5). The single local recurrence (stage III) occurred at 1.3 years and was identified by elevated CEA and minor rectal bleeding with a confirmatory biopsy of the mass. During the study period, a total of 20 anoscopies ($78-$157), 44 proctoscopies ($389-$563), and 495 flexible sigmoidoscopies ($442-$546) were done for surveillance (11 procedures for stricture or dilation excluded). There were 14 patients (12.5%) that had no surveillance procedures performed, 11 were stage II or III. In the 98 patients who underwent routine surveillance, a median of 5 procedures were completed during the follow-up period. The total charges for these procedures (based on yearly average charges) were estimated to be $266,000.

**CONCLUSION:** Routine local rectal surveillance at this single center appears to have not been beneficial. There were no local recurrences detected using this method of surveillance in 112 patients after TME. With the current low rate of local recurrence for rectal cancer, we challenge the NCCN guideline that gives consideration to the use of invasive, expensive, and uncomfortable routine surveillance procedures. Those patients considered to be at high risk for local recurrence, i.e. those not undergoing a TME or those in whom chemoradiation therapy is indicated but not given, may warrant local surveillance; however, this decision should be made on an individualized basis.
4. OUTCOMES OF CHRONIC STEROID USE IN COLORECTAL SURGERY
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BACKGROUND: Chronic steroid use has been introduced as a factor which has effects on multiple organs. We aim to investigate associations between chronic steroid use and postoperative complications following colorectal surgery.

METHODS: The American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) database was used to examine the clinical data of patients undergoing colorectal resection during 2005-2012. Chronic steroid use was defined as administration of oral or parenteral corticosteroid medications in the 30 days prior to surgery for a duration of more than 10 days. Multivariate regression analysis was performed to investigate outcomes of patients with and without chronic steroid use following colorectal surgery.

RESULTS: We sampled a total of 161,499 patients who underwent colorectal resection. Of these, 12290 (7.6%) had history of chronic steroid use. Patients who had history of chronic steroid use had higher rate of emergent/urgent operations (26.2% vs. 15.9%, AOR: 1.22, P<0.01) as well as higher risk of preoperative sepsis (AOR: 1.12, P<0.01), hypoalbuminemia (AOR: 1.77, P<0.01), bleeding disorders (AOR: 1.41, P<0.01), and diabetes (AOR: 1.15, P<0.01). Patients who had history of chronic steroid use had higher mortality risk for emergent (AOR: 1.30, P<0.01), urgent (AOR: 1.55, P<0.01), and elective colorectal operations (AOR: 1.41, P<0.01). Postoperative complications of wound disruption (AOR: 1.74, P<0.01), organ space surgical site infection (SSI) (AOR: 1.25, P<0.01), sepsis (AOR: 1.36, P<0.01), and pneumonia (AOR: 1.21, P<0.01) were higher in patients with chronic steroid use. Laparoscopic surgery had association with significant decrease in mortality (AOR: 0.59, P<0.01) and overall morbidity (AOR: 0.61, P<0.01) for patients with chronic steroid use.

CONCLUSION: Patients with history of chronic steroid use have high risk of preoperative malnutrition, diabetes, bleeding disorders, and sepsis. Also, they have a higher risk for emergent/urgent surgery. Patients with history of chronic steroid use have higher risk of mortality and morbidity especially infectious complications in colorectal surgery. Laparoscopic approach can significantly decrease risk of morbidity and mortality of such patients.
BACKGROUND: Biliary disease is common in morbidly obese patients and its incidence rises following bariatric surgery. No consensus exists on the management of the gallbladder at the time of bariatric surgery.

METHODS: A retrospective review of our institution's prospective bariatric surgery registry was completed to identify patients who underwent laparoscopic Roux-en-Y gastric bypass (LRYGB) or laparoscopic sleeve gastrectomy (LSG) from September 2001 through September 2014. All patients were included, even with previous history of cholecystectomy. Our protocol is to only perform concomitant cholecystectomy at the time of bariatric surgery if the patient has imaging and symptoms consistent with biliary disease.

RESULTS: Overall, 1527 patients underwent either LRYGB (n=1366) or LSG (n=161) during the study period. There were 415 (30%) patients with a previous history of cholecystectomy prior to bariatric surgery. Ninety-one patients (8%) of the 1112 without prior cholecystectomy had biliary symptoms requiring intervention: two patients following LSG and 89 patients following LRYGB. Ninety patients underwent cholecystectomy with 86 successfully completed laparoscopically. One patient had a percutaneous cholecystectomy tube placed due to existing co-morbidities several years after bariatric surgery. Of the 90 cholecystectomies, six patients required laparoscopic-assisted percutaneous transgastric endoscopic retrograde cholangiopancreatography (ERCP) to clear gallstones from the common bile duct, with a 100% success rate of clearing the common bile duct. Four of these were done concomitantly with cholecystectomy. Three patients who had undergone cholecystectomy prior to bariatric surgery developed primary common bile duct stones. Two of these patients underwent successful laparoscopic-assisted transgastric ERCP and one patient required percutaneous transhepatic laser-assisted stone fragmentation and extraction. Interventions occurred between 36 days and 11.6 years from bariatric surgery (median 1.7 years). Postoperative complications included superficial surgical site infections (n=2), organ space surgical site infection (n=1), bile leak (n=2), urinary tract infection (n=2), postoperative pneumonia (n=1), and pancreatitis (n=3). There were no mortalities and no common bile duct injuries associated with biliary procedures.

CONCLUSION: Biliary disease in our bariatric surgery population occurred at a rate similar to the general population. Surgery for biliary disease following bariatric surgery can be completed successfully with minimal complications, making concomitant cholecystectomy with bariatric surgery unnecessary in most patients. The use of percutaneous transgastric ERCP has a high success rate of access to and clearance of the biliary tree.
6. A COMPARISON OF THE ENDOSCOPIC AND LAPAROSCOPIC VIEW OF THE GASTROESOPHAGEAL JUNCTION IN THE USE OF TRANSORAL FUNDOPLICATION
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BACKGROUND: Reliable application of transoral fundoplication requires accurate evaluation of the gastroesophageal junction, including hiatal hernia assessment, to determine if hiatal hernia repair is necessary prior to fundoplication. We have noted that failing to address a significant hiatal hernia can lead to early return of reflux symptoms after transoral fundoplication. We studied the comparison of both the endoscopic evaluation and laparoscopic evaluations of the gastroesophageal junction and hiatal defect.

METHODS: As part of a prospective study, 53 patients with a diagnosis of gastroesophageal disease who underwent a laparoscopic repair of hiatal defect prior to transoral fundoplication, were studied to compare video recordings of their endoscopic evaluation (n=53) of the gastroesophageal junction to the video recording of their laparoscopic view (n=45) of the gastroesophageal junction. Eight general surgeons experienced in endoscopy and reflux surgery performed blinded evaluation of the videos. We compared their evaluation of each patient in an endoscopic view versus a laparoscopic view. Unpaired and paired t-test were used to determine if there is a significant difference between means of hiatal hernia defect as assessed endoscopically and laparoscopically.

RESULTS: Considering all cases, mean greatest transverse dimension of the hiatal defect was significantly lower in the endoscopic view (3.23 ± 1.01). P=0.002 (unpaired t-test). Similarly, comparing matched pairs only, (n=44), mean greatest transverse dimension of the hiatal defect assessed endoscopically was 3.30 ± 1.00 versus 3.88 ± 1.03 assessed laparoscopically, P < 0.001 (paired t-test). In 4 of 8 (50%) evaluators, average greatest transverse dimension of hiatal defect was found to be significantly lower when assessed endoscopically. On average the endoscopic Hill grade was lower than the estimation of Hill grade when viewed laparoscopically in 22.8% of the evaluations. In 11.1% (range 6 to 15%) of the cases, the endoscopic view indicated a hiatal hernia repair was unnecessary when the matching laparoscopic view indicated hiatal repair would be needed.

CONCLUSION: In this study the endoscopic evaluation of the gastroesophageal junction failed to indicate the need for a hiatal hernia repair in 11.1% of patients undergoing transoral fundoplication when evaluated by eight general surgeons. Up to 22.8% of the endoscopic evaluations underestimated the size of the hiatal defect. It appears that the greatest transverse dimension of a hiatal defect is underestimated if evaluated endoscopically. Further studies are needed to determine if endoscopic evaluation alone is adequate to predict the need for hiatal hernia repair prior to fundoplication.
BACKGROUND: Currently a third of the US population is obese with projections to exceed 40% by 2030—approximately 140 million. Obesity’s influence on post-operative (post-op) complications in elective ventral hernia repairs (VHR) with respect to surgical approach, laparoscopic (LVHR) versus open (OVHR) has yet to be defined. While 30 day postoperative complications in both LVHR and OVHR are more frequent as body mass index (BMI) increases, we propose the laparoscopic approach minimizes infectious complications for given BMI categories.

METHODS: Retrospective review of the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database (2009-2012) for all patients (pts) age ≥18 undergoing elective repair of reducible ventral hernia. Exclusion criteria included immunosuppression, disseminated malignancy, advanced liver disease, or pregnancy. Pts were stratified by World Health Organization (WHO) BMI categories of normal weight (NLWT), overweight, and obesity classes I, II, and III, (BMI 20-25, 25-30, 30-35, 35-40, and ≥40 respectively). 30 day postoperative complications were evaluated across BMI groups for LVHR versus OVHR using chi-squared test. Linear regression adjusted for diabetes, smoking, gender and age.

RESULTS: 75,168 patients met inclusion criteria, with nearly 55% of patients obese. Rate of LVHR increased with BMI (NLWT 17.8%, ≥40 28.3%). Superficial and deep SSIs increased with increasing BMI for both techniques. However, LVHR minimizes superficial and deep SSIs across all BMIs (odds ratio (OR) open versus lap, specifically for BMI ≥40, superficial SSI 5.34; deep inf 4.76). Organ space infections, reoperation and wound dehiscence increased with increasing BMI only in OVHR (p<0.05). For organ space infections, reoperation, and wound dehiscence, only higher classes of obesity had statistically significant difference (odds ratio open versus lap at BMI 35-40: organ space 1.98, reoperation 1.86, wound dehiscence 4.79). Significance at p<0.05.

CONCLUSION: Obese patients are overrepresented in ventral hernia repairs. National data demonstrates laparoscopic approach is increasingly preferred as BMI increases when repairing elective reducible hernias. Early postoperative complications are more common as BMI increases in both open and laparoscopic repairs. Laparoscopic approach is associated with lower superficial and deep surgical site infectious complications for all BMI categories, in addition to lower organ space infections, reoperation and wound dehiscence complications for higher obesity classes.
**SPONTANEOUS PNEUMOMEDIASTINUM IN THE PEDIATRIC PATIENT**

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**BACKGROUND:** Pneumomediastinum is a rare radiographic finding with concerning clinical implications. While pneumomediastinum occurring from trauma, airway instrumentation, or surgery is well-described, spontaneous pneumomediastinum (SPM) is rare and more poorly understood. We sought to evaluate the management of patients at our institution with spontaneous pneumomediastinum.

**METHODS:** We performed a retrospective chart review of all children (≤ 18 years) with pneumomediastinum, identified with ICD-9 codes, at a large tertiary care hospital from January 2011 to October 2014. Patients with SPM or pneumomediastinum from intrathoracic infections or asthma were included. Patients were categorized as having primary SPM (with no precipitating factors) or secondary SPM (underlying respiratory infections or asthma). Data were collected on clinical presentation, radiographic findings, and respiratory outcomes.

**RESULTS:** One hundred twenty-nine patients met inclusion criteria at an average age of 11.6±4.6 years; 30.2% (n=39) were males. Most patients (n=68) were transferred in from outside institutions for radiographic findings of pneumomediastinum. The most frequent symptoms at presentation were chest pain (n=76), shortness of breath (n=51), and cough (n=44). All patients had chest x-rays at admission. In addition, 7 patients had esophagrams and 2 had chest CTs. Eighty-nine patients (69%) were admitted to the hospital for a median of 1 day (IQR 0-2 days) with the majority admitted to non-ICU status (n=66). No patient required an esophagogastroduodenoscopy, bronchoscopy, or operative intervention. Eighty-five patients (65.9%) had follow-up over an average time of 11.3±12.9 months. Seventy-three patients had radiographic follow-up with 59% (n=43) having documented resolution over a median time of 2 days (IQR 1-25.5 days). Patients with secondary SPM (n=61) were more likely than primary SPM (n=68) to be admitted (84% vs. 56%, p=0.001), receive supplemental oxygen (82% vs. 61%, p=0.02), and have longer hospital stays (2 days (IQR 1-2.5) vs. 1 day (0-1), p<0.001). No patient with primary SPM developed respiratory distress during the hospital stay. There were no differences between primary SPM and secondary SPM in time to radiographic resolution of SPM (1 day (IQR 1-12) vs. 2 days (1-48), p=0.34) or readmission rates for SPM associated symptoms (1.5% vs. 1.6%, p=0.352).

**CONCLUSION:** This is the largest series describing pediatric spontaneous pneumomediastinum to date. Our study reveals that patients with secondary SPM are frequently admitted to treat their underlying disease while those with primary SPM are often observed and discharged home without any interventions or major complications. This suggests that patients with primary SPM may potentially be managed conservatively in the ED and discharged if stable. Further prospective studies are warranted to determine the appropriate management of primary SPM to decrease unnecessary hospital admissions and imaging tests to minimize cost.
BACKGROUND: Many Americans have limited access to specialty burn care and telemedicine has been proposed as a means to address this disparity. However, many telemedicine programs have been founded on grant support and then fail once grant support expires. Our objective was to demonstrate that a telemedicine program in burns can be financially viable.

METHODS: This retrospective review evaluated telemedicine visits and financial reimbursement during and after a Technology Opportunities Grant to a regional burn center in the Western United States. A convenience sample of burn patients managed via telemedicine from 2005-2014 was reviewed. The main outcome measure was payment received from telemedicine visits versus in-person clinic visits.

RESULTS: During the grant-funded years, telemedicine visits ranged from 12 (2005) to 75 (2007). In the post-grant period (post-2008), telemedicine visits initially dipped to 47 in 2009 but then progressively increased to 478 in the first 10 months of 2014. Our telemedicine network has grown from our initial 3 partners during the grant years to 52 sites in 6 states. In terms of how this compares to “face-to-face” clinic visits, we saw a consistent increase in telemedicine visits as a percentage of total clinic visits. Our initial rate of telemedicine visits of 0.26% in 2005 increased dramatically by 2014 to 14% of outpatient visits. Payment data showed that for 2007-2009 the percent of total charges showed a trend toward being higher for telemedicine than for in-person clinical visits. In 2010, in-person visits paid significantly better than telemedicine visits as a percentage of billing. Since 2011 telemedicine reimbursement has not differed significantly from in-person visits.

CONCLUSION: Specialty telemedicine programs can successfully transition from grant-funded enterprises to self-sustaining activities. The telemedicine program at our burn center has continued to increase in patient volumes and is not inferior to regular in-person visits in terms of reimbursement. Most importantly, the availability of telemedicine services allows access to specialty expertise in a large and sparsely populated region.
THE EFFECT OF SUPPLEMENTAL PARENTERAL NUTRITION ON OUTCOMES OF NECROTIZING ENTEROCOLITIS IN PREMATURE, LOW BIRTH WEIGHT NEONATES.
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BACKGROUND: Necrotizing enterocolitis (NEC) commonly affects premature, low birth weight infants after the initiation of enteral nutrition. The ideal rate of advancement of enteral feeds remains controversial. We hypothesized that supplemental parenteral nutrition (PN) decreases the need for surgery and mortality associated with NEC in premature, low birth weight infants.

METHODS: We reviewed the charts of all premature, low birth weight (<37 week gestation at birth and ≤1500g) neonates diagnosed with NEC at our institution between January 2006 and December 2013. The diagnosis of NEC was based on clinical findings including abdominal distension, feeding intolerance and radiographic findings including pneumatosis intestinalis, or pneumoperitoneum. Clinical outcomes included the need for surgery and in-hospital mortality. Surgical NEC was defined as NEC requiring bedside drain placement or exploratory laparotomy.

RESULTS: Of the 185 NEC patients, 114 (61.6%) were premature infants with low birth weights and were included in the remaining analysis. A total of 37 (32.4%) had perforated NEC and 14 had NEC totalis. Fifty-nine (51.8%) patients required surgical management for NEC. Patients who required surgery for NEC were younger (25.8±4.0 vs. 27.8±3.3 weeks; p=0.005) and weighed less at birth (829±281 vs. 938±271; p=0.038) than those managed medically. There was no difference in the use of PN (37.7% vs. 31.4%; p=0.541) or full enteral feeds (EF) (52.3% vs. 62.8%; p=0.383) between surgical and medical NEC patients. Patients who were on full enteral feeds were almost two times less likely to have a perforation compared to those not on full EF (26.0% vs. 43.2%; p=0.111. There was no difference in mortality at discharge between patients who had PN at NEC onset and those who did not (31.4% vs. 42.6%; p=0.294)

CONCLUSION: In this study, we hypothesized that supplemental parenteral nutrition would decrease the severity of NEC. However, we found that supplemental parenteral nutrition at NEC onset did not appear to improve outcomes as demonstrated by equivalent rates of surgical management and in-hospital mortality.
**BACKGROUND:** The Centers for Medicare and Medicaid Services (CMS) plan to link quality measures to subsequent reimbursement; surgical site infections (SSI) are one such quality measure. The surgical wound classifications (SWC) in one component of SSI risk stratification. Studies have demonstrated that the documented SWC in the medical record is often different from the actual surgical wound classification. This study examines the improvement in SWC documentation before and after implementation of nursing education, the World Health Organization (WHO) Checklist, and debriefing.

**METHODS:** Retrospective review of the hospital documented surgical wound class for eight common pediatric operations was compared to surgical wound class based on NSQIP algorithm. Operations examined included appendectomy, inguinal hernia repair, fundoplication, gastrostomy tube placement, pyloromyotomy, irrigation and debridement (I & D), cholecystectomy, and stoma takedown. Wound class was documented for up to 25 cases for each operation. Percent agreement between the hospital documented SWC and the NSQIP-SWC was calculated and comparisons were made before and after implementation of WHO Checklist and debriefing. Analysis was performed using Chi-square and a p valued < 0.05 was considered significant.

**RESULTS:** Pre-intervention there were 191 cases examined with an overall concordance of 58% (112/119) and post intervention the overall concordance increased to 83% (163/199), p = 0.001. The biggest increase in accuracy occurred in the appendectomy group with pre-intervention accuracy 28% (7/25) and post-intervention accuracy 80% (20/25), p = 0.0005. The most frequently documented wound class for appendectomy prior to intervention was wound class I. Interestingly, there were 5 cases in which pre-intervention I & D was listed as wound class I or II. The most accurately documented operation pre-intervention was pyloromyotomy. The most accurately documented operation post-intervention was gastrostomy tube and inguinal hernia. The least accurately documented operation pre and post-intervention was cholecystectomy.

**CONCLUSION:** The surgical wound class is often documented incorrectly in the medical record. Implementation of the WHO Checklist, debriefing, and nursing education improved the accuracy of documented surgical wound classification.
BACKGROUND: The prevalence of ventilator-associated pneumonia (VAP) in trauma patients is about 4-folds higher than in ventilated non-trauma patients. However, the role of trauma factors in the development of pneumonia in ventilated trauma patients, and the distinction between VAP and trauma-associated pneumonia (TAP) remain in question. In this study, we hypothesize that trauma factors play a critical role in aggravating the development of pneumonia in ventilated trauma patients.

METHODS: In this retrospective study 1,044 ventilated trauma patients were identified from December 2010 to December 2013 using our trauma registry. Study outcome was dichotomous: patients who developed pneumonia and those who did not. Data collection included demographics, injury severity score (ISS), ventilation days, days to develop pneumonia, hospital and ICU length of stay, and trauma factors including rib fracture, aspiration, blood in or around mouth, blood in or around nose, failed pre-hospital intubation, facial fractures, traumatic brain injury, spinal injury, sternal fracture, and pulmonary contusion. Variables were analyzed and compared between two groups and the relationship between development of pneumonia and the trauma factors were analyzed using univariate and multivariate analyses.

RESULTS: Among 1,044 ventilated trauma patients, 95 patients (9.1%) developed pneumonia, and 949 patients (90.9%) did not. Patients who developed pneumonia had significantly higher number of trauma factors than patients who did not develop pneumonia (4.1 vs. 2.4; p<0.001). Univariate regression analysis showed that all of the individual trauma factors except for blood in or around nose significantly increased the chance of developing pneumonia. Multivariate regression analysis further revealed that rib fractures, pulmonary contusion, and failed pre-hospital intubation were the most significant trauma factors in development of pneumonia in ventilated trauma patients. Of the 95 patients who developed pneumonia, 36 patients (37.9%) did not have any of the 3 significant trauma factors (rib fractures, pulmonary contusion, or failed pre-hospital intubation), and 59 patients (62.1%) had at least one of them. The later group developed pneumonia significantly faster than the patients who did not have any of the 3 significant trauma factors (4.4 days vs. 6.3 days; p=0.015).

CONCLUSION: Trauma injuries to the face and oro-pharyngeal cavity, rib fractures, pulmonary contusion, and failed-intubation in the field contribute to the development of pneumonia in ventilated trauma patients, which we would consider as TAP. We propose that the mechanism of infection involves transfer of microbial agents from damaged mucosal surfaces into the lungs, and this process is accelerated in TAP patients. Current CDC definition of VAP needs to be adjusted to account for the effect of these factors in the etiology of TAP.
BACKGROUND: Background: While there exists a nationwide shortage of pediatric surgeons, few studies have examined differences in pediatric trauma outcomes using adult trauma surgeons compared to pediatric surgeons. The purpose of this study was to evaluate pediatric trauma patient outcomes for institutional models using pediatric surgeons vs. adult trauma surgeons.

METHODS: Methods: A 10-year retrospective review was conducted at two geographically similar ACS-verified level II pediatric trauma centers. Center I (pediatric center) provides pediatric trauma coverage through the use of 24-hour in-house trauma surgeons to resuscitate pediatric patients and then hand off the patient to a pediatric surgery service for all operative and non-operative management, with mid-level support. Center II (adult center) provides 24-hour in-house senior surgical resident coverage with an on-call trauma surgeon no more than 15 minutes away. All operative and non-operative management in Center II is provided by adult trauma surgeons with resident support, with a pediatric surgeon available for specific consultation. All pediatric trauma activations resulting from any injury mechanism between July 1, 2003 and June 30, 2013 were identified. Data collected included patient demographics, mechanism of injury, injury severity (injury severity score [ISS] and Glasgow Coma Scale [GCS] score), initial vitals, imaging utilization (ultrasonography and CT scan), intensive care unit (ICU) and ventilator utilization, hospital length of stay (LOS), and mortality.

RESULTS: Results: Patients from the pediatric center were younger (8.3 ± 5.7 vs. 9.3 ± 5.6 yrs, P<0.001), more severely injured (ISS=9.4 ± 9.1 vs. 7.2 ± 8.0, P<0.001; GCS score=13.6 ± 3.6 vs. 14.0 ± 3.0, P=0.027), and more often arrived with a systolic blood pressure of <90 mmHg (5.6% vs. 4.3%, P=0.038) as compared to those from the adult center. Patients at the adult center more often underwent ultrasonography (93.3 vs. 58.8%, P<0.001); however, CT scan utilization was not different between institutions. Admission to the ICU was more common at the pediatric center (52.2% vs. 33.5%, P<0.001), but ICU LOS was longer in the adult center (3.0 vs. 2.5 days, P=0.035). Mechanical ventilation was also more common at the pediatric center (12.9% vs. 7.7%, P<0.001, respectively), but ventilator days did not differ between Centers. Hospital LOS was significantly longer in the pediatric center (3.1 ± 4.6 vs. 2.5 ± 4.7 days, P<0.001). However, mortality was not different between the pediatric and adult centers (3.2% vs. 2.5%, P=0.116).

CONCLUSION: Conclusion: This study found little to no differences in clinically significant outcomes comparing trauma models utilizing adult trauma surgeons vs. pediatric surgeons. As it appears that trauma surgeons’ outcomes compare favorably to those of pediatric surgeons, utilizing adult trauma surgeons may help alleviate shortages in pediatric surgeon coverage, although additional studies are needed to validate these findings.
14. EVALUATION OF STO2 TISSUE PERFUSION MONITORING AS A TOOL TO PREDICT THE NEED FOR LIFE SAVING INTERVENTIONS IN TRAUMA PATIENTS
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BACKGROUND: Background: Hemorrhage remains the leading cause of potentially preventable death among trauma patients. Earlier recognition of hemorrhagic shock decreases the time to implementation of Life Saving Interventions (LSI) such as blood transfusions or hemorrhage control procedures and improves patient survival. However, the presence of hemorrhagic shock is not always apparent using standard vital signs monitoring, a clinical state referred to as occult shock. We hypothesized that near-infrared spectroscopy (NIRS)-derived tissue oxygenation saturation (StO2) can predict the need for LSIs in trauma patients with occult hemorrhagic shock.

METHODS: Methods: This prospective, observational study was performed over an 8 week period at our Level I trauma center with the highest-activation adult trauma patients. Exclusion criteria were prisoners, pregnant women, and patients with burn injuries >30% TBSA or bilateral upper extremity fractures. Hutchinson Technologies Spot Check StO2 device was used to measure StO2 values upon arrival, then every 5 minutes throughout the first 60 minutes after arrival, and before and after the implementation of LSI. Vital signs, outcomes and procedures performed were also recorded for data analysis. Statistical analysis was performed using a Mann-Whitney test for continuous variables and Fisher exact test for categorical data, and a p<.05 was considered significant.

RESULTS: Results: Sixty-two patients were included in the study with a median age of 42 (26, 58), 67% male, 69% blunt injuries with a mortality of 9.7%. There was no difference in StO2 values between blunt and penetrating groups (p=.36), race (p=.059) or gender (p=.054). StO2 <75% were predictive of the need for blood product transfusions (p<.001) and the need for emergency surgeries, as no patients proceeded to the OR within 60 minutes with a StO2 value ≥75%. Patients who presented with StO2 <75% had a median admission systolic blood pressure of 104 (86, 142), a statistically significant difference in median base deficit (p=.01) and ABC score (p=.015) from patients with a StO2 value ≥75%. Nearly 1/3rd of patients who presented with a systolic blood pressure ≥120mmHg presented with StO2 <75%, and had a median base deficit of 5 (3, 6.5).

CONCLUSION: Conclusion: Admission StO2 measurements <75% predicts the need for LSIs including administration of blood products and emergent surgical procedures, and may be used as an adjunct method for identifying critically injured patients suffering from severe hypoperfusion. StO2 measurements can aid in determining the presence of occult shock where additional lab values and trauma scores are unavailable for analysis. Our data indicates that StO2 measurements are useful, noninvasive and can rapidly identify critically injured patients suffering from severe hypoperfusion, and further studies are planned to evaluate this tool in triage in the prehospital setting.
BACKGROUND: The cost of medical care is an area of major emphasis in the current healthcare environment. Medical providers have a significant role in reducing costs. One way to achieve this goal is to eliminate practices that add little value to patient care. The pelvic x-ray obtained during the initial evaluation of blunt trauma is an example. The objective of this study was to explore the utility of the pelvic x-ray in patients with a negative physical exam.

METHODS: Blunt trauma patients with pelvic fractures of any type admitted to our urban trauma center from January through December 2012 were reviewed. Demographics including age, sex, race, mechanism of injury, and outcome were collected. Findings on pelvic x-ray and computed tomography (CT) were compared for correlation. Patients requiring surgery for their pelvic fracture were identified.

RESULTS: Out of 1,757 trauma admissions, 153 patients sustained a pelvic fracture. Mean age 50 years (15-97), male 54%, and Caucasian 46%, Hispanic 31%, African American 22%, Asian 1%. The main mechanism of injury was motor vehicle collisions 45%, followed by fall from standing 22% and auto/pedestrian accidents 12%. There were 22 patients that did not have both imaging modalities for comparison. Of the 131 patients with both CT and pelvic films, findings were the same in 44 (33%). CT identified one or more additional pelvic fractures in 88 (67%) patients. However, the pelvic x-ray findings did not alter patient management in the trauma bay. Out of the 153 patients with pelvic fractures, 24% required surgery for their pelvic injuries. Mortality was 4% for reasons unrelated to pelvic trauma.

CONCLUSION: In the normotensive blunt trauma patient with no pelvic instability or evidence of hip dislocation on physical exam, who are to undergo further evaluation with CT, the trauma bay pelvic film is unnecessary.
IMPACT OF INTRACRANIAL PRESSURE MONITORING ON MORTALITY FOLLOWING SEVERE TRAUMATIC BRAIN INJURY
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BACKGROUND: Intracranial hypertension contributes to secondary injury among patients with severe traumatic brain injury (sTBI). Consensus guidelines recommend intracranial pressure (ICP) monitoring for all salvageable sTBI patients meeting pre-defined criteria. Considerable variability exists regarding compliance with ICP monitoring guidelines. The objective of this study was to examine the impact of ICP monitoring on mortality following sTBI. We hypothesized that ICP monitoring is not associated with improved survival.

METHODS: A 5-year retrospective analysis was performed at a level 1 trauma center to identify all adult blunt sTBI patients. Data collected included patient demographics, Injury Severity Score (ISS), field and admission Glasgow Coma Scale (GCS) scores, episodes of hypotension (systolic blood pressure [SBP] <=90 mmHg), the presence of and time to ICP monitoring, and admission coagulation profile. Patients with EVD monitors placed after emergency craniotomy were excluded. The primary outcome was in-hospital mortality. Logistic regression was performed to identify independent predictors of death. A propensity score adjusted analysis was also performed to minimize selection bias between patients who did and did not undergo ICP monitoring.

RESULTS: During the study period, 249 patients sustained a sTBI. After excluding those who died within the first 24 hours, 123 patients remained. Of these, 40 (33%) underwent ICP monitoring. On univariate analysis, patients who underwent ICP monitoring were younger (40 vs. 50 years, p=0.009) with a higher ISS (30 vs. 24, p=0.0003). Admission GCS, SBP, and coagulation profiles were similar between groups. Mortality was decreased in patients undergoing ICP monitoring (23 vs. 41%, p=0.04). Eleven patients (9%) underwent delayed ICP monitor placement due to coagulopathy and the time from admission to ICP monitor placement was twice as long in this group (18 vs. 9 hours, p=0.03). On multivariate analysis, controlling for age, ISS, hypotension, comorbidities, and coagulopathy, ICP monitoring was associated with a decreased risk for mortality (OR=0.32, 95% CI=0.11-0.99; p=0.049). Upon propensity adjusted analysis, a decreased yet statistically significant reduction in mortality remained among patients undergoing ICP monitoring (OR=0.42, 95% CI=0.18-0.99; p=0.047).

CONCLUSION: Significant variability exists in the use of ICP monitoring among patients with sTBI, as only one-third of patients in the current study underwent ICP monitoring. Despite this, an adjusted analysis demonstrates improved survival among sTBI patients undergoing ICP monitoring. Adequately powered, prospective randomized controlled studies are required to define the optimal group, timing, and outcomes of ICP monitoring following sTBI.
**17. SERIAL ROUTINE REPEAT COMPUTED TOMOGRAPHY SCANS IN PATIENTS WITH TRAUMATIC BRAIN INJURY: A PRACTICE OF THE PAST**
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**BACKGROUND:** The practice of a routine repeat computed tomography (RHCT) scans in patients with traumatic brain injury (TBI) is under question. The aim of our study was to evaluate the utility of a greater than one repeat head computed tomography (M1CT) scans in patients with TBI and intracranial hemorrhage (ICH). We hypothesized that, performance of a M1CT scans do not lead to neurosurgical intervention in examinable patients.

**METHODS:** We performed a 3 year prospective analysis of all TBI patients with an intracranial injury (skull fracture and/ or ICH) presenting to our level 1 trauma center. Patients that received M1CT scans were included. Findings and reason (routine vs. neurologic deterioration) for M1CT were recorded. Neurologic deterioration was defined as altered mental status, focal neurological deficits and/or pupillary changes. Primary outcome measure was the need for neurosurgical intervention (craniotomy/craniectomy).

**RESULTS:** A total of 1,148 patients were evaluated of which, 25.8% (n=296) patients that underwent M1CT were included. 98.6% (n=291) had a routine M1CT while the remaining (n=5) had M1CT due to neurologic decline. In patients that had a routine M1CT (n=291), worsening was seen in 23% (n=67) patients. Neurosurgical intervention was performed in one patient (0.3%) who was in-examinable (Glasgow Coma Scale score=6). Among patients that received M1CT due to neurologic decline, 80% (4/5) had worsening of ICH and neurosurgical intervention was performed in 75% (3/4) patients. Neurological decline was independently associated with the need for neurosurgical intervention (OR [95%CI]: 5.1 [4.2-6.8], p=0.001) in patients undergoing M1CT.

**CONCLUSION:** The practice of multiple repeat head CT scans in clinically examinable patients after TBI with intracranial hemorrhage leads to over utilization of this tool. M1CT should be limited to non-examinable patients or patients with neurological deterioration.
BACKGROUND: New onset post-operative atrial fibrillation (POAF) occurs in 20-30% of isolated coronary artery bypass graft (CABG) patients. Randomized clinical trials comparing the new oral anticoagulants (NOACs) apixaban, rivaroxaban, and dabigatran to warfarin in medical patients have shown that NOACs have lower rates of intracranial hemorrhage and are equivalent or superior to warfarin with regards to stroke and major bleeding. NOACs do not require chronic monitoring and do not have the same interactions with medications and diet as warfarin. We hypothesized that the use of NOACs for the management of POAF could be used safely with low rates of bleeding and post-operative stroke.

METHODS: All patients from a single tertiary referral center undergoing isolated CABG from January 2013 to October 2014 were reviewed and patients with POAF were identified. Anticoagulation with warfarin or NOAC was used in all patients with POAF and differences in clinical outcomes, length of stay (LOS), post-operative blood product transfusions, and readmissions for bleeding were measured.

RESULTS: 510 patients undergoing isolated CABG were identified. 28.0% (n=143) experiencing new onset POAF. Between the NOAC and warfarin groups there was no difference in the average age (NOAC 74.7 ± 6.2 years vs warfarin 73.6 ± 8.5 years, p-value=0.61) or lengths of stay (NOAC 6.6 ± 2.8 days vs warfarin 7.4 ± 3.9 years, p-value=0.46). There were no differences between the time at which the anticoagulation was started (NOAC POD5 vs warfarin POD4, p-value = 0.25) or the average number of days the patient was on anticoagulation at discharge (NOAC 2.2 days vs warfarin 3.2 days, p-value = 0.19). Both groups had similar rates of average post-operative blood product transfusion (NOAC 1.6 ± 2.6 units vs warfarin 1.2 ± 2.3 units, p-value 0.52). No patients in either group required a blood product transfusion after the initiation of anticoagulation. 1 patient in the warfarin group was readmitted for bleeding, while no patients in the NOAC group required readmission for bleeding. No patients in either anticoagulation group suffered a post-operative stroke.

CONCLUSION: While cardiac surgery patients are at high risk for bleeding, this study shows that both warfarin and the NOACs can be used safely and effectively for the management of POAF with no immediate post-operative bleeding issues after initiation of anticoagulation, low rates of readmission for bleeding, and no post-operative strokes. NOACs were noninferior to warfarin in the short term management of POAF and may have long term benefits to their use, such as no need for monthly monitoring, no need for lab draws and possible lower rates of long term bleeding and hemorrhagic stroke.)
"BLUSH AT FIRST SIGHT"; SIGNIFICANCE OF CT AND ANGIOGRAPHIC DISCREPANCY IN PATIENTS WITH BLUNT ABDOMINAL TRAUMA
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BACKGROUND: "Blush", defined as a focal area of contrast pooling within a hematoma, is frequently encountered in patients with severe blunt torso trauma. This radiographic sign often implies the presence of active extravasation or pseudoaneurysm and is associated with an increased propensity for ongoing hemorrhage. Contemporary clinical practice guidelines recommend the use of angiography with embolization in all hemodynamically stable patients with evidence of active extravasation on abdominal CT. Patients presenting with blush visualized on CT, but not demonstrated on subsequent angiography, present a challenging clinical dilemma. In this scenario, the interventional radiologist and the trauma surgeon must make a clinical risk benefit decision of empiric embolization with the attendant procedural risks versus terminating the angioembolization with the potential for rebleeding. The purpose of this study was to study the natural course of patients with this blush disparity between CT and angiography in order to devise an algorithm for management.

METHODS: The study was conducted as a retrospective analysis of patients who underwent angiography after initial CT scans revealed blush following blunt abdominopelvic trauma at a level I trauma center (June 2005 to July 2013). Data collected on the patient cohort included demographic data, injury mechanism, admission vital signs and laboratory data, ISS, and incidence of rebleeding after angiography and clinical outcome.

RESULTS: During the study period, a total of 139 blunt torso injury patients underwent angiography after CT revealed blush concerning for active hemorrhage. The negative angiography rate was 23%. The liver had the highest incidence of CT/angiographic discrepancy at 12/28 (43%). Patients with CT blush secondary to hepatic injury with a subsequent negative angiography without embolization had a 25% (3/12) rate of recurrent hemorrhage requiring intervention. CT/angiographic discrepancy in patients with spleen injury was demonstrated in 15/90 (16.7%) patients. Amongst patients with splenic injuries with positive blush findings on CT, there was a four-fold increase in rebleeding in patients managed without embolization the 3/11 (27.7%) compared to those that were embolized 6/79 (7.6%).

CONCLUSION: CT imaging has enhanced our ability to detect contrast extravasation after injury. Evidence of blush on CT suggests the presence of significant hemorrhage. The current analysis suggests that in patients with CT blush associated with splenic and hepatic injury, the risk of recurrent hemorrhage requiring intervention is substantial and warrants consideration of empiric embolization at the time of the initial procedure even in the absence of blush on angiographic evaluation. In patients with renal and pelvic injuries, CT blush in the absence of contrast extravasation on angiography may be managed expectantly with the expectation of equivalent clinical outcomes. Prospective studies are needed to validate these findings.
20. SURGICAL STABILIZATION OF SEVERE RIB FRACTURES DECREASES INCIDENCE OF RETAINED HEMOTHORAX
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BACKGROUND: Retained hemothorax (RH) is relatively common after severe chest trauma. Patients who develop RH often endure additional procedures, readmissions, and are at risk for empyema, fibrothorax, and even death. At our Level One Trauma Center, we started performing surgical fixation (SSRF) of severe rib fractures in 2009. We hypothesized that patients who have SSRF have a lower incidence of RH than similarly injured patients who are managed non-operatively (NON-OP).

METHODS: All patients admitted to the trauma service with rib fractures between January 2009 and June 2013 were identified. A 2:1 propensity score model was created using age, gender, chest AIS, ISS, and hospital length of stay as variables to identify NON-OP patients who were similar to the SSRF patients. Injury, hospital, surgical, cost, and charge data was collected for all patients for the index hospitalization and for any relevant readmissions. RH was defined as radiographic evidence of intra-thoracic blood requiring additional procedural intervention after placement of tube thoracostomy, or development of intra-thoracic blood requiring intervention more than 96 hours after admission. Discrete variables were compared using Fishers’ exact test, and continuous variable were compared using Wilcoxon rank sum tests.

RESULTS: Propensity score matching successfully identified 411 patients (137 SSRF, 274 NON-OP) who were included in the analysis. 31 (7.5%) patients in the entire cohort had RH, 3 who had SSRF, and 28 NON-OP. Overall, the incidence of RH was lower (2.2%) in the SSRF group than in the NON-OP group (10.2%), p=0.003. Twelve (39%) of the RH cohort did not have a thoracostomy tube placed to treat hemo- or pneumothorax at the time of admission. 6 RH patients (19.3%) required readmission related to their thoracic injury, as compared to 14 (3.7%) in the non-RH group (p=0.002). As expected, all 31 (100%) patients in the RH cohort required additional thoracic procedures to treat RH, as compared to 4 (1.4%) in the non-RH group. Interventions to treat RH included 20 (65%) simple drainage (tube thoracostomy or radiology-guided pigtail), 4 (13%) VATS, and 7 (23%) thoracotomy. Overall hospital costs and charges were not different between the RH and non-RH group, even when taking into account the costs of readmissions.

CONCLUSION: Patients who have SSRF have a decreased incidence of RH as compared to similarly injured patients who have NON-OP management.. Those with severe thoracic trauma and rib fractures who develop RH have more procedures and more thoracic injury-related readmissions than patients who do not. While not a singular reason to perform SSRF, this clinical benefit should not be overlooked.
21. NUSS SURGERY CAUSES DECOMPRESSION OF RIGHT HEART CHAMBERS IN PATIENTS UNDERGOING SURGERY FOR PECTUS EXCAVATUM
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BACKGROUND: Pectus excavatum (PE) is a common malformation of the chest wall that includes posterior depression of the sternum and adjacent costal cartilages. The cardiopulmonary implications and benefits of surgical correction have been debated. PE can cause physiologic limitation by compression of the right heart chambers. Associated incidence of other structural cardiac anomalies and the effects of Nuss surgical repair on right heart chamber dimensions are evaluated.

METHODS: A retrospective evaluation of 120 adult PE patients who underwent a modified Nuss with intraoperative transesophageal echocardiography (TEE) at a single institution was performed from 2010-2012. The prevalence of abnormal cardiac anatomy was recorded in 120 patients who underwent baseline TEE and measurement of right heart chamber dimensions before and immediately after the PE deformity was corrected was performed in 60 subjects who also underwent a post procedure TEE. A single surgeon (DJ) performed PE repair with a modified Nuss and all echo data and measurements were performed by a single observer (CJC). Continuous variables pre and post-surgery were analyzed by 2-tailed, paired Student t-test.

RESULTS: Of the 120 patients reviewed (age: 33.7±10.7, male: 94(78.3%), female: 26 (21.6%)), 1.6% had bicuspid aortic valve, 3.3% had mitral valve prolapse, 5.8% had tricuspid valve prolapse and 3.3% had patent foramen ovale. There were no patients with coronary anomalies or aortic root dilatation. In the 60 patients (age: 32.6±11.3, male: 48(80.0%), female: 12(20.0%)) with pre and post echo images, significant increase in right heart chamber dimensions occurred as follows: right atrium (3.3±0.8 cm to 3.9±0.8, p<0.0001, 18% change), tricuspid annulus end systole (2.3±0.5 cm to 2.6±0.5, p <0.0001, 13% change), right ventricular outflow tract (RVOT) size end-diastole (1.8±0.5 cm to 2.0±0.4, p =0.0019, 10% change), and RVOT size end-systolic (2.2±0.4 cm to 2.3±0.3, p=0.0400m 4.5% change), baseline versus post surgery respectively.

CONCLUSION: In patients with pectus excavatum deformity, surgical correction significantly improved right heart chamber size with relief of compression. An increased prevalence of associated cardiac anomalies was not found in this patient cohort. Relief of right heart compression may translate into improved functional performance after surgery in PE patients and is undergoing further evaluation.
22. MANAGEMENT OF ACUTE APPENDICITIS IN A RURAL POPULATION
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BACKGROUND: The delivery of surgical care to rural America continues to be a concern to many organizations. Many health care systems have developed different strategies to provide surgical care to rural America. Our system uses a Spoke and Wheel Approach (SWA). Patients access health care anywhere in the system, but are subsequently transferred centrally for surgical care. This model works only if the transfer process and the delays incurred do not compromise care. We sought to analyze this assumption in our own network. Outcomes should be equivalent regardless of where patients access care. If they are not, the care model needs to be revisited. We chose Acute Appendicitis (AA) to investigate appropriateness of our care model.

METHODS: Our rural health care system provides care and services for an eight county region covering 5,600 sq mi. AA was chosen as our model for several reasons. First, AA is one of the most frequently performed procedures by general surgeons in the US. Second, the natural history of AA has been extensively studied and is somewhat predictable. Third, outcome of AA after appendectomy can be affected by the timing of the surgery. We identified patients admitted with the diagnosis of AA using ICD-9 code and CPT codes over a two year period. We divided the patients into 2 groups, main campus (MC) presentation and satellite centers (SAT) presentation. Demographics of the two groups were compared as well as site of presentation, time of presentation, time of surgery, time to surgery and clinical information associated with the pre-op, intra-op, and post-op care.

RESULTS: There were no differences between the groups with regard to age, gender, surgical intervention, or use of imaging. Subjects with initial presentation at SAT had longer mean surgery times, 51.5 minutes versus 60.7 (p=0.008). There was no difference in time to surgery, length of stay, Lap v. open surgery, antibiotics, perforation rate, intra-op complications, post op ileus or Intrabdominal abscess.

CONCLUSION: The traditional belief is that AA progresses toward perforation. Therefore expeditious appendectomy is necessary to remove the source and prevent perforation and all its complications. With this in mind, minimizing delay to operation is important. For surgeons working in rural areas, this delay is sometimes hard to avoid. As it is the case in our health network patient have to be transferred from satellite to main campus for definitive treatment. Remote access to health care did not compromise outcome. It is interesting to note that the time to surgery is identical between the two groups. This supports a pragmatic approach to rural patients with AA. Our study showed no difference in any of the variables studied except for the length of operation. Though statistically significant it is only about 10 min difference. This study shows that it is safe to care for patients with AA in a network such as ours without putting patients presenting in satellite centers at a disadvantage.
23. OUTCOMES OF PRIMARY FASCIAL CLOSURE AFTER OPEN ABDOMEN FOR NON-TRAUMA EMERGENCY GENERAL SURGERY PATIENTS

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BACKGROUND: In patients managed with open abdomen (OA), early closure and fewer abdominal washouts have been associated with successful primary fascial closure and fewer wound complications; however, these studies included mostly trauma patients. We hypothesized that emergency general surgery (EGS) patients managed with OA would have a similar association.

METHODS: Adult EGS patients managed with OA from June 2013 to December 2013 were prospectively enrolled into an IRB-approved study at a university medical center. Variables included age, BMI, Charlson Comorbidity Index (CCI), presence of contamination at index operation, intraoperative blood loss, resuscitation, time to fascial closure, and number of abdominal washouts. Primary outcome was success or failure of fascial closure. Data was analyzed using Wilcoxon rank sum, Fisher's exact, and unpaired t tests.

RESULTS: Closures were primarily closed with running or interrupted slowly absorbable suture; two used biologic or synthetic mesh. Mortality was 30% (4 failed, 7 successful). Uncomplicated versus complicated closure was not associated with time to closure (median 3 vs. 2.5 days, p=0.39), time to first re-exploration (median 37 vs. 35 hours, p=0.66), number of re-explorations (median 2 vs. 2.5, p=0.66), or type of closure (running vs. interrupted sutures, p=0.47). Higher BMI was significantly associated with complicated closure (mean BMI 29.3 vs. 36.9, p=0.02). Fascial closure outcome was not associated with age, CCI, indication for operation (p=0.25), or type of intervention (p=0.51). Physiologic compromise was the most common reason for OA (n=19, 53%), 15 of which were closed successfully. Presence of contamination trended towards closure failure (p=0.056). Intraoperative blood loss (median EBL 700 vs. 200, p=0.05) tended to be higher in those who were successfully closed, but infusion of crystalloids or blood products did not have an affect.

CONCLUSION: Contrary to previous studies, time to closure or number of re-operations did not affect fascial outcome. This prospective analysis showed that successful fascial closure was achieved in patients with lower BMI and higher intraoperative blood loss. Patients with intra-abdominal contamination trended towards higher failure rates. This suggests that patients who required OA for hemorrhage fared better in terms of fascial closure, although this should be investigated in a larger sample.
24. ESTABLISHING BENCHMARKS FOR CHOLEDOCHOLITHIASIS MANAGEMENT IN AN URBAN SAFETY NET HOSPITAL: ANALYSIS OF 915 SUBJECTS  
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BACKGROUND: The push for public reporting of the quality of health care delivery makes it imperative that relevant benchmarks exist for particular disease states across different settings. Safety net hospitals have been shown to treat patients with more advanced disease and higher complexity than their private counterparts, so it seems intuitive that their benchmarks for treating given disease states should be different. We undertook this descriptive study to establish benchmarks for the management of choledocholithiasis in the setting of an urban safety net hospital that sees a high volume of biliary disease.

METHODS: We retrospectively reviewed all patients admitted to our urban safety net hospital’s acute care surgery (ACS) with biochemical evidence of choledocholithiasis and undergoing same-admission cholecystectomy (CCY) between July 1, 2012 and December 31, 2013. During this time period, the ACS service was staffed by 13 surgeons, 12 of whom have acute care surgery as their primary practice.

RESULTS: Over the 18 month study period, 2217 CCYs were performed at our institution (382 electively at our hospital’s ambulatory surgery center, 321 electively at our main hospital as a same day surgery, and 1514 as an urgent case after admission to the ACS service). Of these urgent ACS cases, 915 met inclusion criteria and comprised the study cohort (females= 82.2%; mean age= 38.6 (SD + 13.6) years). The majority of subjects were in their 3rd and 4th decades of life (29.8% and 28.7%, respectively). Additionally, a majority of subjects were obese as body mass indexes of 30.0-34.9 were seen in 29.7% (class I obesity), 35.0-39.9 in 11.4% (class II), and >40 in 10.5% (class III). Total bilirubin elevations were generally mild as 9.1% of subjects had levels >3.0, and 16.1% had an abnormal lipase level. Sonographic gallbladder wall thickening was seen in 16.5% of patients, while a pathology report diagnosing cholecystitis was seen in 95.4% of specimens. Conversion to an open procedure was performed in 4.0% of subjects overall and 9.3% of those with gall bladder wall thickening on ultrasound. Intraoperative cholangiography was done in 18.0% of patients, and common bile duct exploration (CBDE) was rare (laparoscopic CBDE=1.0%, open CBDE=0.5%). The dominant management pathway was admission with trending of liver function tests, and CCY with omission of biliary tract imaging in those whose levels decreased expeditiously (n=630, 68.9%). A complication occurred in 5.8% of patients, and the attributable mortality was 0.2%. Finally, the length of stay (LOS) was 3.1 (SD + 2.2) days for laparoscopic CCY and 5.9 (SD + 2.7) days for open.

CONCLUSION: These findings can serve as a first effort at benchmarking outcomes associated with the management of choledocholithiasis at an urban safety net hospital. Similar centers are encouraged to perform and promulgate their own analyses to help refine these point estimates.
**BACKGROUND**: Background: Our acute care surgery (ACS) group’s practice for the management of patients admitted with biochemical evidence of choledocholithiasis allows for trending of liver function tests (LFTs) for a 24 hour period. Patients who show a downtrend may then undergo cholecystectomy (CCY) without intraoperative cholangiography (IOC) and be discharged home without performance of biliary tree imaging. We undertook this study to assess outcomes related to omitting biliary tree imaging in patients admitted with elevated LFTs which downtrend.

**METHODS**: Methods: All patients admitted to our academic ACS practice with biochemical evidence of choledocholithiasis and undergoing same-admission CCY between 7/1/2012 and 12/31/2013 were identified. Patients who underwent preop or intraop imaging of their biliary tree were excluded. Demographics, lab data and their trends, postop procedures performed and their timing, and outcomes were reviewed. Log-transformed ANOVA was used to compare means between groups with Tukey's post hoc testing when indicated.

**RESULTS**: Results: A total of 668 subjects with initially elevated but downtrending LFTs and no preop imaging underwent CCY without IOC during the 18 month study period. Thirty eight subjects (5.7%) ultimately underwent postop imaging of their biliary tree with endoscopic ultrasound, endoscopic retrograde cholangiopancreatography (ERCP), or magnetic resonance cholangiopancreatography alone or in combination at some point in their postop course. Twenty two subjects (3.3%) were shown to have definite evidence of postop choledocholithiasis. Of these, ten cases were diagnosed during the index admission at 2.2 (SD + 2.1) days postop and 12 cases after discharge at 49.8 (SD + 50.4) days after discharge. One case of cholangitis from a retained stone was seen in the latter group in a patient presenting 82 days after discharge. She underwent ERCP at that time, was discharged three days later, and was doing well when seen in clinic two weeks after ERCP. Of the 646 subjects who did not show definitive evidence of postop choledocholithiasis, 482 (74.6%) had their last follow up at 20.8 (SD + 22.0) days after discharge while the remaining 164 (25.4%) were lost to follow up after discharge from their index admission. When considering the three groups of subjects with 1) no postop choledocholithiasis and follow up, 2) no postop choledocholithiasis and no follow up, and 3) proven postop choledocholithiasis, omnibus and post hoc testing showed no differences in presenting LFTs between the patients with and without follow up, and significantly higher presenting LFTs for those patients proven to have postop choledocholithiasis (total bilirubin p=0.02, ALT p=0.02, and AST p=0.004).

**CONCLUSION**: Conclusion: Omission of biliary tract imaging for patients with choledocholithiasis who have downtrending preop LFTs appears to be safe. Delayed intervention for clinically significant retained stones appears to be rare and well tolerated.
BACKGROUND: Despite clear guidelines regarding which asymptomatic breast cancer patients require a metastatic workup, we hypothesized that there would be significant variation amongst surgeons regarding when to order such a workup, and the tests comprising the same.

METHODS: An anonymous web-based survey of surgeon practices was distributed to surgeons via the American College of Surgeons Communities. We evaluated variation in both the indications for ordering a metastatic workup, and the tests used for the same. Statistical analyses were conducted using IBM SPSS Statistics (Version 21).

RESULTS: 253 surgeons from 8 countries responded to the survey; 93.6% were from the US. 17.7% were in academic practice, 39.1% were hospital employed, and 43.2% were in private practice. 55.8% claimed that ≥ 50% of their practice was breast-related; and 30.6% had solely breast practices. Of the 233 surgeons who answered the question regarding when they ordered a metastatic workup in patients presenting with invasive breast cancer, 17 (7.3%) stated they always did a metastatic workup prior to surgery, 74 (31.8%) stated they did so for patients presenting with clinical stage 2 or greater, 122 (52.4%) stated they did so for patients presenting with clinical stage 3 or greater, and 20 (8.6%) stated they never did a metastatic workup. Surgeons who had ≥ 50% of their practice related to breast cancer were more likely to order a metastatic workup in patients with stage 3 or greater disease (61.1% vs. 41.1%, p = 0.031). In terms of tests ordered as part of their usual metastatic workup, 142 (61.7%) surgeons ordered a CT scan of the abdomen, 123 (53.5%) a CT scan of the chest, 102 (44.4%) a bone scan, 94 (40.9%) a chest xray, 94 (40.9%) a PET scan, 19 (8.3%) a CT/MRI of the brain, and 13 (5.7%) an ultrasound of the liver. Only 43 surgeons (17%) stated that a CT chest/abdomen and bone scan was their “usual” metastatic workup. Surgeons who had ≥ 50% of their practice related to breast cancer were more likely to order these tests (23.0% vs. 11.2%, p=0.018), as were those in academic settings compared to those who were either hospital-employed or in private practice (32.6%, 20.0% and 9.5%, respectively, p=0.003). Significant differences were also found in practice patterns based on geography. American surgeons were more likely to use PET scans as part of their metastatic workup (38.9% vs. 12.5%, p=0.035) than their non-US counterparts, who were more likely to order bone scans (68.8% vs. 38.9%, p=0.032) and ultrasounds of the liver (18.8% vs. 4.3%, p=0.042).

CONCLUSION: Despite clearly defined guidelines, nearly 40% of surgeons perform metastatic workups when they are not indicated. In addition, a minority of surgeons adhere to NCCN guidelines in terms of the tests ordered for the same, with tremendous variation based on practice type and setting. These data highlight significant areas for improvement in terms of cost and value.
BACKGROUND: The incidence of regional recurrence after sentinel lymph node (SLN) biopsy is not well documented. The aim of this study was to identify patients who experienced a regional recurrence during the era of SLN biopsy and analyze for associated risk factors.

METHODS: A retrospective review of a prospectively maintained database was performed to identify patients with a regional recurrence of breast cancer after undergoing a first operation for invasive unilateral breast cancer. Patients with a regional recurrence were compared to patients who were alive and disease-free for at least 5 years. Those with ductal carcinoma in-situ and recurrent breast cancer at presentation were excluded. Characteristics were analyzed using two-sample t-test and chi-square analysis.

RESULTS: A total of 1060 patients were eligible for evaluation. Twenty-one patients (2%) experienced a regional recurrence. The majority of the patients underwent SLN biopsy with 16 (1.6%) undergoing axillary lymph node dissection (ALND) alone as their axillary staging. A positive SLN biopsy was found in 24% of the patients and of those, 44 (4% of the total) did not undergo a completion axillary lymph node dissection (CALND). The group with regional recurrences had larger tumor sizes (p<0.001), higher stage disease (p<0.001), more ER negative and/or triple negative breast cancers (p<0.001), and more initial positive lymph nodes (p=0.03). Age, menopausal status, race and BMI were not significantly different between the groups. Among treatment factors, mastectomy at initial operation (p<0.001) and receipt of chemotherapy and/or neoadjuvant therapy (p<0.001) were significantly more common among those with regional recurrences, but the type of axillary staging and the rate of CALND after positive sentinel lymph nodes did not differ significantly between the two groups (p=0.41). The regional recurrences were in axillary (12, 57%), supraclavicular (4, 19%), internal mammary (3, 14%), cervical (1, 5%), and interpectoral (1, 5%) nodes. Two patients had regional recurrences in more than one nodal basin.

CONCLUSION: Regional recurrence of breast cancer occurs very infrequently in the era of SLN biopsy. Risk factors that were more frequent among those with regional recurrences include high risk cancers (large size and triple negative status) that present at a higher stage, with positive lymph nodes and which undergo therapies reflecting higher-risk biology. The type of axillary staging and rate of CALND after positive sentinel lymph nodes did not differ significantly between patients with and without regional recurrence.
A "SAFE AND EFFECTIVE" PROTOCOL FOR POST-THYROIDECTOMY HYPOCALCEMIA
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BACKGROUND: Post-operative hypocalcemia is the most common complication after total thyroidectomy (TTX) and there are no standard guidelines for management. This study evaluates the safety and effectiveness of a protocol to manage hypocalcemia after TTX.

METHODS: A review of prospectively collected data was performed in 130 consecutive patients who underwent TTX after introduction of a protocol that incorporated immediate post-operative PTH level, percentage of PTH drop and corrected calcium level (CCL). Based on laboratory results, patients were stratified to a high risk category (PTH<10 or PTH drop>60%) and were immediately started on oral calcitriol and calcium; intermediate risk (PTH 11-19 and/or CCL<8) and were given only calcium supplementation; and low risk (PTH>20 and CCL>8) and received no supplementation. These study patients were compared to a control group of 190 consecutive patients that underwent TTX the year prior to the protocol when routine calcium supplementation was the practice. Patient demographics, indications for TTX, concomitant central and/or lateral neck dissection, parathyroid auto transplantation, hypocalcemia events, symptomatic and severe hypocalcemia events, need for supplementation on discharge and length of hospital stay were compared between both groups.

RESULTS: Of the 120 patients in whom protocol was followed-10 patients were excluded because of deviation from protocol-, 37% (n=44) were classified in the high risk category; 11% (n=13) intermediate and 53% low (n=63). Overall, 24% of patients (n=29) had hypocalcemia (CCL<8), of those 7% required IV calcium and 9% were symptomatic; the protocol predicted hypocalcemia in 93% of the patients and none of the patients required readmission. Five patients (4%) were discharged home with a CCL <8, of those, none require additional clinic visits or admission, all were eucalcemic 2 weeks after thyroidectomy, and all discontinued calcium/calcitriol supplementation within 3 months. The protocol had a sensitivity of 95% (95%CI: 83-99%), specificity 67% (95%CI: 56-77%) and negative predictive value of 97% (95%CI: 95% to 100%) for predicting hypocalcemia. There was a complete elimination of severe hypocalcemia symptoms (prior protocol 2.1% vs on protocol 0%), a reduction in half of severe hypocalcemia (calcium <7) events (prior 3.1% vs on protocol 1.5%) and reduction in the need for IV calcium (prior 10.3% vs on protocol 6.2%), however it did not achieve statistical significance. Patients receiving calcium supplementation was significantly lower in the protocol group in comparison to the control group (96.9% vs. 47%; p<0.05).

CONCLUSION: This hypocalcemia protocol accurately identifies patients who do not require additional supplementation and additional monitoring. At the same time, the protocol identifies those patients who will benefit from calcium or calcium and calcitriol supplementation after TTX.
BACKGROUND: Thyroidectomy is an operation with a relatively low complication rate; however, these complications can be serious and occasionally, life threatening. The objective of this study is to determine risk factors associated with complications following thyroidectomy in the State of California.

METHODS: A retrospective analysis was performed using the California Office of Statewide Health Planning and Development (OSHPD) hospital discharge database from 1995 to 2010. Main outcome measures were complications following thyroidectomy; these were examined individually and as an aggregate outcome including any complication and death. Logistic regression was used to identify significant risk factors for complication. High volume centers were identified as those at the 90th percentile of volume, performing >121 thyroidectomies per year.

RESULTS: 106,773 patients underwent thyroidectomy in California. 82% of patients were female; 69% of patients were Caucasian, 5.6% were African American, and 16% were of Hispanic origin. 10,979 (10%) thyroidectomies were performed at high volume centers. 16% of operations were performed at teaching hospitals. Voice changes occurred in 0.5% of patients, vocal cord dysfunction in 1.1%, hypocalcemia in 4.5%, Horner’s syndrome in 0.01%, wound infection in 0.44%, tracheostomy in 1.62%, hematoma in 1.2%, and death in 0.3%. While age had no effect on hypocalcemia, there was significantly increased risk of all complications with odds ratios (OR) of 1.1 [0.96-1.2] for age 41-50, 1.2 [1.1-1.3] for age 50-64, and 2.0 [1.8-2.3] for age >65 compared to age <40. High volume hospitals had significantly lower risk of voice changes (0.5 [0.3-0.8]), postop blood transfusion (0.5 [0.3-0.9]), prolonged intubation (0.5 [0.3-0.8]), or any complication or death (0.8 [0.6-0.97]), (p=0.026) compared to low volume hospitals.

CONCLUSION: Older age was the most significant risk factor for complications following thyroidectomy. Patients who underwent thyroidectomy at high volume hospitals were at lower risk for complications. This information should be useful in counseling patients about the risks of thyroid surgery.
30. DETERMINATION OF SIGNIFICANT RISK FACTORS FOR LYMPHEDEMA FOLLOWING NODAL DISSECTION FOR MELANOMA
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BACKGROUND: Secondary lymphedema is a significant post-operative complication following lymph node dissection. In melanoma patients this rate following axillary dissection (ALND) has been reported to be between 9-25% and for inguinal lymph node dissection (ILND) between 24-44%. While several studies in breast cancer patients identify risk factors for development of lymphedema including radiation therapy, extent of surgery, and tumor burden, such risk assessment is not well described for melanoma patients. The goal of this study is to more accurately define clinical factors associated with the development of lymphedema following ALND or ILND in melanoma patients using a robust patient cohort.

METHODS: From a prospectively collected database of 600 melanoma cases having nodal dissection between January 2008 and July 2014, we identified 283 patients who underwent axillary or inguinal lymphadenectomy for lymph-node positive melanoma under general anesthesia at our institution. Patients that underwent bilateral lymphadenectomy or simultaneously underwent both ALND and ILND were excluded from this analysis. The primary outcome evaluated was development of lymphedema as determined by diagnosis in post-operative clinic evaluations or documented referral to lymphedema services. Demographic, clinical, and post-operative data were collected by review of the electronic medical record. Univariate and multivariate analysis were used to determine independent predictors of lymphedema.

RESULTS: Of the 283 patient cohort, 54 (19.08%) developed lymphedema following lymph node dissection with most having stage 3A disease. Patients were fairly evenly distributed between ALND (N=164; 15 (9.2%) with lymphedema) and ILND (N=119; 39 (32.8%) with lymphedema). On univariate logistic regression: having an ILND, getting post-operative immuno- or chemotherapy, and presence of preoperative peripheral vascular disease (PVD) were each clinical factors significantly associated with increased risk of lymphedema (p<0.001, p=0.028, and p=0.011, respectively). In multivariate logistic regression, ILND (OR: 4.33; 95% CI: 2.14-8.79; p<0.001), chemotherapy (OR: 2.12; 95% CI: 1.05-4.26; p=0.035), and PVD (OR: 3.41; 95% CI: 1.05-11.08, p=0.041) remained significant predictors of lymphedema. The average post-op time to the development of lymphedema was 104 days [Range 7 to 521 days].

CONCLUSION: This is the first recent large series to critically evaluate risk factors for lymphedema following lymph node dissection for melanoma. On both univariate and multivariate analysis, factors that significantly increase the risk for developing lymphedema include having an ILND instead of an ALND, getting post-operative immuno- or chemotherapy, and the presence of PVD. As such these factors should be taken into account for surgical decision-making.
31. INFECTIOUS COMPLICATIONS IN COMBINED COLON RESECTION AND ABLATION OF COLORECTAL LIVER METASTASES
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BACKGROUND: The multifactorial incidence of infectious complications carries considerable consequences for patients undergoing more extensive surgery with intent to cure metastatic colorectal cancer. Advances in ablation techniques have emerged as an efficacious method in regional control for liver metastasis from colorectal cancer; however, the degree of increased risk of infectious complications when ablation is performed in combination with colon resection has not been defined.

METHODS: An analysis of a single institution's prospective database was performed for patients undergoing colon resection. Patients were stratified into a colon resection combined with either microwave (MWA) or radiofrequency (RFA) ablation compared to a colon resection only group. Variables included baseline clinicopathologic data, type of operation, complication grade, and infectious outcome. Fisher's exact test, student t test and analysis of variance were used to detect significance levels of p<0.05.

RESULTS: A total of 141 patients with colon cancer of various origins were identified. The group of colon resection combined with RFA or MWA (August 1998 to December 2012) of 53 patients (34 male:19 female) was compared to a matched group of 88 patients (46 male:42 female) who underwent colon resection only (August 2012 to July 2014). Median age (58.2 vs. 60.2 years; p=0.252), complication rate (58.4% vs. 62.5%; p=0.722), infection rate (30.1% vs. 35.2%; p=0.584), mean blood loss (352 vs. 462 mL; p=0.453), mean blood transfused (1.36 vs. 0.72 units; p=0.191), and receipt of neoadjuvant chemotherapy (47.1% vs. 51.85%; p=0.724) were all similar between the ablation group and colon only group respectively. Overall complication rate was 60.9%, with 33.3% infections. One mortality was observed in each group. Transfusion rate (39.6% vs. 18.9%; p=0.016) and Clavien classification grade 3 or higher complication (35.8% vs. 19.3%; p=0.045) were significantly higher in the colon resection combined with ablation group.

CONCLUSION: Combining MWA or RFA techniques with colon resection for liver metastasis appears to have similar infectious and overall complication rates when compared to performing an isolated resection of the primary colon cancer alone, although there may be a higher degree of complication seen in the more aggressive approach for curative intent in patients with colorectal liver metastasis.
BACKGROUND: The natural history of Non-Functional Pancreatic Neuroendocrine Tumors (NF-PNET) is largely unstudied due to its rarity. Furthermore, most studies include patients evaluated over long periods of time, without the use of high quality cross-sectional imaging. The primary goal of this study was to characterize clinical features, tumor characteristics and outcomes of patients with NF-PNETs, in particular, those identified as incidental tumors, treated at a tertiary referral center with high contemporary imaging.

METHODS: An IRB approved retrospective study of patients with NF-PNET who underwent evaluation by the Surgical Oncology service, from January 1st, 2002 to December 31st, 2013. Patients were evaluated with dedicated pancreatic and liver imaging using multiphasic CT scan and dedicated MRI protocols.

RESULTS: The cohort consists of 46 patients (Male 47.8%) were evaluated and 35 ultimately received surgical resection during the study period. Of these, 16 tumors were discovered incidentally [Head=4, Body=12]. The median age of patients with incidentally discovered tumors in comparison to those with symptoms was similar 62 years and 59 years, respectively. The most common symptomatic presenting sign was jaundice, found primarily in tumors of the pancreatic head [Head: 26.7%, Body: 6.9%, p=.07]. Median tumor size in the incidentally detected group was 2.4 cm in contrast to 6 cm in the symptomatic group, p=.037. The presence of lymphatic and liver metastases was 10% and 25% for asymptomatic patients and 45% and 67% for those with symptoms (p≤.05). Despite these differences, median survival between incidentally discovered tumors and symptomatic tumors were 61.7 months and 56.8 months, p=.43.

CONCLUSION: While appearing clinically benign in many objective ways including: size and lymphatic/hepatic metastasis when compared to symptomatic disease, incidentally discovered NF-PNETs do carry similar survival outcomes. Overall, the clinical outcome of patients with NF-PNETs is characterized by the indolent nature of these tumors.
33. RESTRICTIVE BLOOD TRANSFUSION PROTOCOL IN UPPER GASTROINTESTINAL AND PANCREATIC RESECTIONS PATIENTS REDUCES BLOOD TRANSFUSIONS WITH NO INCREASE IN PATIENT MORBIDITY
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BACKGROUND: Appropriately managing perioperative anemia in surgical oncology patients continues to be one of the most important factors affecting treatment in these cases. Several studies have examined the consequences of blood transfusions and have demonstrated worse outcomes associated with transfusion. The purpose of this study was to determine the impact of a restrictive blood transfusion protocol on the number of transfusions performed and the related effect on patient morbidity. The hypothesis was that the restrictive protocol would effectively reduce the frequency of transfusion without negatively affecting patient morbidity.

METHODS: A cohort study was performed using our prospective database with information from 01/01/2000 to 06/01/2013. The restrictive blood transfusion protocol was implemented in September of 2011, so 09/01/2011 served as the separation point for the date of operation criteria.

RESULTS: For the study, 415 patients undergoing operation for an abdominal malignancy were reviewed. Following the restrictive blood transfusion protocol the percentage of patients that received blood dropped from 35.6% to 28.3%. The disease status of the patients showed 13.0% of patients before the protocol either died from their disease or other causes, while this percentage was only 6.2% in patients following the implementation of the restrictive guidelines.

CONCLUSION: The restrictive blood transfusion protocol resulted in a reduction of the percentage of patients transfused, and there was no evidence to suggest that it negatively impacted the outcomes of patients in this group. These results suggest that a restrictive protocol for blood transfusions is effective and may prevent adverse reactions associated with transfusion.