ACS-MO 01

Causes of Postoperative Death in the Octogenarian 2015

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Background: The elderly population is a rapidly growing group in the US with exponentially increasing surgical needs. While preoperative risk in this population has been studied, little data is available on the causes of post-operative death in the octogenarian and nonagenarian.

Hypothesis: The cause of death in the elderly is due to progressice chronic disease

Methods: We retrospectively reviewed the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database for 2015 focusing on procedures and post-operative diagnosis. We divided the study population into three main categories depending on the type of surgery received: emergent, elective and urgent (non-emergent, non-elective). Two subgroups were identified within these groups based on the patient's functional status: independent and dependent. We examined patient demographics, preoperative risk factors, 30-day mortality, and post-operative complications in patients aged 80 years and older.

Results: We identified 25,892 patients with a mortality rate of 3.9%. Of the 1001 deaths, 598 (59.74%) were seen in the emergent surgery group, 140 (13.98%) in the elective group, and 263 (26.23%) in the urgent group. When comparing cause of death, a majority was due to acute abdomen 815 (81.41%). Death associated with cancer was seen in 186 patients (18.59%). See Figure. An comparison of complications between emergent and elective was done and the data is shown in 2nd Figure.

Conclusions: Acute abdomen is the major cause of death in the octogenarian and nonagenarian undergoing surgery in 2015 followed by cancer. We speculate that, despite efforts to address frailty, reduce preoperative risk, and improve complication-rescue in the elderly undergoing surgery, a high surgical risk persists, contributing to patient demise. However, further studies are needed to determine so in attempts to optimize surgical care in this patient population.

ACS-MO02

Damage Control Laparotomy for Surgical Management of Diverticulitis

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Background: Diverticulitis presents in broad degrees of severity ranging from outpatient management in mild cases to septic shock requiring colonic resection and colostomy formation traditionally in the most advanced instances. Initial studies on Damage Control Laparotomy (DCL) applied for intra-abdominal sepsis failed to show a mortality benefit. However, more recent literature has explored indications for utilizing

DCL for acute diverticulitis as a means to avoid colostomy and unplanned re-laparotomy. Furthermore, there has been detailing of preoperative patient characteristics and physiology to guide patient selection for DCL. Encouraged by these results, we sought to implement this technique at our hospital. This retrospective study describes the outcomes of DCL for the surgical management of diverticulitis in a single institution

Hypothesis: DCL is an effective treatment for complicated diverticulitis.

Methods: A retrospective chart review of all diverticulitis patients treated over the last four years with DCL and was performed. Patient characteristics including preoperative physiology and comorbidities were collected. Outcomes measures of mortality, postoperative complications, readmission, anastomotic leak rate, and ostomy rate were also obtained.

Results: Twenty-two patients were identified. The average age was 66.7 years and major comorbidities were 3.25. Patients were identified by Hinchey Classification (classification, number; I, 1; II, 12; III, 4; IV, 5). The mortality rate was 18%. Final ostomy rate was 68% within the cohort. In 8 patients a colonic anastomosis was attempted with an anastomotic leak identified in 3 of these patients (37.5%). The remainder of post-operative complications are shown in Figure 1. The average length of stay was 19 days with 7.0 days on the ventilator.

Conclusions: This data support the principle that DCL for diverticulitis results in an unacceptably high rate of morbidity and mortality. Recent publications on DCL have similarly raised concern for this approach in general surgery patients and its frequent use needs to be reassessed.

ACS-MO03

DELAYED ENTEROCUTANEOUS FISTULA TAKEDOWN IS A RISK FACTOR FOR POST-OPERATIVE NECROTIZING SOFT TISSUE INFECTION

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Background: Enterocutaneous fistula (ECF) is a challenging surgical disease to manage in part due to its devastating complications. Necrotizing soft tissue infections (NSTIs) of the abdominal wall are uncommon in the setting of ECF takedowns. There is a paucity of data evaluating the factors that contribute to the development of abdominal wall NSTI in ECF takedowns.

Hypothesis: We hypothesize that delayed ECF takedown increases the probability of postoperative abdominal wall NSTIs.

Methods: Prospective data were collected on all patients who underwent ECF takedown. We defined early takedown as ECF takedown within one year of diagnosis and late takedown as takedown after one year. Demographics, length of stay,

comorbidities, (LOS), ICU length of stay (ICU LOS), mortality and postoperative complications were collected. We applied Student's T-test for continuous variables and chi-squared for categorical variables.

Results: We identified 75 patients who underwent ECF takedown, of which 38 (50.7%) patients had an early takedown and 37 (49.3%) had a late takedown. Patients who underwent ECF takedown had a mean age of 53.7 (+/- 14.3). ECF takedown was most commonly performed in females 41(54.7%), and Caucasians 54 (72.0%). Patients who underwent late ECF takedown had a significantly higher rate of abdominal wall NSTIs than in the early takedown cohort (21.6 vs 5.3%p=0.05). There was no difference found in age, gender, race, body mass index (BMI), LOS, ICU LOS and Charlson comorbidity index between groups.

Conclusions: Patients who had a late ECF takedown were at a greater risk for developing postoperative abdominal wall NSTIs compared to those who underwent early ECF takedown. Therefore, earlier takedown should be considered for patients who develop ECF. Further research is necessary to better understand this complex surgical complication.

ACS-MO04

Experience with PCT placement in High-Risk Patients with acute cholecystitis.

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Background: Percutaneous cholecystostomy tube (PCT) is a procedure performed in place of surgical cholecystectomy only on select cases of cholecystitis, in which patients may be poor surgical candidates due to their pre-existing or co-existing comorbidities and critical conditions.

Hypothesis: The objective of this study is to do an in depth analysis of utilization of PCT in our institute with clinical outcomes for patients and eventual definitive surgery.

Methods: In this retrospective clinical study with institutional review board (IRB) approval, we accessed EMR charts of 73 patients who were unfit to undergo surgery at the time of diagnosis of acute cholecystitis and had PCT placed in our institute by the interventional radiology department. The data collected spans over 3 years (December 2012-December 2015) for patients diagnosed with acute cholecystitis unable to undergo surgery at time of diagnosis. For the analysis, charts were examined for: Patient Factors, IR Procedure Details (including type of catheter used, approach to placement, bile cultures, any immediate complications), clinical condition following PCT, delayed complication associated with PCT within 30 days of placement, duration of PCT in place before removal and/or cholecystectomy, and finally number of patients who were operated on and their surgical outcome.

Results: Significant clinical improvements were seen within 3 days following PCT placement in high risk patients with acute cholecystitis. There were no immediate complications identified and major complication within 30-day was identified to be tube dislodgement in 12% of the patients. Majority of bile cultures were found to have no growth however; E.coli, Enterobacter, Klebsiella, Streptococcus, and Yeast were organisms in positive cultures. Out of the 73 patients 43.84% (n=32) underwent

cholecystectomy, of whom; 65.63% (n=21) were laparoscopic, 25% (n=8) were converted to open and 9.37% (n=3) underwent open cholecystectomy.

Conclusions: PCT is an effective initial treatment in patients with acute cholecystitis not amenable to cholecystectomy and in some patients it may be the definitive treatment.

MO05

Fluoroquinolones versus beta lactams for complicated intra-abdominal infections: a meta-analysis of RCTs

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Background: Intra-abdominal infections requiring surgical or percutaneous intervention are common and confer significant morbidity, mortality, and cost. In addition to source control, appropriate broad-spectrum antibiotic coverage is essential. According to the 2017 Surgical Infection Society guidelines, empiric coverage should be based on either a beta lactam-based or a fluoroquinolone-based regimen.

Hypothesis: Fluoroquinolone-based regimens are as effective as beta lactam-based regimens for the treatment of patients with complicated intra-abdominal infections (cIAIs).

Methods: A systematic review and meta-analysis of randomized controlled trials was performed using the PRISMA guidelines. We assessed trials comparing a fluoroquinolone-based regimen to a beta lactam-based regimen as an adjunct to operative or percutaneous intervention. Primary outcomes were effectiveness in the clinically evaluable (CE) population and mortality, and secondary outcomes were effectiveness in the intention-to-treat (ITT) and microbiologically evaluable (ME) population and safety. Subgroup analyses were performed based on the specific antimicrobials, the type of infection, the isolated pathogens, and the trial quality. Calculation of pooled risk ratios (RR) and 95% confidence intervals (CI) was performed using the DerSimonian-Laird random-effects model.

Results: A total of 632 studies were identified, of which 9 (5090 patients) were included in the meta-analysis. Fluoroquinolone-based regimes included moxifloxacin (4 studies), ciprofloxacin/metronidazole (3 studies), and alartrofloxacin or clinafloxacin (1 study each). Beta lactam-based regimens included carbapenems (4 studies), ceftriaxone/metronidazole (3 studies), or piperacillin/tazobactam (2 studies). Duration of antimicrobials ranged from 5 to 14 days. Overall, there was no difference in effectiveness in the CE [risk ratio (RR) 0.99, 95% CI 0.96–1.03)], ITT (RR 0.98 [0.95–1.02]) or ME population (RR 0.98 [0.95-1.01]); mortality (RR 1.06 [0.79–1.42]), and safety profile (related adverse events RR 1.03 [0.77–1.37]) were also similar. On subset analysis, moxifloxacin was less effective than beta lactams in the CE (RR 0.96 [0.93–0.99]), ITT, and ME population (figure 1).

Conclusions: Although overall fluoroquinolone-based and beta lactam-based regimens appear equally effective and safe for the treatment of patients with complicated intra-abdominal infections, limited data suggests inferior results with moxifloxacin. Selection of empiric coverage at individual institutions should be based on local bacterial epidemiology and patterns of resistance, as well as stewardship protocols.

ACS-MO06

Immediate versus Delayed Emergency General Surgery is Associated with a Higher Incidence of C. difficile infection.

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Background: Clostridium difficile infection (CDI) remains an increasingly important condition associated with surgical patients. Studies evaluating the incidence of CDI and its impact on outcomes in patients undergoing emergency general surgery (EGS) are scarce.

Hypothesis: We hypothesize that patients undergoing an EGS procedure have a high incidence of CDI.

Methods: Five hundred and fifty one patients that were clinically suspicious for CDI after undergoing an EGS procedure were followed prospectively. Diagnosis of C. difficile was made using the toxin assay. Demographics, surgical procedure, hospital stay, comorbidities and mortality were obtained. We then compared CDI positive and CDI negative patients using univariate analysis with chi-square and students T-test for categorical and continuous variables respectively.

Results: The total incidence of CDI was 12.9% (71 patients). There was no significant difference in age, gender, race or BMI. The mean days for CDI diagnosis were 11.45 +/- 8.71 from admission and 10 +/- 8.6 postoperatively. CDI positive and negative patients were treated with antibiotics for a similar period of time prior to being tested for suspicion of CDI (10.52 +/-9.11 vs. 10.27 +/-10.53, p=0.85). Patients who tested positive for C. difficile underwent a surgical intervention earlier than those who did not, (0.92 days vs. 3.23 days, p<0.0001). The most common EGS procedures, for patients with a positive CDI, were partial colectomy, 15 (21.13%); followed by small bowel resection/repair, 13 (18.31%); perforated peptic ulcer, 7 (9.9%); Laparotomy, 5 (7.04%); and Skin and Soft Tissue procedure, 5 (7.04%). Charlson comorbidity index showed no difference between the groups (4.47 vs 4.90, p=0.226). There was no statistical difference in Hospital LOS, ICU LOS and Mortality between the groups.

Conclusions: Patients that are clinically suspicious for CDI, undergoing an early EGS procedure, have a higher incidence of CDI with 12.9%. Bowel resections appear to be at increased risk for CDI. Clinicians should have a high index of suspicion and low threshold for testing C. difficile in high risk EGS patients. Further prospective studies are

needed to evaluate this population.

ACS-MO07

Impact Of timing of Debridement Of Open Long Bone Fractures In The Lower Extremities in Blunt Trauma On Wound Infection

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Background: The purpose of this study was to see the impact of the timing of incision and debridement (I & D) for cases of open femur, tibia, and fibula fractures following a blunt injury on the occurrence of surgical site infections (SSI), wound disruption, and sepsis.

Hypothesis: early I & D of open long bone fracture decreases surgical site infections

Methods: Patients from the National Trauma Data Bank (2007-2010) who sustained blunt injuries and were diagnosed with an open femur, tibia, or fibula fracture and also underwent an I & D within 24 hours of arrival to the hospital were eligible for inclusion in the study. The patients' characteristics and outcomes were compared between two groups: I & D within 8 hours (Group 1) and between 8-24 hours (Group 2). Initial patient measures and outcomes were compared between the two unmatched groups However, to better balance the groups at baseline, propensity score matching was performed and a follow-up paired analysis was done.

Results: A total of 9,798 patients qualified for the study and of those, 8,292 (84.6 %) patients underwent an I & D within 8 hours (Group 1) and 1,506 (15.4%) underwent an I & D between 8-24 hours after arrival (Group 2). There were significant baseline differences between the two groups regarding age (P=0.03), race (white vs. nonwhite, P<0.001), Injury severity score (ISS, P<0.001), Glasgow Coma Scale (GCS, P<0.001) and the number of patients with an initial systolic blood pressure (iSBP) < 90 mmHg (P=0.03). Given these clear differences, 1,495 patients from each group were pair-matched using age, sex, race, mechanism of injury, ISS, GCS, and iSBP. Afterward, there were no significant differences observed between the two groups in these matching variables. There were also no significant differences observed in the occurrence of sepsis (2.2 % vs 2.7%, P=0. 51), superficial SSI (1.0% vs. 1.5%, P=1.0), deep SSI (0.2% vs. 0.4%, P= 0.68), wound disruption (0.6% vs. 0.8%, P=1.0), or hospital length of stay (Median [IQR]: 8.0 [4.0, 16.0] vs. 8.0[4.0, 16.0], P=0.62) between Group 1 and Group 2, respectively. However, a higher number of patients went home without any services in Group 2 compared to Group 1 (57.5% vs. 52.4%, P=0.005).

Conclusions: There were no significant differences identified between the groups regarding superficial SSI, deep SSI, wound disruption, and sepsis rates, or median hospital length of stay. Conversely, a significantly higher proportion of patients who had the I & D later went home without any follow-up services needed.

ACS-MO08

IMPROVED OUTCOMES IN DIABETIC SURGICAL PATIENTS WITH PERI-OPERATIVE GLUCOSE MANAGEMENT

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Background: Our community hospital operative 30-day outcome report revealed a concerning trend in morbidity for postoperative general surgery patients. Data analysis identified peri-operative hyperglycemia as the common preoperative risk factor for increased post-operative morbidity in these patients with diabetes mellitus (DM).

Hypothesis: The goal of our study was to improve blood glucose control in elective surgery patients and its association with decreased morbidity.

Methods: A multidisciplinary team with representatives from infection control, anesthesia, pharmacy, surgical residents, and nursing was assembled to determine corrective action and plan for implementation of the action. Educational seminars were conducted to promote awareness about hyperglycemia and postoperative morbidity in DM patients to anesthesia, surgeons, residents and nurses. A standardized protocol was created for management of preoperative patients with DM. The management started with optimizing glucose control at the preoperative visit by a nurse practitioner followed by optimal control on the nursing unit with oversight by a diabetic nurse specialist. An electronic medical record order set of the protocol was implemented and used for documentation.

Results: Data was captured using ACS National Surgical Quality Improvement Program (NSQIP) prospectively. Data review for July-Dec 2016 showed that there were a total of 83 patients with DM having elective general surgery with a morbidity of 9.27%. Metrics for adherence were measured by usage of the order set and monitoring postoperative morbidity outcomes in DM patients. Morbidity was defined as a patient having 1 or more of the specific NSQIP postoperative complications. Since implementation there have been 93 patients with decrease in overall morbidity to 7.8% and with overall improvement at our center in post-operative morbidity. The morbidity was below the national rate of 8.7%.

Conclusions: The goal of this (QI) project is to decrease post-operative morbidity in patients with DM by implementation of perioperative blood glucose level monitoring and treatment. Our preliminary data strongly suggests that process change with incorporating electronic tools into daily work flow may improve outcomes.

ACS-MO09

Inadequate antibiotic coverage in emergently operated complicated perirectal abscess has higher rates of readmission.

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Background: Recommended treatment for complicated perirectal abscess is Incision and drainage (I&D) in conjunction with antibiotics. However, there is no standard antibiotic regimen for postoperative therapy in the published literature.

Hypothesis: Appropriate postoperative antibiotics in patients undergoing emergency

I&D in the operating room (OR) for complicated perirectal abscess will improve outcomes.

Methods: Data from 58 patients admitted for complicated perirectal abscess undergoing emergent I&D in the OR were prospectively collected. Demographics, microbiologic and antibiotic data were abstracted. Adequateness of antibiotics was judged by susceptibility data, when available, or by comparing the antibiotic spectrum with the organisms grown in culture, when not speciated. Students T test and X2 test were used to analyze continuous and categorical variables respectively.

Results: Of the 58 patients reviewed, 11 were excluded as no culture information was available, or the culture had no growth. Of the remaining 47 patients, 34(72%) were male and 30(64%) were African-American. The mean age was 39.1±16.4 years and the BMI was 28.2±6.6 Kg/m2. Culture data revealed mixed aerobic/anaerobic 18(38.3%), mixed aerobic 14(29.8%), Gram positives 10(21.3%), Gram negatives 2(4.3%), and other 3(6.4%). Twenty six (55.3%) patients received adequate antibiotic coverage and 21(44.7%) were inadequately covered. The inadequate antibiotic coverage cohort had higher re-admission rates for perirectal abscess drainage (n=6, 28.6% vs n=1, 3.8% p=0.035). More than half were readmitted 30 days or more after the index procedure. There were no differences in length of stay (LOS), ICU LOS and Charlson comorbidity index between groups.

Conclusions: Inadequate antibiotic coverage after OR I&D resulted in a six-fold increase in re-admission for complicated perirectal abscess. A standard oral protocol combining antibiotics covering typical gram positive, gram negative and anaerobic organisms should provide adequate coverage for complicated perirectal abscess after surgical drainage. Additional prospective studies are needed to elucidate optimal antibiotic coverage for these patients.

ACS-MO10

Length of therapy during a phase 3 study of eravacycline and meropenem for complicated intra-abdominal infection

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Background: The recent Study to Optimize Peritoneal Infection Therapy (STOP-IT) trial demonstrated that, for patients with complicated intra-abdominal infection (cIAI) after adequate surgical or interventional radiologic source control, short-duration antibiotic therapy (~ 4 d) was associated with similar outcomes compared to longer-duration therapy (~ 8 d). This study was performed to assess prescribing of antibiotic therapy for cIAI subsequent to STOP-IT with respect to duration, and to determine patient- or disease-related characteristics related to shorter treatment courses, regardless of patient severity of illness

Hypothesis: Compared with enrollees into the Investigating Gram-Negative Infections Treated with Eravacycline (IGNITE)1 study (JAMA Surg 2017;152:224), patients enrolled into IGNITE4 have similar clinical outcomes while receiving shorter courses of antibiotics after adequate source control, regardless of risk factors for complications.

Methods: Post-hoc analysis of IGNITE4, a randomized, double-blind, non-inferiority phase 3 trial, made to describe patient demographics and outcomes by duration of therapy (DoRx). Patients with documented cIAI were randomized (1:1) to either eravacycline 1 mg/kg IV q12h or meropenem 1g IV q8h. DoRx was up to 14 d at the clinician's discretion. Clinical outcome at the test of cure (TOC) visit, ~ 28 d after randomization, was the primary efficacy endpoint in the microbiological-intent-to-treat (micro-ITT) population. Three groups were categorized based on DoRx: < 5 d, 5.5 to 8 d, and > 8 d, respectively. Statistical analysis assessed the association of several collected patient variables using multi-group X2 to compare data among groups ($p < 0.05$). Ordinal logistic regression was performed using all variables having a univariate association with DoRx.

Results: Patients who received longer DoRx had higher Acute Physiology and Chronic Health Evaluation (APACHE) II scores ($p=0.016$), were less likely to have a diagnosis of complicated appendicitis ($p<0.001$), and were more likely to have an open surgical procedure ($p<0.001$) compared to those receiving shorter DoRx. Overall average DoRx was 7.4 d, and for the groups were 4.6 d, 7.2 d, and 12.3 d, respectively. Clinical success in the micro-ITT group for the three groups were 88.4%, 94.5%, and 87%, respectively ($p=0.06$)

Conclusions: In IGNITE4, patients receiving longer courses of antibiotic treatment were sicker, had a diagnosis other than complicated appendicitis, and were more likely to have an open surgical procedure. Average DoRx values exceeded that in the short-course treatment group in STOP-IT and were similar to those in IGNITE1. Clinical practice may not be evolving, but the clinical trial context may be constraining.

ACS-MO11

Measuring Provider Compliance with an Institution-Based Clinical Pathway for Diverticulitis using Radiological Criteria

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Background: Diverticulitis remains a common disease encountered in the acute care setting. Management strategies have been developed to guide treatment decisions based on imaging. By using a multifaceted clinical pathway approach, a standardized method of diagnosing and categorizing disease severity can be performed in order to guide appropriate management. This study evaluated provider compliance with an institutional clinical pathway designed to guide management of diverticulitis.

Hypothesis: Provider compliance will vary based on decision points across a standardized clinical pathway.

Methods: An institutional wide clinical pathway was developed to manage diverticulitis, including radiological classification, primary service line assignment, interventional strategies and antibiotic treatment. To assess provider compliance with the algorithm, we queried the institutional acute diverticulitis database for patients treated from June 1, 2016 to February 9, 2017, which identified 83 patients. Provider compliance with the

pathway was assessed using subgroup analysis of radiological documentation (modified Neff [mNeff] classification), primary service assignment and interventions (i.e., interventional radiology [IR] and antibiotics).

Results: The cohort represented a diverse group of mNeff classifications with the following distribution: Stage 0 (43.4%), Stage 1 (18.1%), Stage 1a (13.3%), Stage 1b (7.2%), Stage 2 (7.2%), Stage 3 (0%), Stage 4 (1.2%), Undefined (9.6%). Of the patients included, 27.7% had a previous history of diverticulitis and 24.1% had recurrent diverticulitis. Patients received a total duration of antibiotic therapy (mean ± SD) of 10.2 ± 5.1 days. Table 1 demonstrates compliance with the clinical pathway. Table 1 Compliance category % (n/N) Overall 9.6 (8/83) mNeff documentation 90.4 (75/83) Primary service assignment Non-surgical primary team mNeff 0 100 (36/36) Non-surgical primary team mNeff 1 or 1a 88.4 (23/26) Surgical primary team mNeff 1b 16.7 (1/6) Surgical primary team mNeff 2-4 100 (7/7) IR drainage for mNeff 1b 16.7 (1/6) Antibiotic choice 20.5 (17/83) Antibiotic duration 69.9 (58/83) No source control 74.3 (55/74) Source control 33.3 (3/9)

Conclusions: Overall compliance with the clinical pathway was poor; except as it related to compliance with radiologic documentation, appropriate assignment to surgical service line and antibiotic duration. These results suggest areas for future improvement to augment compliance with the clinical pathway.

ACS-MO12

Obtaining Cultures in Community-Acquired Intra-Abdominal Infection is not Associated with Outcome

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Background: Most patients with community-acquired intra-abdominal infection (CA-IAI) are successfully managed with source control and empiric antimicrobial therapy. As a result, clinical guidelines do not recommend routine collection of cultures, despite an absence of rigorous data to support this recommendation. With the rise of antimicrobial resistance, this recommendation warrants further scrutiny.

Hypothesis: We hypothesized that obtaining cultures is not an independent predictor of death in the management of CA-IAI.

Methods: All surgical patients with CA-IAI admitted to an academic institution between 1996 and 2011 were included. Univariate analyses compared characteristics and outcomes between patients with cultures and those without. Multivariable logistic regression evaluated the independent effect of obtaining cultures on in-hospital mortality, while controlling for other factors.

Results: A total of 1,192 patients with CA-IAI were included for study and cultures were obtained in 621 (52.1%) patients. Patients with culture data had higher median APACHE II scores (10 vs. 9, $p<0.001$), higher rates of malignancy (11.3% vs. 7.4%, $p=0.03$), insulin-dependent diabetes (11.1% vs. 7.4%, $p=0.03$), and select comorbidities

included in multivariate analysis. Culture data was more frequently obtained in patients with a pancreatic source of CA-IAI (4.3% vs. 1.8%, p=0.02) and less frequently obtained when infection originated from the appendix (13.0% vs. 20.3%, p<0.001). In patients with cultures; mixed flora (27.1%), Streptococcus spp. (18.9%), Escherichia coli (15.1%), and Candida albicans (11.1%) were the most commonly speciated organisms. Unadjusted mortality was higher among patients with cultures although this relationship did not reach significance (6.0% vs. 4.0%, p=0.16). On multivariate regression, obtaining cultures was not associated with mortality (Table). Obtaining cultures was associated with a longer median duration of antibiotic therapy (11 vs. 9 days, p<0.001) and median hospital stay (7 vs. 5 days, p<0.001).

Conclusions: We did not identify a relationship between the acquisition of cultures in CA-IAI and survival, and obtaining cultures was associated with a longer duration of therapy and hospital length of stay. These data support current guidelines that cultures do not yield benefit in the management of CA-IAI.

ACS-MO13

Pre-operative Antifungal Therapy Does Not Improve Outcomes in Perforated Peptic Ulcers

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Background: With the advent of anti-Helicobacter pylori therapy, complications of peptic ulcer disease (PUD) have declined significantly since the 1990s. Despite this, operative treatment of PUD is one of the most commonly performed emergency general surgeries. While previous papers suggest that isolation of Candida from peritoneal fluid cultures may be associated with worse outcomes in patients with perforated peptic ulcers (PPUs), post-operative antifungal therapy has not been shown to be effective. There have been no studies of preoperative antifungal therapy in PPU.

Hypothesis: We hypothesized that preoperative antifungals improve post-operative outcomes in patients with perforated peptic ulcer disease undergoing operative management.

Methods: A prospectively maintained Acute and Critical Care Surgery (ACCS) database spanning 2008-2015 and including over 7,000 patients was queried for patients with PPUs. Demographics and clinical outcomes were abstracted. Preoperative antifungal use, intraoperative peritoneal fluid cultures and post-operative infections were manually abstracted. We compared outcomes and presence of fungal infections between patients receiving perioperative antifungals in the entire cohort and in patients with fungal isolates from intraoperative peritoneal fluid cultures. Chi-squared and Fisher's exact test were used to compare categorical variables. Student's T-test was used for continuous variables.

Results: There were 107 patients with perforated peptic ulcers treated with operative management; 27 (25.2%) received preoperative antifungal therapy. There were no differences in demographics or comorbidities. 33 patients received peritoneal fluid culture; 17 (51.5%) cultures were positive for fungus. Isolation of fungus from in peritoneal fluid culture did not affect outcomes. There were no differences in length of stay (LOS), intensive care unit (ICU) LOS, ventilator days, 30-day readmission rates or rates of intraabdominal abscess formation or fungemia in patients who received preoperative antifungals regardless of the isolation of fungi in the peritoneal fluid.

Conclusions: Historically, Candida has been noted to occur in 29%– 57% of peritoneal fluid cultures in patients with PPUs, however there are no studies evaluating preoperative antifungal therapy in PPUs. This data suggests that preoperative antifungals may not improve outcomes in patients undergoing operative management for perforated peptic ulcers.

ACS-MO14

Risk Factors for Postoperative Sepsis and Septic Shock in Patients Undergoing Emergency Surgery

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Background: Postoperative sepsis in emergency surgery is associated with mortality of up to 4.2%, significantly higher than for elective surgery (1.1%). Overall, total hospital costs increase by 2.3 times for patients that develop post-operative sepsis. This study aimed to identify risk factors for postoperative sepsis or septic shock in patients undergoing emergency surgery.

Hypothesis:

Methods: A retrospective cohort analysis was performed using the National Surgical Quality Improvement Program (NSQIP) by identifying patients undergoing emergency surgery between 2012-2015 and comparing those that developed sepsis with those that did not. Anal procedures and cases with pre-operative sepsis or septic shock were excluded. Multivariate logistic regression was used to identify risk factors for development of sepsis or septic shock in patients undergoing emergency surgery.

Results: Out of 122,757 cases that met inclusion criteria, 1,448 developed sepsis and 962 septic shock. Risk factors for sepsis or septic shock were male gender (OR= 1.38,

95% CI 1.26-1.51, p<0.0001), American Society of Anesthesiologists (ASA) class 2 or higher (OR= 2.54, CI 1.94-3.32, p<0.0001), and partially dependent (OR= 1.62, CI 1.37-1.93, p<0.0001) or totally dependent (OR=1.77, CI 1.28-2.46, p =0.00062) functional status. Compared to colorectal procedures, patients undergoing pancreatic (OR= 3.57, CI 2.28–5.58, p<0.0001) and small intestine (OR= 1.30, CI 1.16–1.46, p<0.0001) surgery were more likely to develop sepsis or septic shock, whereas patients undergoing biliary (OR= 0.37, CI 0.30-0.53, p<0.0001) and thoracic (OR= 0.42, CI 0.22-0.79, p=0.008) procedures were less likely to develop septic complications.

Conclusions: Risk factors for development of sepsis or septic shock are male gender, ASA class 2, or higher, and partially or totally dependent functional status. Emergency pancreatic or intestinal procedures may confer a greater risk for the development of sepsis or septic shock. Greater vigilance and early post-operative screening may be of benefit in patients with these risk factors.

ACS-MO15

Short Term Morbidity Following Total Pancreatectomy and Auto Islet Transplantation; A National Surgical Outcomes Review.

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Background: Total pancreatectomy with auto-islet transplantation(TPIAT) is an effective surgical approach to manage the disabling complications of chronic or acute recurrent pancreatitis. Fewer than 1000 procedures have been reported to date. Immediate post-surgical morbidity rates varies based on the reporting institution.

Hypothesis: Our objective was to quantify short-term surgical morbidity following TPIAT from a national surgical outcomes database and identify independent pre-operative predictors of post-surgical infectious complications(PSIC).

Methods: ACS NSQIP database was reviewed from 2005-2015 to identify all patients who underwent a TPIAT. Patients with malignant disease were excluded from the analysis. Patient demographics, pre-operative co-morbidities, laboratory variables, postoperative 30-day mortality, and overall morbidity outcomes were evaluated. PSIC was defined as a composite categorical outcome that included superficial, deep and organ space infections, pneumonias, urinary tract infections and post-operative sepsis and shock. Univariate analysis followed by multivariate logistic regression was performed to identify independent predictors of PSIC.

Results: A total of 384 patients met our inclusion criteria, with a mean age of 41.7 ± 12.7; predominantly female (70.3%) and Caucasian (81.3%). Mortality rate at 30 days was 0.8%(N=3) with an overall morbidity rate of 36.2%(N=139). PSIC rate was 28.9%(N=111) whereas superficial and deep surgical site infections rates were 6.5%(N=25) and 2.3%(N=9) respectively. Organ space infections, pneumonias, UTI's, sepsis and septic shock rates were 9.1%(N=35), 8.5%(N=33), 5.2%(N=20), 11.5%(N=45%), 1.8%(N=7%), respectively. Post-operative bleeding requiring blood transfusion was present in 27.1% (N=104) of patients. On univariate analysis emergency surgery status, increased surgical wound classification, ASA scores ≥2, decreased pre-operative sodium, increased alkaline phosphatase levels and increased intraoperative time were associated with an increased PSIC rate. On the multivariate model, increased operative

time was independently associated with an increased risk of developing a PSIC (OR: 1.02, 95% CI 1.01- 1.04, Hosmer-Lemeshow ᵾ2= 5.04, P= 0.7).

Conclusions: TPIAT is associated with low 30-day mortality and significant postoperative morbidity. Postoperative bleeding, sepsis and organ space infection contribute significantly to postoperative morbidity.

ASC-MO16

Surgical Site Infections and Postoperative Intraabdominal Abscesses in Appendicitis: An ACS-NSQIP Study

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Background: Surgical site infections (SSI) and postoperative intraabdominal abscesses (IA) are common postoperative complications for appendicitis. Although laparoscopic appendectomies have been associated with reductions in postoperative pain, in-hospital length of stay, and SSI rates, other studies associate laparoscopic appendectomies with higher rates of postoperative IA.

Hypothesis: The aim of the study is to evaluate risk factors for surgical site infections and postoperative intraabdominal abscesses after appendectomy using a large national database.

Methods: The 2016 American College of Surgeons – National Surgical Quality Improvement Program Procedure-Targeted Appendectomy database was used to identify cases with appendectomies for appendicitis confirmed on pathology. Cases were divided into the following cohorts: those with incisional SSI, postoperative IA, any SSI, and no postoperative infections. Comparisons between cohorts were made using the student's t-test and Pearson's chi-squared test where appropriate. Binary logistic regression analysis was used to identify independent predictors of incisional SSI and postoperative IA.

Results: A total of 11,314 patients underwent appendectomies for appendicitis, with an overall SSI rate of 4.5%. Patients with any SSI were more likely to be older (44.6 vs 39.5 years old, p<.001), male (59.3% vs 52.1%, p=.002), BMI>35 (20.8% vs 13.9%, p<.001), diabetic (9.3% vs 4.8%, p<.001), have preoperative sepsis (56.3% vs 43.7%, p<.001), open surgery (8.9% vs 3.0%, p<.001), laparoscopic conversion to open (9.3% vs 2.1%, p<.001), and longer operative times (68.0 vs 52.5 minutes, p<.001). They were less likely to have uncomplicated appendicitis (34.2% vs 77.6%, p<.001), or have the surgical specimen placed in a bag prior to removal (85.4% vs 91.0%, p<.001). On regression analysis, appendicitis complicated by abscess or perforation was an independent risk factor for both incisional SSI and IA. Open surgery, conversion to open surgery, and BMI>35 had higher odds of incisional SSI. Preoperative sepsis, diabetes, and longer operative times had higher odds of IA, while placing the specimen in bag had lower odds of IA.

Conclusions: Incisional SSI and postoperative IA are common complications after appendectomy. Independent predictors of postoperative infections include complicated appendicitis, open surgery, conversion to open surgery, BMI>35, diabetes, preoperative

sepsis, and longer operative times. Placing the surgical specimen in a bag prior to removal has lower odds of intraabdominal abscesses.

ACS-MO17

The Emergency Surgery Score (ESS) Accurately Predicts the Risk of Postoperative Infection in Emergency General Surgery

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Background: The Emergency Surgery Score (ESS) was recently created and validated as an accurate and user-friendly postoperative mortality risk calculator specific for Emergency General Surgery (EGS). ESS is calculated by adding integer points for 22 preoperative variables (demographics, co-morbidities, and preoperative laboratory values); increasing scores accurately and gradually predict higher mortality rates. We sought to evaluate whether ESS can predict the occurrence of post-operative infectious complications in EGS patients.

Hypothesis: In EGS patients, a higher ESS is associated with an increased likelihood of post-operative infectious complications.

Methods: Using the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database from 2007-2015, EGS patients were identified by using the “emergent” ACS-NSQIP variable and a concomitant surgery CPT code for “digestive system”. Patients with missing ESS variables or those who died within 72 hours from surgery were excluded. A composite variable, postoperative infection, was created and defined as the postoperative occurrence of one or more of the following: superficial, deep incisional or organ/space surgical site infection, wound disruption, pneumonia, sepsis, septic shock, or urinary tract infection. ESS was calculated for all included patients, and the correlation between ESS and postoperative infection was examined using c-statistics.

Results: Out of a total of 4,456,809 patients, 90,412 patients were included. The mean age of the population was 56 years, 51% were female, and 70% were white; 22% developed one or more post-operative infections, most commonly sepsis/septic shock (12.2%), surgical site infection (9%), and pneumonia (5.7%). ESS gradually and consistently predicted infectious complications with 7%, 24%, and 49% of patients with an ESS of 1, 5, and 10 developing postoperative infections, respectively [Figure 1]. The c-statistics for overall postoperative infection, postoperative sepsis/septic shock and pneumonia were 0.73, 0.75 and 0.80, respectively.

Conclusions: ESS accurately predicts the occurrence of postoperative infectious complications in EGS patients, and could be used for preoperative clinical decision-making as well as quality benchmarking of infection rates in EGS.

Basic-MO01

A nanocomposite electrospun scaffold enhanced cell adhesion in wound healing

Cheng Zhao; Jianan Ren

Background: For open abdomen, many patches and scaffolds have been used. The electrospun attracts people's attention for mimicking the extracellular matrix which is suitable for cell adhesion and proliferation. The scaffold has been used for wound protection, corneal cells adhesion and cardiomyocytes proliferation. In wound healing, gold nanoparticles showed great potential in promoting fibroblast regeneration, protecting vascular endothelial cells and anti-infection. We used the microsphere to control the release of gold nanoparticles. In this work, we sought to directly test cell adhesive ability of the scaffold and its therapeutic effect in healing the wound.

Hypothesis: We hypothesized that nanocomposite scaffold could enhance the cell adhesion and promote healing.

Methods: We produced the scaffold by electrospinning and characterized it. We tested the contact angle, controlled release ability and cell adhesion in vitro. Open abdomen model was set to analyze the therapeutic effect.

Results: Scaffolds with different shapes of porous microsphere were produced and analyzed. It showed controlled release ability in vitro. After loading the AuNPs, the hydrophobic surface was changed. We cocultured the scaffold with fibroblast for 3 days. Enhanced cell adhesion was oberved. In vivo study confirmed the idea that the scaffold could accelerate the healing. Reduced inflammation and increased neovascularization were observed. The granulation in highest AuNPs concentration scaffold group was thicker than the others.

Conclusions: The scaffold showed great ability in enhancing cell adhesion. It may owing to the effect of AuNPs. Different sizes of AuNPs have different effect. More work need to be done.

Basic-MO02

Biofilm formation correlates with bacterial binding to enterocytes in Enterococcus faecalis.

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Background: Although necrotizing enterocolitis (NEC) is believed to be associated with bacterial colonization, the exact nature of the relationship between NEC and bacterial populations remains elusive. Our previous studies implicated a clinically relevant strain

of Cronobacter muytjensii, but not several other strains of this species, as a causative agent of NEC. This led us to hypothesize that certain strain characteristics may account for the difference between pathogenic and potentially protective bacteria. We are characterizing multiple isolates of Enterococcus faecalis, a common first colonizer of rat intestine, and their role in the pathogenesis of experimental NEC.

Hypothesis: Ability to form a biofilm has been shown to enhance bacterial virulence or pathogenicity, although the underlying mechanism is still undefined. We hypothesize that biofilm formation may enhance bacterial binding to the intestinal epithelium.

Methods: Bacteria were isolated from 4-day-old rats and characterized. Isolates with different combinations of characteristics were considered different strains. The identified strains were examined for their ability to bind to IEC-6 enterocytes and to form biofilm on polystyrene microtiter 96-well plates using a quantitative crystal violet assay.

Results: 21 strains were identified among the 146 isolates. There was considerable diversity in the ability of the E. faecalis strains to bind IEC-6 enterocytes. When biofilm production was compared between the high-binding group (>2% bacteria bound) and the low-binding group (<0.8% bacteria bound), the latter had significantly lower biofilm formation (0.012± vs. 0.008±, p = 0.014).

Conclusions: Ability of E. faecalis to effectively bind intestinal epithelial cells positively correlates with another potentially pathogenic characteristic—ability to form biofilm. Further characterization of these bacteria may identify potentially pathogenic or protective strains.

Basic-MO03

Can IL-6-receptor blockade rectify burned induced hypermetabolism?

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Background: Hypermetabolism is a debilitating response after burn injury that has been shown to contribute to multi-organ failure, sepsis, morbidity and mortality. We have previously reported that the cytokine interleukin-6 (IL-6) plays an important role in the pathogenesis of burn-induced hypermetabolism. Specifically, the soluble form of the IL-6 receptor (sIL-6R) has been implicated in both adipose tissue browning and persistent inflammation via the acute phase protein serum amyloid a. Tocilizumab, is a clinically approved antibody targeting the IL-6 receptor (IL-6R mAb) that has demonstrated beneficial results in Rheumatoid arthritis patients. Aim: This study was undertaken to examine whether the anti-mouse IL-6R antibody (Tocilizumab analogue) attenuates hypermetabolism and its associated pathology in a preclinical animal burn model.

Hypothesis: We hypothesize that blocking IL-6 signaling post-burn injury will attenuate burn-induced hypermetabolism.

Methods: Patients with burns admitted to our burn centre and non-burn controls undergoing elective surgeries were consented for blood collection to measure both soluble IL-6 receptor and IL-6. To determine the efficacy of IL-6R blockade in burns, we administered I.P injections of saline control or IL-6R mAb (1.3mg/kg/day) to burned

(30% total body surface area) mice daily for 5 days. Subcutaneous white adipose tissue and plasma collected were analyzed for browning markers and metabolic state via histology, gene expression, and lipid profiling. Liver and skin tissue were collected to assess the effects of IL-6R blockade.

Results: Clinically, we show that plasma sIL-6R, but not IL-6, is more sensitive to delineating hypermetabolic burn patients. In a burn mouse model, we also demonstrate that treatment with IL-6R mAb is safe with no adverse effects. In fact, anti-IL-6R mAb treatment in post-burn mice attenuated burn-induced hypermetabolism, characterized by reductions in adipose browning, mitochondrial respiration, and body weight loss. Histopathological analysis also showed reductions in hepatic fat infiltration in post-burn IL-6R mAb treated mice. Importantly, blockade of soluble IL-6R did not impair wound healing in post burn mice, as no differences were present between treated and non-treated groups for collagen deposition and granulation tissue formation in the skin.

Conclusions: Our findings identify sIL-6R as a critical driver of post-burn hypermetabolism, and suggest that selectively blocking this receptor as a novel therapeutic approach to mitigate burn-induced hypermetabolism.

Basic-MO04

Comparison of CHG Retention in a Repetitive Fluid Challenge with 2% CHG/70 % IPA Preoperative Skin Preparations.

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Background: Preoperatively, skin is treated with topical antiseptic products to minimize the risk of surgical site infections by reducing microorganisms on skin. Chlorhexidine gluconate (CHG) is an antimicrobial used in preoperative skin preparations because of its broad-spectrum activity and persistent properties. However, chlorhexidine is water-soluble leaving the possibility a CHG-formulation may be removed during surgery when prepped areas are exposed to fluid and repeated blotting. The objective of this study was to evaluate the impact that the addition of an acrylate copolymer has in a CHG-containing preparation in minimizing CHG loss during simulated surgical irrigation and wiping procedures when compared with a CHG-containing preparation without a polymer.

Hypothesis: Addition of a copolymer to 2% CHG/70 % IPA preoperative skin preparation improves retention of CHG on the skin during a surgical irrigation challenge.

Methods: In this prospective-randomized, paired-comparison study, 21 healthy volunteers were enrolled and had 2 test preparations, 2% CHG/70% IPA (polymer) and 2% CHG/70% IPA, applied to their back. Test sites were randomized to pre-challenge (no repetitive saline soak/wipe) or post-challenge (repetitive saline soak/wipe). Samples were collected using a modified cup scrub method; HPLC analysis measured CHG content. Study endpoints: CHG (µg/cm2) removed during challenge; CHG (µg/cm2) remaining post-challenge. Skin irritation was rated pre- and post-product application and adverse events were collected. A Mixed Model ANOVA compared products for response of CHG concentration.

Results: 2% CHG/70% IPA (polymer) had significantly more CHG on skin than 2% CHG/70% IPA, both pre-challenge (14 µg/cm2 more; p=0.001) and post-challenge (29 µg/cm2 more; p<0.0001). Significantly less CHG was removed from 2% CHG/70% IPA (polymer) sites (47.6 µg/cm2) than from 2% CHG/70% IPA sites (62.6 µg/cm2) post-challenge; the difference (15 µg/cm2) (p=0.012). No skin irritation or adverse events were reported.

Conclusions: Addition of a copolymer to a CHG-containing preparation resulted in more CHG on skin, both pre- and post-challenge, and less CHG removed in this repetitive saline soak/wipe model. Both preparations were well-tolerated.

Basic-MO05

Does Immune Status Impact the Utility of SOFA Score in Predicting Outcomes in Necrotizing Soft Tissue Infections?

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Background: Sequential assessment of SOFA score is a good indicator of prognosis in NSTI patients. However, the prognostic value of the SOFA score in immunocompromised patients with NSTI has not been described. Our aim was to determine the impact of immune status in the utility of the SOFA score and its change over time for predicting mortality in patients with NSTI.

Hypothesis: We hypothesize that immune status decreases the utility of the SOFA score in predicting mortality in patients with NSTI.

Methods: This is a retrospective cohort study of NSTI patients admitted from 1995 to 2014. SOFA scores were calculated at baseline (T0), 24 (T1), 48 (T2) and 72 (T3) hours after admission. ΔSOFA was also calculated (change in SOFA from T0 to T1, T2 and T3). Multivariate logistic regression was performed to assess the association between SOFA score and in-hospital mortality. Subgroup analysis was performed based on immune status.

Results: There were 509 total patients, 57% males and a median age of 57 years (IQR 46–67). 132 (26%) were immunocompromised. Overall in-hospital mortality was 15% and 23% in immunocompromised patients. Sofa scores at T0, T1, T2 and T3 were significantly different between survivors and non-survivors (Table 1). However, when compared by immune status, only Sofa score at T1 was significantly different between immunocompetent and immunocompromised patients (Table 2). On multivariate analysis, SOFA score and change in the score over time were predictive of mortality in immunocompetent patients. However, SOFA score and change over time were not predictive of mortality for immunocompromised patients.

Conclusions: While in immunocompetent NSTI patients, sequential assessment of SOFA score correlated with mortality, that was not true in immunocompromised

patients.

Basic-MO06
Enabling a Standardized Assessment of SSI post-discharge

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Background: Surgical site infections (SSIs) are the most common of hospital acquired infections, occurring in 2-5% of patients undergoing inpatient surgery. SSIs are expensive for the healthcare system, and cause significant morbidity and mortality among surgical patients. At present, most SSI surveillance is completed in the acute-care setting, and hospital infection control programs do not always include a standardized methodology for post-discharge surveillance (PDS). However, approximately 60% of SSIs occur following discharge and therefore, the true rate of SSI is likely underreported. Moreover, the lack of standardization for post-discharge data collection has resulted in a limited understanding of SSIs in the post-acute and home care areas.

Hypothesis: Evaluate the feasibility of a web-based surgical site infection (SSI) tool(how2trak) that used the 1999 United States Centers for Disease Control and Prevention guidelines for the detection of SSIs (Mangram, et al., 1999).

Methods: Feasibility was evaluated by measuring concordance, a measure of inter-rater reliability, within paired nurse assessors and nurse assessor feedback regarding the usefulness of the tool. Patient referral and recruitment, nurse pair assessments using the how2trak SSI tool, and follow-up visits with the patients occurred from March 2015 through July 2016 at 3 Calea Home Care Clinics in Toronto. Discussion groups were carried out in 2 sessions via teleconference on September 6 and 7, 2016.

Results: Overall positive concordance between nurse assessors was demonstrated; in many instances, concordance rates were reported above eighty percent. Discussion groups reported that: (1) that the how2trak tool was user friendly; (2) that it proved to be a productive data collection tool in the clinical setting; and (3) that it made tracking patient outcomes far more efficient than the traditional paper-based tool. Using the CDC guidelines for the identification of an SSI, the prevalence of SSIs post-discharge in the Calea Clinic was found to be 34.6 %.

Conclusions: Overall, this study demonstrated that the how2trak tool is a feasible data collection tool for nurses in the Calea Clinics. Therefore, the how2trak tool provides a feasible option for standardizing data collection and analysis for the assessment of SSIs post-discharge across clinic settings.

Basic-MO07
Farnesoid-X Receptor Inhibition Allows Uninhibited Epidermal Growth Factor Activity

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Background: Cell migration and proliferation are components of intestinal restitution that promote the integrity of the intestinal barrier. We have previously shown that activation of the epidermal growth factor receptor (EGFR) pathway increases cell migration in a COX-2 and Erk-dependent fashion, while activation of the nuclear farnesoid-X receptor (FXR) interferes with the EGFR pathway.

Hypothesis: We hypothesize that FXR activation will decrease cell proliferation and migration through inhibition of the EGFR pathway, leading to exacerbation of intestinal barrier injury. We will test this hypothesis using both in vitro and in vivo models of injury.

Methods: Rat intestinal cells (IEC-6) were serum-starved for 24-48 hours and treated with vehicle control, GW4064 (FXR agonist), or guggulsterone (FXR antagonist) for 24 hours. Proliferation was measured using a crystal violet staining assay, and migration was measured using a modified wounding assay. Wild-type C57BL/6 (WT) mice received intraperitoneal injections of 30 mg/kg lipopolysaccharide (LPS) to induce peritonitis, 30 mg/kg GW4064, or the combination. Terminal ileal mucosal scrapings were harvested 16 hours after treatment. Phosphorylated Erk (pErk) and COX-2 were measured via Western blot. Statistical comparisons were done using ANOVA.

Results: In vitro, guggulsterone-induced FXR inhibition increased cell proliferation compared to control or GW4064-induced FXR activation. FXR inhibition also allowed increased cell migration in IEC-6 cells. In vivo, both pErk and COX-2 levels were decreased in mice treated with GW4064, and further decreased in mice treated with the combination of LPS+GW4064, as measured by Western blot. We have previously shown that pErk and COX-2 epithelial expression increased with ursodeoxycholic acid (UDCA)-induced EGFR activation, leading to improved migration and barrier function.

Conclusions: We conclude that FXR inhibition increases cell migration and proliferation, possibly through uninhibited activity of the EGFR pathway. In contrast, FXR activation decreases cell migration and proliferation, while decreasing pErk and COX-2 levels. In our lab, this change is seen when barrier function worsens. FXR may be a valuable target in treatment of intestinal diseases, such as necrotizing enterocolitis and inflammatory bowel disease.

Basic-MO08

Necrotizing Soft Tissue Infections: Wound Microbiology and Outcomes at a Regional Quaternary Referral Center

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Background: The incidence of Necrotizing Soft Tissue Infections (NSTI) remains consistently low; however, morbidity and mortality rates remain high. Clinical diagnosis remains nuanced, and suspicion of NSTI often results in transfer to regional referral centers. Etiologic microorganisms can be grouped into Type I (Polymicrobial), Type II (Group A β-hemolytic Streptococci +/- Staphylococci), or Type III (monomicrobial, Clostridium spp. or Gram negative). A retrospective review was conducted to examine the outcomes of NSTI patients based on wound microbiology.

Hypothesis: Patients with Type II NSTI will have increased morbidity and mortality compared to patients with Type I NSTI.

Methods: An 8-year retrospective chart review was performed, including all patients evaluated by the acute care surgery or burn surgery service with NSTI, confirmed by operative report and positive wound cultures. Demographic data was collected, as well as culture and laboratory results. Mortality was the main outcome measure. Non-parametric continuous data were analyzed using a Mann-Whitney U test. Categorical data were analyzed by Fisher's exact test.

Results: Sixty-nine patients met inclusion criteria. Most (58%) were female, with a median age of 55. 72.5% were African American. Forty-two cases were classified as Type I, 25 as Type II, and 2 cases as Type III. One patient had cultures positive for Vibrio vulnificus and two patients had 6 different bacteria isolated from their wounds. The overall mortality rate was 7.25, with a median length of stay of 16 days (IQR = 8.8-30) Type II patients had a significantly higher mortality (4) compared to Type I (1, $p = 0.0368$). Immature granulocyte percentage and PTT were higher in Type II ($p = 0.03$; < 0.0001) compared to Type I. Lactate ($p = 0.101$) level and white cell count ($p = 0.845$) were not significantly different between types.

Conclusions: Patients in the Type II group had a significant increase in mortality. Overall mortality rates were lower than reported elsewhere. This may represent selection bias, or improvements in aggressive surgical care. Bacterial subtype may be an important driver of outcomes in this important disease, and should be the topic of further study.

Basic-MO09

Pathophysiology of Septicemia in Adult Burn Patients

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Background: Burns are a common form of trauma that account for over 300,000 deaths each year worldwide. Survival rates have improved over the past decades due to improvements in nutritional and fluid support, burn wound care, and infection control practices. However, mortality remains unacceptably high. The primary cause of death has changed over the last decades from anoxic causes to now predominantly infections and sepsis. Despite the importance of infections and sepsis, the diagnosis and prediction remain a major challenge.

Hypothesis: The aim of this study was undertaken to examine the pathophysiology or

immune-metabolic trajectories of adult burn patients to delineate indicators of aberrant responses.

Methods: Adult burn patients admitted to our burn centre between 2011 and 2017 were included in the study and further stratified based on clinical outcomes (sepsis, mortality, etc.). White adipose tissue from the site of injury was collected from the time of OR and blood was routinely withdrawn during the course of hospital stay. Gene and protein expression was conducted for various markers (NLRP3 inflammasome, ER stress, mitochondrial function, hypermetabolism) using RT-PCR and western blotting. Systemic biomarkers in plasma were analyzed at multiple time points post injury using the multiplex system to characterize chemokine and inflammatory cytokine expression.

Results: Here we show that white adipose tissue of adult septic burn patients had increased expression of NLRP3 inflammasome components, ER stress and mitochondrial dysfunction. Interestingly, acute phase mediators of inflammation (NLRP3, IL-1β) persisted well beyond two weeks after injury. Systemically, sepsis burn patients had increased inflammation, chemokines, metabolic mediators than non-septics and trajectories supported a non-parabolic decline over time. Decreased systemic free fatty acids were present acutely after injury in septics where as hypermetabolsim was significantly increased, relative to non-sepsis burn patients. Lastly, when comparing only sepsis adults, non-survivors displayed hyper-responsiveness beginning at 11-20 days post injury that was not present in survivors.

Conclusions: Our findings indicate that adult burn patients with sepsis display unique immune and metabolic trajectories. Furthermore, it sheds light on new insights and considerations when managing burn patients to delineate early indicators of sepsis.

Basic-MO10

Probiotics Microsphere Restored Gut Barrier by Reducing Oxidative Stress in Colitis

Cheng Zhao; Jianan Ren

Background: The gut microflora dysbiosis and the damage to gut barrier have been closely related with the colitis. Probiotics could interact with the intestinal epithelium cells and dendritic cells modulating inflammation. In this study, the effect of encapsuled probiotics on the gut barrier was evaluated by DSS induced colitis model.

Hypothesis: The encapsuled probiotics could ameliorate the gut barrier through reducing the inflammation and oxidative stress.

Methods: The microsphere was produced and characterized. The probiotics was encapsuled. The rat model was induced by DSS. The expression of gut barrier protein was analyzed by WB, qPCR and fluorescent staining. HE staining was also conducted. Oxidative sterss was measured through the level of MDA, SOD and GSH-Px. TUNNEL assay was conducted to make out the apoptosis.

Results: The result supported that the encapsuled probiotics could reduce the level of oxidative stress and inflammation. It could modulate the expression of inflammatory cytokines. At last, it increased the level of gut barrier protein which prevents furthur damage in return.

Conclusions: The probiotics microsphere could modulate the oxidative stress and inflammatory level. It could avoid the damage to gut barrier and prevent furthur damage. The probiotics microsphere could be used as a encouraging method to protect the gut barrier against inflammation.

Basic-MO11

Proteomic Evaluation and Immunosuppression in Sepsis Derived Circulating Exosomes

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Background: During Sepsis systemic immune dysregulation and immunosuppression is a poor prognostic marker and may predispose survivors to increased infection risk and worse outcomes. During this process, gene expression is significantly altered with subsequent persistent derangement of the pro- and anti-inflammatory responses. During sepsis, circulating exosomes are known to transport cellular cargo and participate is systemic signal amplification. Exosomes have been implicated in potentiating endothelial dysfunction and gene regulation via microRNA transfer. Despite these advances in knowledge, our understanding of the role of circulating exosomes during sepsis remains limited.

Hypothesis: We hypothesize that circulating exosomes contain protein cargo important in the regulatory processes involved in the immune response.

Methods: Circulating exosomes were isolated from plasma of patients with sepsis and septic shock within 24 hours of diagnosis and subjected to 1D liquid chromatography/mass spectrometry and pathway analysis was performed using Gene Ontology Enrichment Analysis and Ingenuity Pathway Analysis.

Results: Exosomes were isolated from patients with septic shock(n=5) and critical illness without sepsis(n=5). Exosomal origin was predomiinately with monocyte derived in patients with sepsis and controls (64% vs. 72%). 198 total proteins were detected. 18 were differentially expressed with 17 downregulated and 1 upregulated($p<0.05$). Gene ontology identified several key downregulated biological process including the immune system and response to stimuli. These downregulated process were largely focused on the immune response and the defense response to bacteria. Ingenuity Pathway Analysis identified several involved networks including primary immunodeficiency signaling, hematopoiesis from pluripotent stem cells, and communication between innate and adaptive immune cells. Taken together, these pathway analyses suggest a significant role for sepsis derived circulating exosomes in relation to immunomodulation and immunosuppression.

Conclusions: Sepsis-derived exosomes are rich in protein networks involved in key regulatory components of the immune response. Several networks identified are important in the anti-inflammatory response suggesting an immunosuppresive effect. These data are important because they offer new insights into the regulatory mechanisms involved in the septic response. Additionally, existing data suggests that a heightened anti-inflammatory response is associated with worse outcomes in patients with sepsis, and circulating exosomes may be used as a novel therapeutic target to

maintain immune function.

Basic-MO12

Urbanization Alters the Expression of NADPH Oxidase and Superoxide Dismutase Genes

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Background: Urbanization in low-income countries represents an important inflection point in the epidemiology of communicable and non-communicable diseases. Populations living in undeveloped rural areas experience a high burden of chronic and recurrent infections, whereas those living in cities take on a pattern of non-communicable diseases (NCDs). The molecular mechanisms that underlie this epidemiological transition remain poorly understood. NADPH oxidases (NOX) have an important role in fighting infection via production of the superoxide radical, and in the pathophysiology of NCDs such as atherosclerosis and hypertension. This research begins to explore whether urbanization alters NOX function and antioxidant pathways.

Hypothesis: Urbanization alters the expression of selected NOX genes (CYBA, CYBB) and genes encoding superoxide dismutase (SOD1, SOD2). CYBA and CYBB encode the cytochrome b alpha and beta chains that comprise cytochrome b (-245), a critical component of the microbicidal oxidase system of innate immune cells. SOD1 and 2 are important antioxidants that destroy free superoxide radicals.

Methods: We compared the expression of the NOX and SOD genes in a rural and urban population living in Morocco. The Moroccan dataset (NCBI GSE8847) contains information on the expression of peripheral blood leukocyte genes from genetically similar nomadic, rural, and high-density urban Amazigh populations (PLos Genet 2008, 4(4): e1000052). Adjusted p values were extracted from Dataset S2 provided in the Supporting Information Section of the Idaghdour et al. 2008 manuscript, and corresponded specifically to the rural-urban comparison. A p value <0.05 was considered significant.

Results: Moroccans living in rural areas had significantly higher expression of the CYBB gene, compared to those living in urban areas (p=2.66e-8). Expression of the CYBA gene approached significance (p= .08). The expression of the antioxidant gene SOD2 was increased in the urban population, compared to the rural population (p = .0018). Urbanization had no effect on the expression of the SOD1 gene.

Conclusions: These preliminary results suggest urbanization alters the expression of genes that control NADPH oxidase and superoxide dismutase. We hypothesize that the greater expression of NOX genes in the rural population might relate to higher rates of infection, while the increased expression of the SOD2 gene in the urban population may represent an adaptive response to greater oxidative stress. The increased prevalence of NCDs in urban populations might, in part, relate to an imbalance of oxidant species and antioxidant defenses. Further research is needed to investigate how chronic and

recurrent infection affect the activity of NADPH oxidases and associated antioxidant pathways.

Basic-MO13

Urinary mitochondrial DNA Identifies Renal Dysfunction and Mitochondrial damage in Sepsis-induced Acute Kidney Injury

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Background: Recent animal studies have shown that mitochondrial dysfunction initiates and accelerates renal injury in sepsis, but its involvement in human sepsis remains unknown. Released fragments of mitochondrial genome derived from mitochondrial stress or dying cells are considered as surrogate marker of mitochondrial dysfunction. Therefore, we evaluate the urinary mitochondrial DNA (UmtDNA) as a biomarker of renal dysfunction in human with sepsis-induced acute kidney injury (AKI).

Hypothesis: UmtDNA are elevated in sepsis patients with AKI, and correlated with markers of renal dysfunction, which implicating mitochondrial damage in kidney damage in sepsis-induced AKI patients.

Methods: DNA was isolated from plasma and urine of patients, and mtDNA levels were quantified by quantitative PCR using mtDNA-specific genes COX3 and ND1. Sepsis patients were stratified into no AKI, mild AKI and severe AKI groups according to RIFLE criteria. Additionally, cecal ligation and puncture (CLP) was established in rats to evaluated the relationship of UmtDNA to mitochondrial integrity in AKI following sepsis.

Results: A total of 52 (49.5%) developed AKI among enrolled sepsis patients (n=105). Increased systemic mtDNA do not correlate with systemic inflammation or renal dysfunction in sepsis patients, meanwhile AKI does not have additional effect on circulating mtDNA levels. In contrast, UmtDNA was significantly elevated in severe AKI patients, compared with mild AKI or no AKI group, and directly correlated with plasma creatinine, urinary neutrophil gelatinase-associated lipocalin, and kidney injury molecule-1, and inversely with estimated glomerular filtration rate. Additionally, UmtDNA increased in rat following CLP-induced sepsis. UmtDNA was predictive of AKI development, and correlated with plasma creatinine and blood urea nitrogen in rat sepsis model. Finally, UmtDNA level was inversely correlated with renal cortical mtDNA copy number and relative mitochondrial gene expression.

Conclusions: Elevated UmtDNA level correlates with mitochondrial disruption and renal dysfunction in sepsis patients, implicating mitochondrial injury in kidney damage in human sepsis. UmtDNA may serve as valuable biomarker for the occurrence of AKI and the development of mitochondrial-targeted therapies in sepsis-induced AKI.

Global-MO01

An Emerging Relationship Between a US Surgical Team and a Ugandan Hospital; Avoiding the Cut and Run

Kristin Colling, University of Minnesota; Kristin Colling; Mariya Skube, University of Minnesota; Peter Kiggundu, Ruth Gaylord Medical Center; Jeffrey Chipman, University of Minnesota; Greg Beilman, University of Minnesota

Background: International surgical missions increase access to surgical care for patients in low- and middle-income countries; however long term outcomes have not been well studied. We previously demonstrated that lymph node and anorectal mucosal biopsies can be safely performed in a low-income country with limited resources. We report our experience and outcomes of more complex procedures.

Hypothesis: Moderately complex operations can safely be performed in a low-income country, using US-based teams and local staff.

Methods: US-based surgical teams (surgeons and anesthetists) performed all procedures in collaboration with local staff (nurses, surgical technologists, and residents) at the Ruth Gaylord Medical Clinic (RGMC) in Kampala, Uganda. The missions occurred in February and October 2017. RGMC house physicians saw all patients in follow-up, at a minimum once 2 weeks post-op. The US team remained in close contact with RGMC staff for postop management.

Results: 80 patients were seen in a one day clinic in February, leading to 32 procedures on 28 patients on the following 4 days. In October we returned and screened 58 patients, leading to 30 procedures on 27 patients (Table 1). Seven patients initially presented in February and went on to have surgery in October. All procedures were performed without electrocautery. Most procedures were performed under local anesthesia with mild sedation. Two procedures were performed with spinal blocks and sedation: a thrombosed hemorrhoidectomy and a large, incarcerated inguinal hernia repair with bowel obstruction. All inguinal hernias were repaired with mesh, whereas all ventral hernias were repaired primarily. No surgical site infections occurred. The only complication was a hematoma after excision of a 10cm lipoma. The case was notable for significant intraoperative bleeding, likely due to thrombocytopenia related to HIV treatment. This was successfully drained with no further complications.

Conclusions: Using minimal resources, including no electrocautery and minimal anesthesia, 57 patients were successfully treated through our partnership with RGMC with a low complication rate. Short-term medical missions are often criticized for their “cut and run” character, with foreign teams performing cases, then leaving with no follow up. Planned return trips, which allowed scheduling of cases we could not cover the first trip, as well as close collaboration with local staff helps create a relationship benefiting both parties and improving patient care. Future plans include increasing the frequency of missions, allowing for closer follow-up and the ability to perform more complicated cases.

Global-MO02

Clinical Practice Guideline in Complicated Intraabdominal Infection 2018 An Indonesian Perspective

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Background: The prevalence of cIAi represent by data from six tertiary hospitals in Indonesia in mid–2017 were ranged in 10% with mortality 16.6%.%. The heterogeneity of management was thought to be responsible to such number even though there were CPGs on cIAI that periodically updated. Further it is realized that there was a problem in the implementation of these guidelines due to different characteristics found. Therefore,

an Indonesian specific guideline should be developed.

Hypothesis:

Methods: The team assigned by Indonesian association of digestive surgeons (IKABDI) started to develop a guideline by process of adaptation which is consist of three steps in accordance to ADAPTE. Critical appraisal of CPGs was preceded using AGREE II Tools. Where as CheckUp was used for those updated CPGs. On the development, a provided tool online for CPG development namely GRADEPro GDT available in GRADE was used. The statements and recommendation were setup by Delphi method. Reviews were carried out internal and externally by CEEBM of Faculty of Medicine Universitas Indonesia, dr Cipto Mangunkusumo General Hospital.

Results: Seven questions formulated in the setup phase. On searching, there were 68 guidelines with full text downloaded from several sites. On selection, there were 33 CPGs related to intraabdominal infection and 18 among others were specific CPG on IAIs and cIAIs. Furthers, the last mentioned eighteen CPGs were appraised using AGREE II tools and found that 13 CPGs were strong recommended, 3 were of can be recommended, and 2 of not recommended. The next step was the evaluation of the updated CPGs using CheckUp. On the evaluation there were five updated CPGs, and those five earned the same score. It found two CPGs of 'strong recommended', updated, and recently published in 2017. The answer for clinical questions asked in the early step of the development is then searched on these two selected CPGs, with consideration to Indonesian specific characteristic. The draft was reviewed by each member through electronic communication. Appropriate statements and recommendations were then adapted. There were 153 statements and recommendations established by the hierarchy of evidence used by Guyatt et all on GRADE with regards on the changes of the descriptor (2012 and 2016), appropriateness to Indonesian specific characteristics, benefit and risk, and cost.

Conclusions: The need of Indonesian specific CPGs is absolute, to equate perception of IAI/cIAI and the management, but not to eradicate heterogeneity in management.

Global-MO03
Efficacy of a Surgical Site Infection Scorecard for Quality Improvement in Haiti

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Background: Surgical site infections (SSI) are one of the main complications to arise after any type of surgery. These complications are compounded in low resource settings, where patients have less follow up care, and hospitals have less means to deal with the sequelae of surgical wound infections. SSI can contribute to more severe complications including sepsis and mortality. For these reasons, it becomes even more important to prevent the development of an SSI in low and middle income countries (LMIC). The WHO produced a "Safe Surgery Checklist" for the prevention of SSI for global surgery. Our goal with this project was to track the risk factors specified by the WHO in our patients over a 4-week surgical mission trip to Pignon, Haiti by using an SSI scorecard system. The scorecard was used to stratify each patient's risk of SSI, and overall variable incidence data was then used to evaluate quality improvement steps for the prevention of SSI on subsequent trips to Haiti.

Hypothesis: A SSI scorecard can accurately stratify risk of SSI and improve postoperative antimicrobial stewardship.

Methods: An eleven-element SSI scorecard was completed for each operative patient (n= 54), General Surgery (n=32), Urology (n=10), and Head & Neck (n=12). The cumulative value of the scorecard was used to risk stratify each patient for development of SSI. (0-2)-Low Risk (n=18), (3-4)- Intermediate Risk (n=30), (>4)- High Risk (n=6). We then calculated the incidence of each variable for the entire study population.

Results: Follow-up was performed in 41 patients with a mean follow up of 8.6 ± 4.9 days. We had 2 patients with a SSI in our cohort (4.8% n=41). These patients with SSIs had scores of 3 and 5, a perineal incision and a prostatectomy, respectively. Mean score of the scorecard was 2.9 ± 1.2 (n=54). Variable Incidence (n=54): Age >50 (30%), Malnutrition (BMI <18.5) (17%), Pre-op Antibiotics (Abx) not indicated (22%), Surgery time > 1 hr (54%), Clean Contaminated (39%), Contaminated (4%), Drain Indicated and not placed (9%) (n=11), No Post-op Abx (54%).

Conclusions: Implementation of scorecards can help stratify SSI risk and guide antibiotic stewardship preoperatively and postoperatively in LMIC. SSI risk is highly variable and should be assessed for individual patients undergoing surgery.

Global-MO04

Endo-luminal Graft Exclusion for Enteroatmospheric Fistulae

Gefei Wang; Jianan Ren; Xiuwen Wu

Background: It remains an extreme challenge in clinical practice to manage the enteroatmospheric fistula (EAF) which is a severe complication of open abdomen, and herein we report “Endo-luminal Graft Exclusion” technique to control EAF.

Hypothesis: We designed an innovative “Endo-luminal Graft Exclusion” technique for avoiding loss of enteric fistula effluent from EAF, protecting open abdominal wounds from being contaminated by intestinal fistulae drainages, and applying enteral nutrition.

Methods: “Endo-luminal Graft Exclusion” technique with “fistula patch” or 3D-printed “fistula stent” was designed and applied in 30 EAFs, from Jan 2010 to Sep 2017.

Results: 30 patients were successfully treated by the “Endo-luminal Graft Exclusion” technique including 25 patients with “fistula patch” and 5 patients with 3D-printed “fistula stent”, and all patients ultimately achieved enteroatmospheric fistula excision and abdominal wound closure.

Conclusions: The “Endo-luminal Graft Exclusion” technique with “fistula patch” or 3D-printed “fistula stent” is effective methods to control EAF, because it can avoid loss of enteric fistula effluent, cease tissue destruction, simplify wound management, and perform enteral nutrition followed by definitive operation to resect EAF and repair ventral hernia.

Global-MO05

Incidence of Staphylococcus aureus Infection after Elective Abdominal or Breast Surgeries in U.S. Hospitals

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Background: National estimates of post-surgical S. aureus (SA) infections are limited.

Hypothesis: We sought to assess 180-day SA incidence rates after elective abdominal and breast surgeries in real-world hospital settings and project the U.S. national burden of such infections.

Methods: The Premier Healthcare Database (PHD) was used to identify adults ≥18 years with an abdominal or breast surgery performed during an elective inpatient or hospital-based outpatient encounter from 6/1/2010 – 6/30/2015. Twenty-one surgical categories were included using ICD-9-CM procedure and CPT codes according to established National Hospital Surveillance Network groupings and additional categories. Microbiology results and ICD diagnosis codes were used to define invasive (e.g. bloodstream, deep wound and organ/space SSI) and overall (i.e. invasive, superficial SSI, UTI, and respiratory) SA infections within 180-days of the surgery. Cumulative postsurgical SA infection rates were calculated using data from 181 representative PHD hospitals reporting microbiology results. To estimate the national infection burden, surgery-specific infection rates were multiplied by the number of nationally projected inpatient elective surgeries (overall and by category), calculated using surgery counts in the entire PHD (N=665 hospitals) and established weights based on hospital characteristics.

Results: Among 157,701 inpatient elective abdominal or breast surgeries, overall and invasive SA infection incidence at 180-days was 1.69% and 0.57%, respectively. Nationally, this translated to an estimated 12,527 SA infections (4,223 invasive) among 734,981 surgeries annually. Following 298,748 hospital-based outpatient elective surgeries, 180-day overall and invasive SA incidence was 0.57% and 0.17%, respectively. Figure 1 shows the cumulative incidence of invasive and overall SA infections after inpatient abdominal or breast surgeries, as well as the estimated U.S. annual number of elective surgeries and overall post-surgical SA infections.

Conclusions: To our knowledge, this is the most comprehensive assessment of U.S. national-level postsurgical SA infection counts and rates among abdominal and breast surgeries based on real-world microbiology data. These results may help guide targeted infection prevention efforts at U.S. hospitals.

Global-MO06

Predictors of mortality in cases of abdominal sepsis at a Nicaraguan teaching hospital

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Warren Alpert Medical School at Brown University; Andrew Stephen

Background: Abdominal sepsis remains a significant challenge for surgeons worldwide. Currently available scoring systems or predictors of mortality are based on standards established in higher income Western countries. Despite increased globalization of healthcare and international collaborations, little is known regarding applicability of these predictors in less developed countries.

Hypothesis: In this pilot collaborative study, we hypothesize that similar to US based metrics, patient comorbidities and initial presenting physiology will be the best predictors of mortality in patients with abdominal sepsis at a Nicaraguan teaching hospital.

Methods: This is an initial pilot study of 100 adult surgical patients with a diagnosis of abdominal sepsis. 50 consecutive non-survivors and 50 survivors were reviewed for patient factors, presenting laboratory or physiologic parameters, and aspects of management. Abdominal sepsis was diagnosed by an abdominal source of infection combined with the presence of at least 2 SIRS criteria. This pilot study was not powered to detect a statistical difference, but all data approached significance.

Results: Compared to survivors, non-survivors were more often men(64% vs 54%), age greater than 50 years(36% vs 22%), and had pre-illness diabetes(12% vs 6%), hypertension(16% vs 10%), chronic kidney disease(4% vs 0%) or chronic respiratory disease(16% vs 10%). Non-survivors were more likely to be ASA III/IV compared to survivors(60% vs 38%). Although there was no difference in rates of leukocytosis between groups, non-survivors were noted to more likely present with hyperglycemia or acute kidney injury. A colonic source of the sepsis was noted more frequently among non-survivors (42% vs 26%). Hemodynamic compromise, duration of operation greater than 2 hours and metabolic acidosis occurred more often in non-survivors. There was no difference in the utilization of ICU and ICU-related resources between groups.

Conclusions: Sepsis from abdominal sources remains a significant problem worldwide. Similar to more developed settings, our results show that age, comorbidities, health status, and a colonic source of abdominal sepsis affect outcome. It is critical to establish predictors that may have universal applicability to guide triage and management of patients in resource limited environments. This pilot study will form the basis for ongoing international collaboration on surgical sepsis.

Global-MO07

Prevalence and Trends in Postoperative S. aureus Cultures in the Veterans Health Administration during 2009-2013

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Background: Postoperative Staphylococcus aureus (SA) infection is associated with morbidity and excess cost. Many of these events are preventable, and efforts are underway to develop a SA vaccine. This study describes the rate of postoperative SA positive cultures in 5 selected surgery types in the Veterans Health Administration (VA) during a 5-year period.

Hypothesis: We hypothesize that rates of SA cultures varied among surgery type, and

decreased over time.

Methods: We obtained demographic and clinical data on Veterans undergoing elective surgery during FY09-13 (10/1/2008 – 9/30/2013), as well as cultures positive for SA one year postoperatively. Specimen topography was categorized as blood, urine, sputum, wound, or other, as a proxy for bloodstream infections, urinary tract infections, pneumonia, or surgical site infections, respectively. Surgeries were flagged as having a 1-year postoperative SA culture or not, independently by topography.

Results: We identified 93,546 surgeries during the study period. Median patient age was 64 years, and 93.7% were male. Patients who had a positive SA culture, compared with those who did not, were more likely to be male (96.4% vs. 93.5%), were similar in age, and had a longer mean index length of stay (14.1 vs. 7.7 days). Mean time between surgery and positive culture was 89.6 days. The positive culture rate was 5.1% among all surgeries. Rates varied by surgery type (5.7% in cardiac, 7.0% in colorectal, 1.2% in hysterectomy, 3.1% in orthopedics, and 11.5% in vascular). The most frequent topography was wound, and prevalence ranged from 0.7% in hysterectomy to 8.8% in vascular. Overall, annual positive culture rates declined linearly, from 6.3% in FY09 to 4.0% in FY13. A similar trend occurred in cardiac (6.2% to 4.5%), colorectal (8.4% to 5.7%), and orthopedics (4.3% to 2.6%). Hysterectomy rates were flat, ranging from 0.6% in FY11 to 1.5% in FY10. The rate in vascular surgery varied but had a consistent decline from FY11-FY13 (12.8% to 9.5%).

Conclusions: The rate of 1-year postoperative positive SA cultures declined by approximately a half percentage point per year during the study period. This improvement is similar to recent work showing an 8-year reduction through FY17 in MRSA hospital acquired infection rates in the VA. These may be attributable to better infection control practices such as the VA MRSA Prevention Initiative. Future work could examine the extent to which positive cultures represent true infections, and their association with the index surgery.

Global-MO08

Reviewing the AHA prophylaxis guidelines on infective endocarditis prevention in a teaching hospital from 2007-2015

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Background: Pre-procedure infective endocarditis (IE) prophylaxis guidelines were narrowed in 2007 by the American Heart Association (AHA). Studies on the effects of the revised guidelines on Viridans group Streptococci (VGS) IE are conflicting. This retrospective review of IE at a tertiary-care teaching hospital aims to determine the association of specific procedures and risk classes with the causative organisms of IE.

Hypothesis: The revised AHA guidelines adequately cover high risk patients for IE prophylaxis.

Methods: Admissions from 2007-2015 were identified with IE-related ICD-9 codes. Cases that met Modified Duke Criteria for IE and also underwent a procedure in the prior 6 months were analyzed. Cases were divided into three groups: patients

meeting AHA defined cardiac risk factors (history of IE, prosthetic cardiac valves, congenital cyanotic heart disease, and cardiac transplants with valvulopathy) for IE prophylaxis (Group A), patients with other valvular/structural cardiac diseases not meeting AHA characteristics (Group B), and those without either (Group C). Three types of procedures were studied in each group, including dental/respiratory (recommended for prophylaxis), invasive gastrointestinal/genitourinary(GI/GU), and vascular procedures, for causative organisms and mortality.

Results: 363 admissions met criteria for definite endocarditis and 133 had a procedure in the prior 6 months. Group A had 49 cases, Group B had 39, and Group C had 45 cases. For the dental/respiratory procedures, Group B was more likely to have VGS IE than Group A (OR=40, P=0.016) but same as Group C (OR=2, P=0.624). For GI/GU procedures, all groups were equally likely to have IE caused by gut pathogens. IE caused by staphylococci species did not differ among the groups. Group C was more likely to develop methicillin resistant (MR) staphylococcal IE than group A (OR=4, P=0.041). The overall 30 day mortality was highest in group A, followed by group B and C. However, for patients in group A and B, mortality was higher for those who underwent a procedure in the preceding 6 months.

Conclusions: Patients in group A who underwent any procedure had the highest mortality related to IE. All patients in group B that underwent a dental/respiratory procedure developed VGS IE. This data indicates that antibiotic prophylaxis before a dental/respiratory procedure should be extended to include this group of patients. All patients who underwent a vascular surgery had higher percentages of staphylococcal IE than those who underwent other procedures, with group C having a predilection to developing MR staphylococcal IE.

Global-MO09

Risk Factors and Outcomes for Sepsis Following Appendectomy

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Background: Sepsis is an uncommon occurrence following appendectomy, but the morbidity and mortality of patients who develop sepsis remain high. The purpose of this study is to identify risk factors and outcomes associated with sepsis following appendectomy.

Hypothesis:

Methods: The American College of Surgery National Surgical Quality Improvement Program participant user database was queried from 2012 to 2015. Patients who underwent appendectomy were identified and demographic data, intraoperative variables, and postoperative outcomes were collected. The primary outcome was postoperative sepsis following appendectomy, which was defined as the development of SIRS/Sepsis/Septic Shock postoperatively. Patients who had sepsis within 48 hours prior to surgery or was present at the time of surgery were excluded. Multivariate analyses (logistic and linear regression) were performed to assess for risk factors and outcomes associated with sepsis.

Results: Of the 104138 patients that had appendectomy, 541 patients (0.52%) were identified to have postoperative sepsis. Age greater than 60 (OR=2.07, 95% CI=1.67-2.56), African Americans (OR=1.86, 95% CI=1.44-2.40), history of hypertension (OR=1.63, 95% CI=1.31-2.02), morbid obesity (BMI≥40 or BMI≥35 with hypertension or diabetes) (OR=1.54, 95% CI= 1.20-1.98), and renal failure or dialysis (OR=4.01, 95% CI=2.37-6.79) were found to be associated with increased risk of sepsis. 27 patients (5%) expired within 30 days. Postoperative sepsis following appendectomy is associated with increased risk of 30-day mortality (OR=26.77, 95% CI=16.78-42.71) as well as an average of 5.27 days increased length of stay (95% CI=5.01-5.52). Postoperative sepsis was found to be associated with increased risk of pneumonia (OR=35.63, 95% CI=26.47-47.97), unplanned reintubation (OR=40.04, 95% CI=29.10-55.09), pulmonary embolism (OR=9.74, 95% CI=4.41-21.52), ventilation for >48 hours postoperatively (OR=56.84, 95% CI=39.81-81.15), cerebrovascular accidents (OR=13.46, 95% CI=3.85-47.26), cardiac arrest (OR=14.42, 95% CI=6.81-30.54), myocardial infarction (OR=9.99, 95% CI=4.84-20.64) and deep vein thrombosis (OR=6.12, 95% CI=4.09-9.88).

Conclusions: Patients that experience sepsis following appendectomy are at significant risk for adverse postoperative morbidity and mortality. Given the remarkably large number of appendectomies that are performed each year, the findings of this study can aid in the adjustments of current protocols to further reduce the incidence of sepsis following appendectomy.

Global-MO10

Surgical Instrument Reprocessing in LMICs: A Scoping Review of Existing Methods, Policies, and Barriers

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Background: Surgical infections are a major cause of morbidity and mortality in low- and middle-income countries (LMICs). Improperly reprocessed surgical instruments can be a vector for pathogens. Little is known about the current state of surgical instrument decontamination and sterilization (IDS) practices in low-resource settings.

Hypothesis:

Methods: We performed a scoping review of English-language articles in PubMed, Web of Science, and Google Scholar databases describing current methods, policies, and barriers to IDS in LMICs. We conducted qualitative analysis of all studies to categorize existing practices and barriers to successful IDS. Barriers were non-exclusively categorized by theme: education/training, resource availability, environment, and lack of policies/procedures. Studies associating surgical infections with IDS practices were separately evaluated to assess this relationship.

Results: Nine-hundred seventy-two abstracts were identified. Forty studies met criteria for qualitative analysis and three studies associated patient outcomes with IDS. Most

studies (n=28, 70%) discussed institution-specific policies/procedures for IDS; half discussed shortcomings in staff training. Sterilization (n=38, 95%), certification in sterilization (n=16, 40%), and instrument cleaning and decontamination (n=16, 40%) were the most common instrument reprocessing practices examined, with poor resource availability, lack of education/training, and lack of policies/procedures cited as common barriers. Of the case series associating IDS with patient outcomes, improperly cleaned and sterilized neurosurgical instruments and contaminated rinse water were linked to Pseudomonas aeruginosa ventriculitis and Mycobacterium chelonae port site infections, respectively.

Conclusions: Large gaps exist between instrument reprocessing practices in LMICs and recommended policies/procedures. Areas for improvement identified include instrument cleaning and decontamination, certification in sterilization, and other sterilization related aspects of instrument reprocessing. Education and training of staff responsible for reprocessing instruments and realistic, defined policies and procedures are critical, and lend themselves to improvement interventions.

Gllobal-MO11

Surveillance of the in vitro activity of eravacycline and comparators against clinical isolates from the US from 2016

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Background: Eravacycline is a novel, fully-synthetic, fluorocycline antibiotic that has completed phase 3 clinical development for the treatment of complicated intra-abdominal infections and is in phase 3 clinical development for patients with complicated urinary tract infection. We report the in vitro activity of eravacycline and comparators against clinical isolates from patients in the United States isolated during 2014-2016.

Hypothesis: None

Methods: A total of 7,815 non-duplicate, non-consecutive, single-patient clinical isolates were collected during 2014- 2016 from hospitals throughout the United States. These comprised Enterobacteriaceae (n = 5142), Acinetobacter baumannii (n = 717) and 1,956 Gram-positive isolates. Isolates were from multiple infection sources including blood, body fluids, gastrointestinal, genitourinary, skin, respiratory amongst others. MICs were determined by CLSI broth microdilution. Antibiotic susceptibility was interpreted using CLSI breakpoints, where available. FDA breakpoints were used for tigecycline.

Results: Summary MIC data for eravacycline and tigecycline are shown in the Table. Eravacycline exhibited potent activity and was 2 to 4-fold more active than tigecycline against the majority of both Gram-negative and Gram-positive clinical isolates. Tigecycline resistance ranged from 0 to 16.6%.

Conclusions: Overall, eravacycline exhibited potent in vitro activity against these clinically-important isolates and was several fold more active than tigecycline.

Global-MO12

Sustainable Surgical Site Infection Prevention in LMIC: Persistence of a Limited Intervention in a Kenyan Hospital

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Background: Surgical site infections (SSI's), which account for up to one third of all hospital acquired infections (HAI), are a crucial public health challenge. Efforts to minimize SSI's must not only be effective, but also sustainable, particularly in low- and middle-income countries. Recent prevention tactics have trended toward bundled interventions and multi-disciplinary programs that focus as much on changing the culture around surgical safety as explicit practical recommendations. While these programs have been shown to be effective in high-income, well-established hospitals, it is unclear whether they will be superior to simpler "limited intervention" efforts in low resource setting.

Hypothesis: We believe that limited, practical interventions are better suited for facilities in low- and middle-income countries than bundled, unit-based interventions.

Methods: A program for SSI prevention consisting of SSI surveillance and a single intervention to administer antibiotic prophylaxis immediately before all surgical operations was developed and implemented at a Government hospital in Kenya.Surveillance was conducted between August 2010 and November 2011, and policy implementation began in February 2011. An observational study was conducted at two Kenyan Hospitals, including the Government Hospital that participated in the 2010 study (Hospital A), between September and December 2015 to collect data on the incidence and risk factors for post-cesarean SSI in 609 women.

Results: Prior to implementation of the policy in 2011 to change the timing of antibiotic prophylaxis, approximately 99% of patients at Hospital A were exclusively administered post-operative antibiotics; in 2015, all patients at Hospital A received antibiotic prophylaxis no more than 120 minutes before their operation. Patients at Hospital B were demographically comparable to those at Hospital A, but were given only post-operative antibiotics according to hospital policy. The SSI rate was 4.0% (12/299; 11 superficial SSI, 1 deep SSI) at Hospital A and 9.3% (28/301; 18 superficial SSI, 7 deep SSI, 3 organ/space SSI) at Hospital B.

Conclusions: The policy change at Hospital A was found to have persisted well beyond the study period. We believe that the success and sustainability of this policy was in large part due to local engagement through the development and implementation process, extensive staff training and support, and the presence of a strong policy champion at the hospital. As this limited-intervention model has been shown to be both effective and sustainable for hospitals in low- and middle-income regions, we would recommend it's use in future infection prevention efforts in these settings.

Global-MO13

The prognostic analysis of emergency pancreaticoduodenectomy due to abdominal trauma

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Background: Emergency pancreatoduodenectomy (EPD) is a complicated surgical procedures for severe pancreatoduodenal injuries, accompanied with high incidence of complications and mortality.

Hypothesis: To explore the prognosis of EPD due to abdominal trauma.

Methods: Clinical data of seventeen patients admitted in Jinling Hospital between August 2012 and January 2017 with EPD due to abdominal trauma were retrospectively analyzed.

Results: All the cases admitted were preformed EPD in other hospitals due to trauma, then transferred to our institute for postoperative complications. 11 patients survived and 6 patients died after therapy, the mean length of hospital stay was 112.6 days. All the patients suffered various degree of gastrointestinal fistulae and intra-abdominal infections, including 14 cases of hemorrhage of digestive tract or abdominal cavity(82.4%), 10 cases of pancreatic fistulae(58.8%), 10 cases of enteric fistulae(58.8%), 9 cases of biliary fistulae(52.9%), 8 cases of Gastrointestinal anastomotic leakage(47.1%) and 8 cases of colonic fistulae(47.1%). The grade of pancreas injuries、blood transfusion and incidence of pancreatic fistulae in death group were significantly higher than those of survival group, $p<0.05$.

Conclusions: The postoperative mortality and occurrence of complications of EPD due to abdominal trauma were markedly elevated, and the approach of damage control surgery should be applicated in the procedure of management.

Global-MO14

Tunable Sequential Drug Delivery System for Management of Non-healing Infected Wound

Jinjian Huang; Jianan Ren, Jinling Hospital

Background: Treatment of non-healing infected wound is an arduous task in clinical practice.

Hypothesis: Early antibacterial strategy and subsequent promotion of granulation tissue growth facilitate to cure the wound.

Methods: We fabricated a sequential drug delivery system by incorporation of an injectable hydrogel with porous PLGA microspheres. Vancomycin was linked to the injectable hydrogel via a reversible schiff 's base reaction, and VEGF were encapsulated into PLGA microspheres.

Results: The results demonstrated that releasing file of vancomysin was pH-dependent and VEGF’s file was regulated by pore size of PLGA microspheres. The duration of VEGF release was longer than vancomycin. This system was valid to inhibit bacteria

growth and accelerate vein endothelial cell proliferation in vitro. In animal models, it was effective to manage non-healing infected wounds by reducing inflammation and promoting angiogenesis.

Conclusions: In conclusion, the sequential delivery system is promosing to be applied in management of non-healing infected wound.

Trauma-MO01

A comparison of post-injury infectious outcomes in elderly patients with Medicare vs private insurance

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Background: Health care insurance status is associated with differences in trauma related outcomes. We previously demonstrated that under- or un-insured young trauma patients were less likely to be diagnosed with comorbidities and more likely to develop infectious complications. Diagnosing and managing multiple comorbidities in a geriatric patient are both time intensive and costly, resources often lacking among patients with government based insurance. Geriatric patients with no or few comorbidities may be truly healthy or may lack maximal diagnoses and management.

Hypothesis: Given constraints upon Medicare/Medicaid (MC) providers and patients we hypothesize that geriatric trauma patients with MC insurance will have increased rates of infections.

Methods: A retrospective chart review all admitted geriatric blunt trauma patients(>/=65 years old) over a 10 year period. Patients were divided into MC or Private/Commercial (PI) insurance. All injuries, pre-trauma co-morbidities, hospital course, infections, and mortality were recorded. Infections were diagnosed via either culture based (UTI, catheter, pneumonia confirmed via alveolar lavage) or CDC clinical criteria (eg surgical site infections).

Results: Of 7,319 geriatric trauma patients, 85.9% were MC. MC patients were older(81.1 vs 77.5 years;$p<0.01$), less likely male(38.8% vs 46.9%; $p<0.01$) and had lower ISS (10.1 vs 11.2;$p<0.01$). There was no difference in Head AIS. Patients with MC had higher rates of infections(11.9% vs 9.2%;$p=0.012$). Hypertension was the most common diagnosis among both groups. Among patients with no more than one comorbidity, MC patients had higher rates of infection(10.6% vs 7.7%;$p=0.007$). Adjusting for age, gender and ISS, MC patients had greater risk of infection (OR-1.32(95%CI=1.1-1.7)). Among patients with at least 2 comorbidities there was no difference in rates or risk of infection. Patients with dementia had the highest rates of infection with no difference between MC and PI(21.2% vs 21.3%;$p=0.97$). Among PI patients, increasing numbers of infections did not affect risk of death, whereas among MC patients, each added infection among an individual patient significantly increased the risk of death($p<0.006$).

Conclusions: Geriatric MC patients have higher rates of infections. We speculate that inherent difficulties exist in providing maximal diagnostic care among patients with MC

health coverage. Future MC policies and decision making need to focus on optimizing diagnoses and health maintenance services for the elderly MC population.

Trauma-MO02

A Propensity Score Analysis of Clostridium Difficile Infection Among Adult Trauma Patients.

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Background: Clostridium difficile infection (CDI) is now the most common cause of healthcare associated infection and carries a mortality rate ranging from 5-30%. Previously, trauma patients developing CDI were thought to represent a unique younger at-risk population. This study aimed to establish the incidence of CDI among adult trauma patients.

Hypothesis: We hypothesized these patients would have increase risk of mortality, intensive care unit (ICU) length of stay (LOS), and hospital LOS.

Methods: A retrospective study on trauma patients admitted between 2014-2016 for greater than 48 hours was conducted. Analysis was carried out using 1-to-5 propensity score matching. Propensity score matching was used to analyze the relationship between CDI, mortality and other outcome variables.

Results: Out of 12,706 trauma patients, 27 patients (0.21%) were diagnosed with CDI between 2014-2016. These patients had a mean age of 55.6, mean injury severity score (ISS) of 22.4 (see Table 1) and mortality rate of 9.1%. Of these patients, 22 were able to find appropriate propensity score matches. After adjusting for important covariables, there was no significant difference in mortality between CDI and non-CDI patients (OR=0.39, 95% CI: 0.06-2.57, adjusted p 0.66). Additionally, there was no significant difference in ICU LOS between the two groups (relative mean (RM): 1.55, 95% CI: 1.04-2.33, adjusted p 0.09). However, CDI patients did have a significantly longer hospital LOS, as compared to non-CDI patients (RM=1.39, 95% CI: 1.16-1.66, adjusted p <0.01).

Conclusions: CDI infection occurred at a much lower rate than anticipated, 0.21% of trauma patients admitted >48hours. Patients developing CDI had a significantly longer hospital LOS. There was no significant difference in odds of mortality or ICU LOS.

Trauma-MO03

Antibiotic Exposure Does not Affect Clearance of Alveolar Pathogens

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Background: Ventilator-associated pneumonia (VAP) is a common but poorly understood condition in the trauma population. We have previously shown that

mechanically ventilated trauma patients can develop high pulmonary bacterial burden without developing clinical symptoms of VAP. Factors associated with pathogen clearance versus subsequent development of VAP are unknown.

Hypothesis: We hypothesized that antibiotic exposure is associated with increased pathogen clearance in surveillance mBAL.

Methods: Critically injured adults ventilated for > 2 days were enrolled. Patients underwent daily surveillance mini-bronchoscopic alveolar lavage (mBAL) while ventilated for 14 days or until extubation. Standard semi-quantitative cultures were performed and results were blinded from clinical use. Standard patient management was performed by the clinical team. Patients suspected of VAP underwent bronchoscopic-BAL (bBAL) and semi-quantitative culture, with VAP defined as clinical symptoms plus > 104 CFU bacteria. All mBAL with >104 CFU were assessed for antibiotic exposure with a spectrum covering the isolated bacteria and bacterial burden was assessed in the following 24 hours.

Results: 60 patients enrolled were ventilated a median of 9 days. 37 patients had clinical suspicion for VAP and had a bBAL. 26 had confirmatory growth on bBAL. On surveillance mBAL, 20 had bacterial burden < 104 CFU. 13 had mBAL > 104 CFU without suspicion of VAP, all of whom had culture clearance. 56 patients had antibiotic exposure, and 31 were treated for VAP. 4 patients had no exposure, and none developed VAP. There were 75 positive surveillance mBAL specimens. 46 mBAL samples had 104 CFU growth and were not exposed to any antibiotic on the sample day. Of these, 12/46 had either stable or increased growth in 24 hours. Thus, 74% (34/46) had either clearance or a decrease in CFU without any antibiotic exposure. 29 mBAL samples had 104 CFU growth and were exposed to antibiotic therapy on the sample day. 19 had antibiotic exposure that covered the pathogen. Of these, 3/19 had either stable or increased growth in 24 hours. Thus, 84% (16/19) had either clearance or decreased pathogen growth. 10 had antibiotic exposure that did not have activity against the specific bacterial growth. 1/10 had increased bacterial growth and the remaining 9/10 had either clearance or a decrease in CFU. The three groups were not statistically different on chi-squared analysis.

Conclusions: Contrary to our hypothesis, clearance of pathogenic bacteria on surveillance mBAL was not affected by antibiotic exposure, whether or not the antibiotic had activity against the pathogen.

Trauma-MO04

Early Palliative Care in Critically Ill Patients with Fatal Disease is Associated with Decreased Length of Stay

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Background: The care of patients in the intensive care unit (ICU) requires significant

resources, especially at the end of life, with sepsis being the major diagnosis in most ICU admissions. Disposition delays, including floor bed availability and end of life decisions are a major cause of prolonged ICU stay. We sought to evaluate the effects of early palliative care (PC) discussions on length of stay (LOS).

Hypothesis: We hypothesize that early PC consultation is associated with decreased LOS in patients who die in the ICU.

Methods: Using Crimson (The Advisory Board Co, Washington, DC), a relational quality improvement database, we identified adult patients in 5 ICUs on mechanical ventilation >96 hours during the year 2016 who succumbed to their disease. We compiled two patient groups: those with ICU LOS >10 days over system average, and those with ICU LOS less than system average. Crimson was used to collect patient demographics. Additional retrospective chart review was conducted to assess primary admitting diagnosis, chronic health conditions, and PC intervention practices. Fisher's exact test and Welch's test were used to compare groups.

Results: There were no significant differences in age, sex, chronic illnesses, or illness severity between groups. Sepsis was the most common diagnosis in both groups (43% vs 35%, p= 1, Table 1). Patients with excess LOS received PC consult significantly later in their hospital course (28 vs 10 days, p<0.001, Table 1). In subgroup analysis of septic patients, PC consults occurred significantly later in hospitalization of the excess LOS group (Table 2).

Conclusions: Early PC intervention in patients who died in the ICU was associated with a significantly shorter LOS. Our study suggests that early PC intervention may decrease unnecessary resource utilization in ICU patients, including those with sepsis as a major diagnosis.

Trauma-MO05

Fever and Trauma are Protective in ICU-Acquired Infections

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Background: Patients admitted to the ICU with a primary diagnosis of trauma are known to have better survival from ICU-acquired infections compared to non-trauma surgical patients. Victims of trauma are also more likely to be febrile during infection, perhaps due to an ischemia-reperfusion-induced enhancement of the immune response.

Hypothesis: We hypothesized that the survival benefit seen with a traumatic diagnosis among surgical patients with ICU-acquired infections is due to a greater incidence and degree of fever associated with a more robust immune response.

Methods: All patients admitted to the surgical and trauma ICUs at a single academic institution from November 1996 to July 2014 were prospectively surveyed for the development of ICU-acquired infection. A retrospective cohort study was conducted comparing in-hospital mortality between trauma and non-trauma patients with and

without fever. Univariate analyses assessed patient and infection characteristics and multivariable logistic regression adjusting for clinically relevant concurrent effects was used to identify predictors of in-hospital mortality, particularly the interplay between fever and trauma status.

Results: We identified 941 trauma patients and 1449 non-trauma patients with ICU-acquired infections. The most common site of infection was lung (31%) followed by abdomen (29%). Trauma patients were younger (48 vs. 59, $p<0.001$), less likely to be female (27% vs. 44%, $p<0.001$), more likely to receive transfusion (74% vs. 47%, $p<0.001$), and had lower APACHE II scores (18 vs. 19, $p=0.02$). Trauma patients were more likely to have fever (72% vs. 43%, $p<0.001$), with a higher maximum temperature (38.8 vs. 38.2, $p<0.001$), and had lower in-hospital mortality (9.6% vs. 22.6%, $p<0.001$). In multivariate analysis, when compared to non-trauma patients without fever (Table), trauma patients with fever had the lowest mortality (OR 0.25, $p<0.001$). Trauma patients without fever and non-trauma patients with fever also had lower mortality (OR 0.53 and 0.64, both $p<0.001$).

Conclusions: Both an admitting diagnosis of trauma and the presence of fever are associated with better survival after ICU-acquired infection. The traumatic state itself may activate a systemic response that is protective in subsequent infections; however, since afebrile trauma patients also have improved survival, this trauma-mediated survival benefit appears to be dependent on other mechanisms in addition to fever.

Trauma-MO06

Gender Disparity in Surgical Infection Research

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Background: Although the number of women surgeons and surgery residents has increased over time, women remain under-represented in surgery and academic surgery leadership positions. A 2015 report from the Association of American Medical Colleges showed that while 47% of medical students and 46% of residents are women, women only make up 39% of full-time academic faculty, 22% of full professors, 16% of department chairs, and 16% of medical school deans. In surgery, women comprise of 23% of full-time faculty, 10% of full professors, and 3% of department chairs. Surgical research and publications are used as determinants of hiring and promotion.

Hypothesis: We hypothesize that among published authors in surgical infection research, there is an under-representation of women.

Methods: Pubmed was searched for surgical infection related publications using the

search criteria (“surgical infections” OR “surgical site infection”) in four different time periods: 2000-2005, 2006-2010, 2011-2015, and 2016-2017. Articles were selected using a random number generator and the gender of the first and last authors were determined by an online search. The percentage of women to men authorship in surgical infection research was compared over time using chi-square statistic.

Results: Of 160 surgical infection publications reviewed, only 28.1% of the first authors ($p<0.001$) and 13.8% of the last authors ($p=0.034$) were women physicians. The percentage of women first authors and women last authors were 10.0% and 22.5% from 2000-2005, 42.5% and 2.5% from 2006-2010, 15.0% and 20.0% from 2011-2015, and 45.0% and 10.0% from 2016-2017 (first author $p<0.001$ and last author $p=0.034$; Figure).

Conclusions: Women physicians are under-represented in surgical infection research. The number of women surgeons and residents has been increasing over the last few decades, but this is not reflected in the number of women authors in surgical infection publications. Despite the increase in the number of women surgeons, women are still underrepresented at more senior levels of academic surgery in the United States. The reasons for these differences require further research.

Trauma-MO07

Glutamine-Supplemented Parenteral Nutrition May be Associated with Increased Insulin Resistance in Surgical ICU Patients

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Background: Critical illness results in changes in glycemic control (GC) and insulin resistance (IR) that have been associated with increased infection and mortality rates. Small studies have indicated that parenteral nutrition supplemented with glutamine (GLN-PN) might reduce rates of infection and mortality. RCT's have indicated that GLN might lower IR after trauma or critical illness. We performed a subset analysis of critically ill patients with dense GC data at a single surgical ICU after gastrointestinal, vascular, or cardiac surgery who required PN and were enrolled in the GLND multicenter RCT.

Hypothesis: We hypothesized that GLN-PN would improve GC, decrease IR, and lower incidence of pneumonia compared to standard PN (STD-PN).

Methods: This was a post hoc, single-center subset analysis of a cohort of patients enrolled in the GLND multicenter RCT of GLN-PN versus STD-PN in patients with a requirement for ≥7 days of PN and ICU care after gastrointestinal, vascular, or cardiac surgery. Patients were randomly assigned to receive either STD-PN or GLN-PN (isocaloric isonitrogenous PN supplemented with 0.5 g/kg/day glutamine dipeptide). Patients were followed daily with assessments for clinical outcomes and SOFA scores. Our cohort had dense GC data, comprising blood glucose (BG, mg/dL), insulin infusion rate (units/hr), and insulin multiplier M, a surrogate marker of insulin resistance utilized in a computerized glycemic control protocol.

Results: There were 20 patients in the STD-PN group and 21 in the GLN-PN group. Gender and mean age, body mass index, and APACHE II scores at study entry were comparable. Plasma glutamine and glutamate concentrations were higher in the GLN-PN group, as previously reported. There were no differences in the rates of hospital mortality and pneumonia between groups. There were no clinically significant differences in median daily BG or rates of hyperglycemia (BG>200) or moderate (BG<60) or severe (BG<40) hypoglycemia between groups. On days 2-6 and 17-20, the median daily insulin drip rate (Figure) and insulin multiplier M were higher in the GLN group ($p < 0.05$).

Conclusions: GLN-PN may be associated with increased IR as manifested by an increased insulin dose required to maintain euglycemia in critically ill post-surgical patients and increased insulin multiplier M.

Trauma-MO08

Healthcare-Associated Infections (HAIs) in Elderly Trauma Patients

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Background: Increased morbidity, mortality, and cost have been linked to healthcare-associated infections (HAIs). Little is known about HAIs or their outcomes in elderly patients.

Hypothesis: We hypothesized that elderly trauma patients would have more HAIs compared to younger trauma patients.

Methods: A trauma registry was used to find all trauma patients with HAIs at a level I trauma center from 1/15 to 12/16. Retrospective analysis of HAIs was performed including: surgical site infection (SSI), urinary tract infection (UTI), catheter-associated UTI (CAUTI), pneumonia (PNA), ventilator-associated PNA (VAP), and Clostridium difficile (C. diff) infection. Age, injury severity score (ISS), length of stay (LOS), death, and infections were compared between elderly (>=65 years) and younger patients using Chi square and students ttest for categorical and continuous variables, respectively.

Results: The study population consisted of 5228 trauma patients, with 2036 (39%) elderly and 3192 (61%) younger patients. A total of 101 (1.93%) HAIs were found, with a similar proportion in older and younger cohorts (1.96% vs. 1.91%, respectively, $p = 0.90$). In patients with HAIs, the mean ISS was 24.3 with lower ISS in elderly patients (15.7 vs. 24.4, $p<0.05$). The mean LOS was 23.9 days, with shorter duration in elderly patients (14.2 vs. 22.9 days, $p <0.05$). There were 3 deaths, with all deaths occurring in elderly patients ($p=0.030$). The table compares HAIs by age group.

Conclusions: Overall incidence of HAIs is low in this trauma population. There was no difference in overall rates of HAIs in elderly versus younger trauma patients, but we observed a significant difference in the type of HAIs seen. CAUTIs were seen more often in elderly patients whereas younger patients developed more SSIs and VAP.

Trauma-MO09

Meta-Analysis of Antibiotic Prophylaxis of Facial Fractures Managed by Open Reduction/Internal Fixation (ORIF)

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Background: Prolonged antibiotic prophylaxis (PAP) after operative facial fracture (FFx) repair persists despite accumulating evidence of lack of efficacy for prevention of surgical site infection (SSI). Three recently published randomized, controlled trials (RCTs) each terminated early due to demonstrated lack of efficacy PAP prompted a systematic review of the literature.

Hypothesis: We hypothesized that PAP after operative FFx repair has no proven efficacy for the prevention of SSI.

Methods: A systematic review of four databases: PubMed, CENTRAL, EMBase and Web of Science, from inception date through February 15, 2017 included RCTs, observational studies, and case studies. Two independent reviewers extracted fracture location, antibiotic use, SSI incidence, and time to surgery. Analysis was carried out for mandible, orbit and zygoma/LeFort independently. Comparisons for 24-72 hours and > 72 hours of PAP versus < 24 hours of post-operative prophylaxis were made. Odds ratios (OR) and 95% confidence intervals (95%CI) were estimated using the Mantel-Haenszel approach of studies reporting direct comparisons.

Results: We identified 192 manuscripts that underwent full text review, resulting in 26 studies that met inclusion criteria. Of these, 16 studies (2,316 patients) provided data for mandible, 4 studies (439 patients) for zygoma/LeFort, and 6 studies (377 patients) for orbital fractures. The incidence of SSI for each was 8.5% for mandible, 1.1% for zygoma/LeFort and 1.6% for orbital fractures. Pooled analysis of each fracture type's SSI rates showed no statistically significant association between the odds of developing a SSI with different prophylactic regimens. For mandible fractures treated with ORIF, the OR for developing a SSI for 24-72 hours of PAP relative to < 24 hours was 0.85 (95%CI (0.62-1.17)) whereas for > 72 hours of PAP the OR was 1.42 (95%CI (0.96-2.11). Removal of a single outlier non-RCT resulted in a statistically significant increase in SSI for > 72 hours of PAP vs <24 hours [OR = 1.63, 95%CI (1.08-2.46)]. Similarly, there was no improvement in SSI rate from PAP for zygoma/LeFort fractures [OR = 1.05 (95%CI (0.20-5.63)] when comparing > 72 hours to < 72 hours. The OR for orbital fractures could not be estimated.

Conclusions: Our review underscores the lack of evidence that antibiotic prophylaxis post-operatively for any type of facial fracture managed by ORIF prevents or lowers SSI. PAP > 72 hours may paradoxically increase SSI after ORIF of mandible fractures. Given the low risk of SSI and the lack of efficacy demonstrated future placebo-controlled RCTs of adequate power are warranted.

Trauma-MO10

No Increased Risk of Osteomyelitis Associated with Long Bone Shaft Fractures

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Background: Osteomyelitis of the long bones can result from hematogenous spread, direct inoculation or from a contiguous focus of infection. Osteomyelitis after long bone fractures ranges between 4-64 % in previous studies. Risk of osteomyelitis after long bone fractures has not been studied using a large national database.

Hypothesis: We hypothesized that long bone shaft fracture and major bone surgery are independent risk factors for osteomyelitis.

Methods: This was a retrospective analysis using the National Trauma Data Bank. We included all patients > 18 years of age and grouped them by presence of long bone (femur, tibia/fibula, humerus) shaft fractures and major bone surgery. We included previously reported risk factors for osteomyelitis into a univariate linear regression model. Covariables used in our multivariate analysis included history of diabetes, end-stage renal disease, peripheral arterial disease, smoker, steroid use, major bone surgery, blood transfusion, bacteremia, injury severity score > 25, positive blood alcohol concentration and illegal drug screen on admission.

Results: From 5,494,609 patients, 375,290 were identified to have long bone shaft fractures (6.8%) with the majority being tibia/fibula (42.3%). The osteomyelitis rate in long bone shaft fractures was 0.5% but the overall rate was 0.02%. A demographic analysis of all patients with osteomyelitis showed 34.6% of patients had no extremity fracture. After adjusting for covariates, independent risk factors for osteomyelitis included major humerus surgery and major tibia/fibula surgery. The strongest risk factor was bacteremia. Long bone shaft fractures were not found to be an independent risk factor for osteomyelitis ($p>0.05$).

Conclusions: In of itself, long bone shaft fractures are not associated with increased risk for osteomyelitis. Major extremity surgery on the humerus and tibia/fibula, but not femur, are independent risk factors for osteomyelitis. The strongest risk factor is bacteremia.

Trauma-MO11

Pulmonary Complications Following Emergency Craniotomy Versus Craniectomy For Acute Subdural Hematoma In Severe TBI

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Background: Patients who sustain a severe traumatic brain injury (TBI) with Subdural Hematoma (SDH) have shown better outcomes when operative interventions are performed within 4 hours of admission. The procedures typically used for the evacuation of hematoma are craniotomies or craniectomies. Therefore, the purpose of the study

was to evaluate the impact of both procedures on post-operative pulmonary complications and sepsis.

Hypothesis: Evacuation of acute subural hematoma in severe TBI either by craniotomy or craniectomy does not effect pulmonary complications

Methods: Study data was obtained from the National Trauma Data Bank (2007-2010). Only patients who sustained blunt or penetrating injuries, presented with severe TBI with SDH and an initial GCS ≤ 8, and who underwent a craniotomy or craniectomy within 4 hours of hospital arrival were included in the analysis. Patient characteristics and outcomes were compared between the two procedural groups: craniotomy (Group 1) and craniectomy (Group 2). These measures were first compared between the two unmatched groups then later In an attempt to better balance the groups, propensity score matching analysis was also performed using baseline characteristics; paired analyses was performed.

Results: A total of 2,414 patients qualified for the study and of those, 1,880 (77.9%) patients underwent craniotomy (Group 1) and 534 (22.1%) underwent craniectomy (Group 2). There were significant differences between the two groups regarding age (Mean [SD]: 47.7 [22.7] vs 39.3 [20.0], P<0.001), sex (male, 70.5% vs 75.3%, P=0.03), race (white, 77.0% vs 72.7%, P=0.04), the injury type (blunt, 98.5% vs 97.0%, P=0.03), the injury mechanism (fall, 50.0% vs 32.2%, P<0.001), Injury Severity Score[ISS] (28.0 [9.3] vs 30.3 [10.0], P<0.001) and GCS (4.0 [1.6] vs 3.7 [1.4], P=0.01). In order to balance the groups, 534 patients from each group were pair-matched on patient's characteristics. Afterward, there were no significant differences between the groups. There were also no significant differences seen in the occurrence of acute respiratory distress syndrome (ARDS) (11.2% vs 9.1%, P=0.5), pneumonia (38.8% vs 38.8%, P=1.0), pulmonary embolism (1.4% vs 1.4%, P=1.0), or systemic sepsis (8% vs 10.5%, P=0.38).

Conclusions: Approximately 80% of patients who sustained severe TBI with SDH at hospital presentation underwent craniotomy within 4 hours of hospital arrival, while the remaining patients underwent craniectomy. However, no significant differences were observed in the incidence of ARDS, pneumonia, pulmonary embolism, or systemic sepsis.

Trauma-MO12

SPRINT Methodology as a Basis for Developing an Antimicrobial Stewardship Program in a Trauma Surgery Service Line

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Background: Antimicrobial stewardship programs can decrease adverse events, optimize antibiotic treatment, reduce antibiotic resistance and decrease cost. However, the process to develop a program remains a challenge due to lack of resources and time. Various dissemination and implementation (D&I) models have been used in

literature but have been found to be time and resource intensive. The SPRINT model is a common framework used in the technology industry known for its time efficient gains in productivity. Limited data exist to show its utility in the healthcare setting. We adopted the SPRINT model to develop and implement an antimicrobial stewardship program within a public level 1 trauma center.

Hypothesis: SPRINT methodology can be successfully applied in developing an antimicrobial stewardship program at a public level 1 trauma center.

Methods: A multidisciplinary committee of key stake holders including trauma surgery, surgical subspecialties (Orthopedics, ENT, OMFS, Plastic Surgery), nursing, pharmacy and respiratory care were identified. A SPRINT team captain was designated to guide the team through a preSPRINT preparatory review of the literature, interview of local experts and assessment of current practice. Then at a 1-hour focused meeting we would review the proposal to create a service specific guideline. The next week a second 1-hour SPRINT would occur focusing on rollout and education. At completion, there was a consensus on treatment and D&I of the guideline.

Results: Five infectious processes were identified in developing guidelines including open fractures, facial fractures, C. difficile, pneumonia and intra-abdominal infections. On average, it required 3 weeks for preSPRINT preparation including contact of specific stakeholders, review of literature and assessment of current practice patterns and fallouts. One SPRINT meeting was held for guideline formalization and a second SPRINT for D&I of the guideline. Immediately following SPRINT, Each guideline was distributed in a hard copy and electronically to a cloud based file system available through care providers' smart phones.

Conclusions: The SPRINT process can be adapted for rapid dissemination and implementation of an antimicrobial stewardship program. We identified that it is critical for SPRINTs to be driven by leadership to nudge commitment to the process for effective completion. It was imperative that the SPRINT team captain have the ability to work in a multidisciplinary setting and effectively motivate team members. We were able to create and implement five guidelines in only five weeks each in efforts to optimize patient care.