

10756 Targeted Muscle Reinnervation: Factors Predisposing to Successful Pain Score Reduction

Kristina Crawford D.O., Harvey Chim MD

Acute Care/Trauma/Sepsis/Burns Clinical/Translational

Introduction: Targeted muscle reinnervation (TMR) has demonstrated efficacy in reducing neuroma and phantom limb pain.¹⁻⁴ Here we investigated postoperative outcomes in our patient cohort, with a focus on the role of nonmodifiable factors such as patient age and gender.

Methods: Patients who had extremity TMR from April 2018 to October 2022 were reviewed. Outcomes of interest included patient age, gender, cause and type of amputation, delayed vs immediate TMR, as well as postoperative improvement in pain as assessed by numerical rating score (NRS).

Results: A total of 39 patients underwent 46 TMR surgery with a mean age of 45.9 ± 17.2 years. Delayed TMR (27, 58.7%) was most commonly performed, followed by immediate and delayed-immediate at 10 (21.7%) and 9 (19.6%), respectively. Amputation level was most commonly above-knee in 20 (43.5%) patients, followed by below-knee (11, 23.9%), transhumeral (9, 19.6%), and transradial (6, 13.0%). The median time interval between amputation and TMR was 12 months. The median preoperative NRS score for patients that underwent delayed TMR was 10. At the last follow-up, 33 (71.7%) patients had more than 50% resolution of pain. The median postoperative NRS for all patients was 0 (IQR₂₅₋₇₅: 0-4) and significantly improved compared to preoperative NRS ($P < 0.001$). There was a significant difference in median postoperative NRS by gender (3.5 in men and 0 in women) ($P < 0.05$). Postoperative median NRS also favored younger patients (0, < 50 yrs; 4, > 50 yrs; $P < 0.05$).

Conclusion: TMR showed high efficacy in our cohort, with improved outcomes in women and younger patients.

10753 Patient Reported Outcome Measures after Endoscopic Cubital Tunnel Release with at least One-Year Postoperative Follow-Up

Ramin Shekouhi MD, Harvey Chim MD
Plastic Surgery Clinical/Translational

Introduction: The primary objective of this study was to investigate mid-term outcomes following endoscopic cubital tunnel release (ECuTR) with the Seg-Way system using patient-reported outcome measures (PROM). A secondary aim was to evaluate symptom resolution as assessed through Dellon stage, McGowan grade and Messina's criteria and recurrence following ECuTR.

Methods: Functional outcomes were assessed in 38 patients who underwent 43 surgeries. Details on baseline characteristics as well as preoperative and postoperative symptoms were collected. PROMs were administered with at least 1-year follow-up in all patients.

Results: Mean age of patients was 50.2 ± 16.1 years with 20 (52.6%) males and 18 (47.4%) females. Postoperatively, pain completely resolved in 21 (72.4%), while sensory and motor deficits improved completely in 22 (56.4%) and 11 (64.7%) of patients. Meantime interval between ECuTR and PROMs was 26.3 (13-63) months. Median Michigan Hand Outcomes Questionnaire (MHQ) score was 73.2 (48-91). Median Disabilities of the Arm, Shoulder and Hand (DASH) and Numerical Rating Scale (NRS) scores were 12.9 (7-35) and 2.5 (0-5), respectively. The majority of patients were satisfied postoperatively with a median satisfaction score of 4 (3-5). There was a significant difference in median DASH and NRS scores between patients with and without concomitant proximal nerve disease. **Conclusion:** ECuTR is a safe and effective option for surgical management of CuTS. The presence of other proximal nerve disease is associated with poorer outcomes, less symptom resolution and higher recurrence rates. One-year postoperative PROMs show equivalence to those reported in other studies following OCuTR.

10649 A Novel Murine Model for Electronic Cigarette-Exacerbated Muscle Damage with Limb Ischemia

Kenneth Harland , Scott Berceci MD

Vascular Basic Science

Introduction: The deleterious impacts of electronic cigarette use have been thoroughly described in literature over the past decade. Despite the numerous publications and coverage in the nightly news, e-cigarette use is at an all-time high. A 2019 paper found e-cigarette use in 27.5% of high school students that they interviewed (Cullen 2019).

With increased use, it is crucial to understand how e-cigarette use impacts patient recovery from surgery. Hind Limb Ischemia (HLI) is a fitting model to begin investigating this relationship and was facilitated by our group's prior experience with HLI.

To guide further use of this model, recovery in mice with three different levels of ligation were compared in both control and exposure mice. This work aims to track recovery over 14 days with LDPI, compare muscle weights, and examine histology to determine what level of ligation will best serve a model to explore e-cigarette exposure in peripheral ischemia.

Methods: Twenty male C57BL/6 mice were given femoral artery ligation (FAL) at three different levels (High, Medium, Low). For each of these conditions, there were two groups, control and exposure. Exposure mice received four weeks of e-cigarette (20mg/mL nicotine) exposure for two hours five days a week. At week two of exposure, all mice received FAL with the contralateral limb serving as control. The exposure mice then continued exposure for the remaining two weeks until sacrificed POD14. Laser Doppler Perfusion Imaging (LDPI) was performed Baseline, POD 0, 5, 3, 7, 10, and 14. Muscle samples of the gastroc, soleus, TA, and EDL were weighed and preserved in OCT. Anti-Laminin and trichrome stains were performed on TA muscles to track histological changes.

Results: LDPI demonstrated some differences depending on level of ligation and exposure. However, with high variation common to LDPI and low sample size, these were not statistically significant. Mean RTA (ischemic limb) muscle mass in mice exposed to e-cigarette was lower in high ligation group compared to medium (.04655g vs .05646g, $P = .085$).

Histological data is currently being produced and analyzed, which will shed more light on the relationships between severity of ischemia, exposure, and recovery.

Conclusions: By considering reperfusion, histology, and muscle mass, we can design an effective, replicable model to test the effect of e-cigarette exposure on limb recovery after an ischemic event. We can use this data to select a timepoint for sac, pinpoint the severity of ischemia to target, and determine if a more chronic exposure is needed.

10643 Evaluation of Quality-of-Life Measurements in Pancreatic Cancer Clinical Trials

Gerik Tushoski-Alemán , Steven Hughes
Outcomes & Quality Clinical/Translational

Introduction: Pancreatic cancer patients face a multitude of physical and emotional symptoms that significantly affect their quality of life. Measuring health-related quality-of-life (HRQoL) is crucial in evaluating the impact of pancreatic cancer and its treatment from the patient's perspective. The availability of various instruments and differences in methodology can limit comparability between studies. Here, we aimed to evaluate the methods used in measuring HRQoL in pancreatic cancer clinical trials, including the type, frequency, and duration of these measurements.

Methods: We performed a systematic review of phase three randomized controlled trials in pancreatic cancer that measured HRQoL in accordance with PRISMA guidelines. We surveyed PubMed.gov and ClinicalTrials.gov, from the database's inception, until February 21st, 2023. Publications describing the results of phase three randomized controlled trials in pancreatic cancer in the first-line setting were included.

Results: Fifty-three randomized controlled trials in pancreatic cancer were identified; of these, 23 (43.4%) used a HRQoL instrument. Instruments included the EORTC QLQ-C30 (n=14), FACT-HEP (n=3), Spitzer QoL Index (n=2), EQ-5D (n=2), LASA (n=1) and FACT-PA (n=1). Most studies measured HRQoL until disease progression or death (9/23). The most common schedule for quality-of-life assessment was at 4-week intervals (7/23). One study demonstrated statistical significance in improving HRQoL with a 2-week recurrent evaluation in the metastatic setting. For trials with locally advanced and metastatic, metastatic, and resectable disease, 50% attrition was achieved at 9.45, 12.41, and 54.2 weeks, respectively.

Conclusions: More frequent or longitudinal assessment of quality-of-life based on disease progression may better capture quality-of-life in more patients with pancreatic cancer.

10640 A novel small molecule inhibitor targeting chemokine receptor CXCR6 to treat hepatocellular carcinoma

Abhishek Shrestha , Sergio Duarte
Oncology Clinical/Translational

Abstract: For almost 2 decades Sorafenib has been the only effective treatment for unresectable hepatocellular carcinoma (HCC). However, its survival benefits are very limited by resistance and therefore, in a landscape of rising HCC incidence worldwide, there is an urgent need for alternative therapeutic strategies. CXC chemokines play important role in HCC tumor growth and metastasis. CXCR6, the natural cellular receptor for CCL16, is increased in multiple hepatoma cell lines and has been linked to higher rates of metastasis and poor HCC prognosis. SBI-457, is a novel small molecule antagonist of CXCR6 receptor that may be used to treat HCC. This study aims to test the effectiveness of SBI-457 to restrict the growth of HCC in a Cell Derived xenograft(CDX) compared to standard of care, Sorafenib.

12-14 weeks, Male NSG mice were injected subcutaneously in the right flank with 1×10^6 SK-HEP cells per 100ul of DMEM: Matrigel in 1:1 ratio. 4 days after human SK-HEP cells injection, mice were randomly assigned to 1 of 3 groups with 5 mice per group: Control, Sorafenib (30mg/kg) and SBI-457 (30mg/kg) treated group and drug administration initiated via oral gavage. Weight and tumor measurements were taken every alternate day. After 42 days of treatment, mice were euthanized, and tumor, lung, liver and blood collected for analysis.

Throughout 42 days of therapeutic intervention SBI-457 achieved a significant inhibition of the SK-HEP HCC xenograft tumor growth when compared to untreated control mice. This inhibition was comparable to the successful growth inhibition achieved by a standard Sorafenib therapeutic regimen used as a positive control over the same time span. Indeed, we found that weights of the SK-HEP xenografts excised from the subcutaneous flank of the mice at treatment endpoint were reduced in SBI-457 treated mice and statistically comparable to those measured in sorafenib treated mice. Furthermore, growth inhibition was achieved without significant evidence of drug toxicity, with mice of the 3 groups maintaining stable body weights over the course of the study and therapeutic interventions.

In conclusion, our collaborative study has provided evidence that the newly discovered SBI-457 can decrease tumor growth, comparable to that of Sorafenib in SK-HEP hepatocellular carcinoma xenografts. More research is needed in both cell and patient derived xenografts to further validate SBI-457 and test whether it can be used in combination with Sorafenib to mitigate acquired sorafenib resistance.

10637 Spatial proteomics of indoleamine 2, 3-dioxygenase 1-treated mouse abdominal aortic aneurysm induced by peri-adventitial elastase

Yong He , Scott Robinson

Vascular Basic Science

Introduction: Inflammation plays important roles in abdominal aortic aneurysm (AAA) pathogenesis. Indoleamine 2, 3-dioxygenase 1 (IDO) has demonstrated a role in reducing local inflammation. We examined whether IDO modulates AAA development and explored the potential underlying cellular and molecular mechanisms.

Methods: AAA was induced by topical peri-adventitial application of 5 μ l elastase solution to infrarenal abdominal aorta in male, 8–12-week-old C57BL/6 mice. Intraperitoneal injection of 200 μ l of 200 μ g IDO coupled to polyethylene glycol (PEG) followed 5 min-elastase application at the next day, while saline was injected in the control group. The outer diameter of the AAA was measured, and aortas were then harvested at post-operative (elastase application) 5 and 14 days for immunohistochemistry analysis and cell type-specific protein profiling of formalin-fixed paraffin-embedded sections using the Nanostring GeoMx platform, including proteins in the immune cell profiling core for nCounter and 5 modules (assays of immune cell typing, pan-tumor, cell death, PI3K/AKT signaling, and MAPK signaling).

Results: Outer diameter measurements of aortas demonstrate that IDO treatment attenuated aneurysmal dilation at both post-operative day 5 (IDO: 80 ± 32 %, control: 107 ± 28 %, mean \pm SD, $P = .062$, $n = 10$) and day 14 (IDO: 116 ± 34 %, control: 175 ± 26 %, $P < .001$, $n = 10$). There were more T lymphocytes and less neutrophils and macrophages on day 14 than day 5 in either group; however, there were no significant differences in the number of these cells between treated and control groups. 49 of 61 proteins had counts higher than the 3 negative, non-specific rat or rabbit antibodies. Combining both timepoints, there were no statistically significant differences in endothelial cell and white blood cell (WBC) protein levels between treated and control groups (false discovery rate (FDR) > 0.05). Combining both conditions, 11 and 23 proteins had different levels between day 5 and day 14 for smooth muscle cells (SMC) and WBCs, respectively. SMCs in the treated group had higher levels of PD-L1 and GZMB than the control group.

Conclusion: IDO treatment attenuates aortic aneurysmal dilation induced by elastase. There are more differences in the number of WBCs and protein levels between day 5 and day 14 than between treated and control groups. The underlying mechanisms need further investigation.

10634 MULTICOMPARTMENTAL TRAUMA ALTERS MACROPHAGE-ERYTHROBLAST INTERACTION IN BONE MARROW ERYTHROBLASTIC ISLANDS

Gwendolyn Gillies , Alicia Mohr

Acute Care/Trauma/Sepsis/Burns Basic Science

Background: Trauma is associated with widespread inflammation, neuroendocrine activation, and an inadequate bone marrow response to anemia. During terminal erythropoiesis, erythroid progenitors/erythroblasts form clusters on the surface of specialized bone marrow macrophages where they form erythroblastic islands (EBIs). Prior study has shown changes in both EBI number and structure following severe trauma. The aim of this study was to identify changes in the expression of EBI macrophage surface receptors following multicompartmental polytrauma (PT).

Methods: Male Sprague-Dawley rats (n= 8/group) were subjected to PT consisting of lung contusion, hemorrhagic shock, cecectomy, and bifemoral pseudofracture and compared to naïve. Animals were euthanized on day seven, and bone marrow EBIs were enriched and cultured. EBI macrophages were isolated and identity of the cells was confirmed via flow cytometry for integrin alpha M (CD11b), erythropoietin receptor (EPOr), and cluster of differentiation 163 (CD163). RNA was isolated from the EBI macrophages, followed by creation of cDNA and analysis of expression of erythroblast macrophage protein (EMP), CC chemokine ligand 17 (CCL17), colony stimulating factor 3 receptor (CSF3r), and CD11b via qPCR. Two-tailed t-tests were performed in GraphPad with significance defined as *p<0.05 vs. naïve.

Results: Erythroblast macrophage protein (EMP) expression was significantly decreased in PT compared to naïve (*0.6138 vs. 0.8725 fold change). CCL17 expression was significantly increased compared to naïve (*1.652 vs. 0.9936 fold change). CSF3r expression was significantly increased in PT compared to naïve (*1.860 vs. 1.096 fold change). There no significant difference in the expression of CD11b following PT compared to naïve.

Conclusions: Based on this study, we believe that multicompartmental polytrauma and critical illness may result in alteration of the interaction between developing erythroblasts and central macrophage within EBIs, and that this in turn may lead to suppression of mature red blood cell development. Further studies of the EBI niche serve as a promising new area to improve the mechanistic understanding of persistent anemia after trauma.

10631 Quality Improvement of Physician Orders as Means of Communication in the Burn Intensive Care Unit

Stacey Kirkpatrick , Amalia Cochran

Acute Care/Trauma/Sepsis/Burns Clinical/Translational

Introduction: Effective communication between physicians and nurses is paramount in any clinical setting, especially in the intensive care unit (ICU). The electronic medical record (EMR) is a relatively recent development which is one of many means for communication. As with many EMRs, physician orders for implementing care (e.g. holding medications like anticoagulation before surgery) are often verbally communicated but all users rely on the EMR as a safeguard to effectively communicate about patient care with free text orders. When these fail, the quality of patient care suffers. In this quality improvement study, we aimed to implement new standards for effective communication with free text orders by creating automated time alerts to accompany them.

Methods: In this single center quality improvement study within the burn intensive care unit, we routed free text orders from physicians to the medication administration record for nurses. In this early phase of this quality improvement study, medical records informatics specialists identified use of free text orders as “nursing communication” orders (NCOs) within the burn ICU. To identify the number communication failures we are identifying the number of NCOs used over the course of three months that subsequently resulted in communication failures. Our planned intervention is a new order type that uses a time alert to prompt patient care within the context of the medication administration record (MAR).

Results: This quality improvement study is ongoing. Currently engaged stakeholders include burn ICU faculty, staff and residents as well as physician director of nursing informatics and general surgery department quality improvement directors.

Conclusion: Given the precedent of burn ICU communication failures related to EMR NCOs, we aimed to identify communication failures due to these order types and implement a new order type with data acquisition ongoing. Given the engagement of our current stakeholders, we can conclude that this intervention will have a significant impact on the quality of patient care in the burn ICU.

10628 Using Artificial Intelligence Algorithms for Pancreatic Cell Detection and Classification

Michael Guyot , Brittany Bruggeman MD

AI/Artificial Intelligence Clinical/Translational

We developed a robust Artificial Intelligence classification algorithm in QuPath containing both supervised and unsupervised components to quantify and classify the various pancreatic cells into their respective subtypes, including supporting cells such as vasculature, endocrine cells (can be further broken down into alpha, beta, delta and pancreatic polypeptide producing cells) and exocrine cells (can be further broken down into acinar and ductal cells). From this, we plan to extract relevant feature information such as cell size, number and density among others. After we have the architecture solidified, we hope to use it to analyze differences in the disease and control pancreas. We hope this will uncover previously overlooked information that may prove critical to the understanding of the mechanism of disease progression of T1D and pancreatic adenocarcinoma. This panel has been tested in formalin-fixed paraffin embedded (FFPE) pancreatic tissue sections from one control donor. Preliminary images have been collected with successful imaging of several exocrine and endocrine pancreatic proteins. With these images, a supervised Artificial Neural Network (ANN), Random Tree (RT) and K Nearest Neighbor (KNN) algorithm was trained on around 6000 cells. To test the algorithms, another Region of Interest (ROI) was selected with around 2000 cells and the accuracy of each classification algorithm was evaluated. The most accurate algorithm was the Random Tree with an 88% accuracy. As these algorithms were classifying with 7 class options, the accuracy is considered exceptional. However, more work needs to be done to ensure a diverse training data set to combat the possibility of overfitting. Additionally, the algorithms need to be trained on disease pancreases as well to ensure that they can be used to classify cells in non-control organs as well.

10625 Global Surgery in Jamaica: A Review of 17 Years Experience and Importance of Student Involvement

Liam Kugler , JeffreyP. Jacobs MD

Thoracic/Cardiac Clinical/Translational

Introduction: The Cardiac Kids Foundation of Florida was established in 2006 to provide medical and/or surgical care to pediatric patients with congenital heart disease in Kingston, Jamaica. The purpose of this study is to review our 17-year experience delivering care to these patients, with a particular emphasis on the most recent mission and the importance of student involvement.

Methods: We performed a retrospective review of prospectively collected data for pediatric patients (<18 years) with congenital heart disease who received medical and/or surgical care provided by the Cardiac Kids Foundation team. This organization was established in 2006 and has been delivering care annually through 2023, except for the years 2018 through 2022 (partially due to COVID-19). Partnership and teamwork between our organization and a local Jamaican team allow for sustainability of this mission at the Bustamante Hospital for Children.

Medical, undergraduate, and high school students were invited to participate in the most recent trip (February 2023). These students provided psychosocial support for patients and their families preoperatively and postoperatively, and collected data to monitor patient outcomes to inform delivery of care in future trips. These students received unparalleled clinical education, both relating to the patient-physician relationship and to the performed surgical operations and critical care.

Results: Over the past 17 years, our team of pediatric cardiac nurses, nurse practitioners, intensivists, anesthesiologists, perfusionists, surgical staff, and surgeons has performed 133 pediatric cardiovascular operations while also providing the appropriate postoperative care to these patients. During the most recent mission, 12 pediatric patients with congenital heart disease underwent cardiovascular operations. Median age was 3.5 (interquartile range [IQR]=1.1-12.4) years, and median weight was 17.2 (IQR=7.3-39.4) kg. Operations performed included ventricular septal defect repair (n=3), double chambered right ventricle repair (n=2), complex mitral valve repair for rheumatic heart disease (n=2), atrioventricular canal defect (with intact atrial septum) repair (n=1), atrial septal defect repair (n=1), extended end-to-end repair of coarctation of the aorta via thoracotomy (n=1), carotid cutdown and balloon valvotomy of the aortic valve in an 8-day-old with critical aortic stenosis (n=1), and pericardial window (n=1). Median cardiopulmonary bypass time was 82 (IQR=70-100) minutes, and median cross clamp time was 41.5 (IQR=35.3-66) minutes. To date, eleven out of 12 patients (92%) have been discharged alive.

Conclusions: International partnerships and teamwork can improve access to sustainable medical and/or surgical care for pediatric patients with congenital heart disease. Student involvement and mentoring pave the way for these partnerships to be developed and nurtured.

10622 Extrinsic Aortic Compression from Abdominal Compartment Syndrome: A Case Report

Chelsea Viscardi , Michol Cooper

Vascular Case Report

This is a case of a young woman with intellectual disability who had severe abdominal compartment syndrome causing extrinsic compression and total occlusion of the abdominal aorta. This is a rare cause of aortic occlusion, with only two cases previously reported in the literature and none from mechanical obstruction. This case highlights the importance of early recognition of abdominal compartment syndrome and aortic occlusion and prompts discussion about prevention of re-perfusion injury. In addition, it calls attention to the need for vigilance in intellectually disabled patients as presentation of morbid pathologies may be unique and/or delayed in this population.

10619 Combinational Targeting Therapy Inhibiting MEK, Bcl-XL, and EGFR Pathways in Pancreatic Cancer

Alexandra Crespin , Song Han
Oncology Basic Science

K-ras activating mutations drive over 94% of cases of pancreatic cancers, but targeting k-ras activity has proven elusive. As an alternative, downstream of k-ras, MEK inhibitors have been developed, and recent research showed that Bcl-XL inhibition in combination with MEK inhibition was lethal – this combination was clinically effective in gynecologic malignancies but not colorectal cancers, suggesting the EGFR pathway could salvage cancer cells from this drug duplicate. We hypothesized that inhibition of k-ras mutant PDAC may require the combination of MEK, Bcl-XL, AND EGFR inhibition.

Here, we tested various combinations of trametinib (MEK inhibitor), a novel Bcl-XL /Bcl-2 proteolysis targeting chimera (PROTAC) 753b, and afatinib (pan-EGFR inhibitor) on four primary pancreatic cancer cell lines. Cells were treated with various doses of these drugs including appropriate controls, and impact was assessed by automated assays that quantify cell viability and induction of cell death. Statistical analyses included assessment of synergy.

Our data showed that the combinational treatment provided synergistic growth inhibition and cell death induction in 3 out of the 4 cell lines tested. Cell growth over time was measured under multiple treatment conditions, and we found statistically significant synergistic effects of the triplicate therapy in 4 primary PDAC cell lines.

In conclusion, a triplicate drug strategy to attack abnormally regulated k-ras activity in PDAC shows promise in vitro. Validation of this observation in vivo is in process and could lead to a novel clinical trial for k-ras bearing pancreatic cancer patients.

10616 A rare paraneoplastic syndrome: hypoglycemia in the setting of a solitary fibrous tumor

Grace Thompson MD, Christiana Shaw MD

Oncology Case Report

Background: A male patient presented with new onset hypo insulinemic hypoglycemia that was found to be the result of prohormone secretion from a solitary fibrous tumor.

Summary: Our patient is a 47 year-old male who presented from an OSH for management of new onset hypoglycemia in the setting of a 39x34x45 cm abdominal mass. He initially presented with lightheadedness and confusion and was found to be hypoglycemic to glucose 22. Extensive work-up was done and revealed random insulin was less than 1, C-peptide this than 0.3, BHB 0.04 and LDH 172 (consistent with non-islet cell mediated hypoglycemia). CT abdomen/pelvis revealed a new, large abdominal mass that was biopsied, and pathology showed a solitary fibrous tumor. Tumor marker workup including CEA 19-9 (4.4), AFP (3.2), and TSH and LFTs were all within normal limits. Patient was started on a D5W infusion and then transferred to UF Health for further management. On review of patient's history, he had first noticed an increase in the size of his abdomen about 5 years prior but had attributed this to weight gain. He attempted losing weight but his abdomen remained enlarged. 1 year prior the patient also began to experience severe lower extremity edema that was managed by his PCP with oral diuretics. He denied any prior episodes of confusion and had no history of diabetes mellitus nor family history of cancer. Endocrinology was consulted and recognized that patient's hypoglycemia was likely secondary to his solitary fibrous tumor, a consistent with Doege-Potter syndrome (a rare paraneoplastic syndrome of non-insulin mediated hypoglycemia from an IGF producing tumor). IGF-1 and IGF-2 levels were 55 and 136, low limits of normal and low respectively. Multidisciplinary input consisted of medical and radiation oncology and the consensus was to proceed with surgery because of concern for damage to nearby critical organs. Patient underwent en bloc resection of a 21.75kg solitary fibrous tumor with sigmoidectomy and end colostomy. Patient remained on D5W infusion up until day of surgery to maintain normoglycemia, but within 2 days post-op his blood glucose returned to normal without need for medications. Final pathology confirmed a high-risk solitary fibrous tumor that multifocally involved the peripheral resection margin. Two months later patient underwent colostomy reversal without complication. He was recommended to undergo surveillance with CT chest, abdomen, pelvis every 3 months for 2 years, then every 6 months thereafter. Imaging at 6 months post-op was negative for any local or metastatic disease.

Conclusion: While rare, Doege-Potter Syndrome is a paraneoplastic syndrome that is a potential cause of hypoinsulinemic hypoglycemia due to ectopic secretion of a prohormone of insulin-like growth factor 2 from a solitary fibrous tumor. Surgical resection is curative in a majority of cases.

Key Words: Doege Potter Syndrome, solitary fibrous tumor, hypoinsulinemic hypoglycemia

10613 Advanced age is associated with decreased cytotoxic immune responses in patients with papillary thyroid cancer

Dominique Szymkiewicz , Aditya Shirali MD
General Surgery Basic Science

Introduction: Aggressive and advanced differentiated thyroid cancer in older adults has been linked to imbalanced immune responses with age that create a tumor permissive microenvironment. Here, we sought to determine the impact of age on immune responses in papillary thyroid cancer (PTC).

Methods: RNA sequencing data of PTC samples were obtained from The Cancer Genome Atlas (TCGA). Immune cell composition was characterized through computational immunogenomic analysis using a CIBERSORT deconvolution tool and NCI Genomic Data Commons. Spearman's rank correlation analyses were performed.

Results: 499 PTC samples with complete data were retrieved from the TCGA data portal. With increasing age, expression of mediators of cytotoxic activity CD47 ($r=-0.12$), FAS ($r=-0.13$), CX3CL1 ($r=-0.10$), and FGF2 ($r=-0.09$) decreased ($p<0.05$). In patients with lymph node metastases, increasing age was associated with decreases in FAS ($r=-0.15$), VEGFA ($r=-0.13$), and CX3CL1 ($r=-0.14$) but increases in CCL17 ($r=0.16$) and CCL22 ($r=0.18$, $p\text{-value}<0.05$). Increased age was associated with increased NK resting cell ($r=0.10$) and decreased CD8+ T lymphocyte fractions ($r=-0.15$, $p<0.05$). Decreased CD8+ T lymphocyte ($r=-0.22$) and increased T regulatory lymphocyte ($r=0.19$) and dendritic resting cell fraction ($r=0.22$) were seen with advanced age in patients with lymph node metastases ($p<0.05$).

Conclusion: PTC tumors of patients with advanced age are associated with decreased cytotoxic CD8+ T lymphocyte cell fraction and decreased expression of certain cytotoxic mediators, most notably in patients with lymph node metastases. Further studies are needed to determine if these age-specific changes in immune response are associated with poor outcomes.

10610 Patterns of Chronic Pain Management in Patients with Pancreatic Adenocarcinoma who Undergo Surgical Resection

Riley Bohan BS, Steven Hughes MD
Oncology Clinical/Translational

Introduction: Of patients with pancreatic cancer (PDAC), 90% report disease-associated pain that impacts quality of life. The mainstay of analgesia remains opioids, despite literature showing the effectiveness of celiac plexus blocks (CPBs). We aimed to characterize modern utilization of opioids and CPBs for pain in patients with PDAC who receive surgical resection.

Methods: An observational study was conducted using the OneFlorida i2b2 database, a de-identified clinical research network encompassing data from 15 million patients in the Southeastern United States. Queries were conducted using ICD9, ICD10, CPT, and RX-NORM codes to identify patients with PDAC who underwent surgical resection, with or without additional treatment modalities, pain diagnoses, opioid prescriptions, and CPBs. Statistical significance was assessed using Chi-Squared Tests of Independence and standardized residuals.

Results: 1059 patients with PDAC who underwent surgical resection were identified. 37.4% of patients received a pain diagnosis, 60.5% received an opioid prescription, and 2.5% received a CPB. Whether a patient received a pain diagnosis had a significant relationship with age (more in younger patients), healthcare payer (more in patients with Medicaid), and treatment modality (more in patients receiving surgical resection and chemotherapy, regardless of radiation) (all X2 p-values<0.0001). Whether a patient received an opioid prescription had a significant relationships with demographic factors of sex (more in males), race (more in white patients), ethnicity (more in non-Hispanic patients), and age (more in 75-84 age group), as well as healthcare payer (more in patients with private insurance or no insurance), treatment modality (more in surgical resection without chemotherapy or radiation), and presence of a pain diagnosis (more without the presence of a pain diagnosis) (sex X2 p=0.001, all other X2 p-values<0.0001). Whether a patient received a CPB had significant relationships with ethnicity (more in Hispanic patients, X2 p=0.029), age (more in 45-64 age groups, X2 p=0.0001), healthcare payer (more in patients with Medicaid, X2 p<0.0001), the presence of a pain diagnosis (more with a diagnosis, X2 p<0.0001), and the presence of an opioid prescription (more without a prescription, X2 p=0.010).

Conclusions: In patients with PDAC who undergo surgical resection as part of their treatment, pain is vastly under-diagnosed and pain treatment with CPB is under-utilized. Pain diagnosis and treatment patterns appear to vary by demographic factors and healthcare payer, indicating possible health system disparities, provider bias, or inequities in access. The inverse patterns seen in sociodemographic variables between opioid and CPB use is somewhat counterintuitive and requires more investigation in systems-based practices. Overall, this study highlights an area of necessary investigations and improvement in the holistic management of surgical PDAC patients.

10607 PRA Trends and Outcomes Among Patients with Pediatric and/or Congenital Heart Disease and Elevated PRA Undergoing Heart Transplantation

Liam Kugler , MarkS. Bleiweis MD

Thoracic/Cardiac Clinical/Translational

Introduction: We have shown that elevated preoperative panel reactive antibody (PRA) >10% is not a risk factor for mortality following heart transplantation for pediatric and/or congenital heart disease using modern immunosuppressive strategies. The purpose of this study is to better characterize patients with baseline elevated PRA who have a reduction in PRA versus those who do not, and to determine if survival differences exist between these groups.

Methods: We conducted a retrospective single-center study of 56 patients with pediatric and/or congenital heart disease with baseline elevated PRA (>10%) who underwent 60 heart transplants (01/01/2011-12/31/2021). Longitudinal survival was evaluated using the Kaplan-Meier method, and the log-rank test was used to evaluate group differences. Group characteristics were evaluated by procedure, while multivariate analyses and Kaplan-Meier survival were evaluated by patient to limit dependencies in the data.

Results: Among patients with baseline elevated PRA, 38 (63.3%) had a decline in PRA while 22 (36.7%) had no decline in PRA. Patients who had a decline in PRA were more frequently female (50%[n=19] versus 22.7%[n=5], $p=0.056$) and more frequently had prior cardiac surgery (92.1%[n=35] versus 72.7%[n=16], $p=0.063$), although these did not reach statistical significance. Groups did not differ in crossmatch status, heart disease type, comorbidity burden, or requirement for preoperative mechanical circulatory support. In multivariate analyses, decline in PRA was not associated with any survival benefit (hazard ratio [HR], 1.9; 95% confidence interval [CI], 0.381-9.36, $p=0.437$). Among all patients with baseline elevated PRA, risk factors for mortality included:

- Comorbidity present: HR 7.2 (1.47-35.1), $p=0.015$
- Number of prior cardiac operations: HR multiplies by 1.3 for each additional operation (1.07-1.60), $p=0.008$
- Preoperative renal dysfunction: HR 5.4 (1.31-22.1), $p=0.019$
- Cardiopulmonary bypass time: HR multiplies by 1.11 for each 10-minute increase (1.02-1.21), $p=0.015$

There was no difference in longitudinal survival between those who had a decline in PRA versus those who did not (log-rank $p=0.4$).

Conclusion: Among patients with pediatric and/or congenital heart disease with baseline elevated PRA, modern immunosuppressive regimens mitigate the risk of elevated PRA independently of whether PRA declines—a persistently elevated PRA does not preclude transplantation. The overall cohort had excellent longitudinal survival with a 1-year survival estimate of 86.7% (95% CI, 78.0%-96.4%) and a 5-year survival estimate of 83.8% (95% CI, 74.0%-95.0%). Among patients with baseline elevated PRA, risk factors for mortality include the presence of a comorbidity, increasing number of prior cardiac operations, preoperative renal dysfunction, and increasing cardiopulmonary bypass time.

10604 A large ovarian mass in a patient with severe social anxiety and depression

Christine Rodhouse , Christiana Shaw
Oncology Case Report

Introduction: Effective teamwork and coordination is essential in the operating room. In complex cases preoperative preparation, anticipation of rapid changes in hemodynamics, and communication among team members is key for success.

Case presentation: A 45yo female with severe social anxiety, depression, and COPD presented for evaluation for a 10-year history of an enlarging abdominal mass after she developed increased weakness and lower extremity swelling. On imaging the mass was large and created a large mass effect so the origin was not able to be identified. She was also found to have a right lower extremity DVT on her workup. Multidisciplinary coordination was required to optimize the patient preoperatively and numerous teams were involved given her deconditioning, poor nutritional status, and mental health problems. The teamwork and communication continued the day of surgery from preoperative preparation and positioning, anticipation of rapid changes in hemodynamics, and proper equipment to get her through this massive surgery. She successfully underwent resection of a 203lb mass and intraoperatively the mass was found to be a right ovarian cystic mass with 170lbs of brown fluid drained. Even with this large mass that was compressing all her organs including her IVC, and rapid fluid changes due to the large cystic component, she remained stable throughout the surgery and the surgical team was able to successfully perform the operation. Final pathology showed a right ovarian mucinous tumor with intraepithelial carcinoma. Her post operative course was complicated by respiratory failure requiring tracheostomy, sepsis from pneumonia and fungemia requiring courses of antibiotics and antifungals, concern for stroke due to left sided weakness, and bradycardia. She was ultimately stabilized and was able to be transferred to a hospital closer to home to continue her recovery.

Discussion: This case demonstrates not only a rarely seen resection of a large intrabdominal mass, but the importance of an effective OR team to make a surgery a success. Ovarian masses themselves are not rare, but in this case, the patient's severe depression and social anxiety prevented her from seeking care at a time when most patients likely would, resulting in a mass that weighed more than the patient herself. Communication and teamwork among members of the operative team made this surgery a success. Each member played their role and other members respected their expertise ultimately leading to the successful outcome of the surgery.

10601 Methylation-Based ctDNA Quantification: A Promising Non-Invasive Approach to Monitor Hepatocellular Carcinoma Burden

Isabella Angeli-Pahim , Ali Zarrinpar
Oncology Clinical/Translational

Precision monitoring of treatment efficacy in hepatocellular carcinoma (HCC) would greatly facilitate timely adjustment or transition to alternative therapies and improve patient outcomes. Circulating tumor DNA (ctDNA) in the bloodstream serves as a potential biomarker for cancer. However, distinguishing ctDNA from other circulating cell-free DNA necessitates matching mutational patterns with tumor tissue obtained through invasive biopsies. We hypothesize that identifying and quantifying ctDNA using methylation patterns can improve routine tumor burden monitoring. This study aimed to evaluate the performance of a novel ctDNA quantification technology based on methylation patterns, Northstar Response (BillionToOne, Inc), as a biomarker of HCC burden.

We enrolled 14 subjects (5 with HCC undergoing surgical resection, 5 with HCC receiving liver transplants, and 4 negative control undergoing resections for benign hepatic cysts) at the University of Florida Health. Blood samples were collected pre- and post-operatively. Absolute quantification of methylated ctDNA molecules was performed, assessing multiple CpG sites on ~550 preselected cancer-specific amplicons. The "Tumor Methylation Score" (TMS) was calculated by measuring the difference between the number of methylated molecules in the plasma and buffy coat. A cutoff value of ≤ 120 normalized methylated molecules was established as within normal limits.

Preoperative TMS was significantly higher than the first ($p=.0005$) and second ($p=.001$) postoperative TMS measurements, revealing a consistent postoperative decline in 9 patients with HCC. Interestingly, one HCC resection patient with a POD1 sample and subsequent metastatic disease and recurrence exhibited an elevated TMS score. Among resection patients ($n=5$), a positive correlation (Spearman $r = 0.8$) was observed between preoperative TMS and tumor burden (measured as the sum of the largest tumor diameters in centimeters). In the negative control cohort, all four subjects had normal-range TMS in both pre- and post-operative samples.

In conclusion, these findings indicate that ctDNA methylation scores can effectively evaluate significant tumor burden changes, such as those observed in HCC patients undergoing surgical resection or liver transplantation. This represents a promising first step towards a non-invasive HCC monitoring method and encourages further prospective data collection from patients receiving systemic therapy.

10598 SH2B3 Risk Allotype is Associated with Increased Vascular Inflammation in Induced Pluripotent Stem Cells from Type 1 Diabetes donors

Similoluwa Ogundare , Clayton Mathews
Vascular Basic Science

Introduction: Genome wide association studies have identified a single nucleotide polymorphism within exon 3 of SH2B3 (rs3184504 (C784T)) as a genetic element associated with increased risk for Type 1 Diabetes (T1D). SH2B3 encodes lymphocyte adaptor protein (LNK), a potent negative regulator of inflammatory signaling in leukocytes and endothelial cells. rs3184504 results in a non-synonymous change, R262W, with LNK262W associated with elevated disease risk.

Methods: We hypothesize that LNK262W fails to restrain inflammatory signaling leading to increased vascular inflammation contributing to the development of T1D. Induced pluripotent stem cells (iPSC) from donors with T1D (n=4) were edited using CRISPR/Cas9 at rs3184504 (to 784C (LNK262R) or 784T (LNK262W risk)) and differentiated into endothelial cells (iEC). A single donor gene-edited iEC was treated with TNF α in static culture and the expression of adhesion molecules assessed by flow cytometry.

Results: At 500U/mL for 4 hours, LNK262W (risk) iEC exhibited elevated adhesion molecule expression necessary for T cell transendothelial migration compared to common allotype (LNK262R) expressing HUVEC (CD54 = 3.88 fold-change; CD106 = 3.19 fold-change p=0.0032) and iEC (CD54 & CD106 = 1.65 fold-changes each).

Conclusions: These results demonstrate that LNK262W fails to restrain inflammatory signaling in EC, which may contribute to the resulting mobilization of autoreactive T cells into the islets of Langerhans to promote beta cell destruction. Follow-up studies involve longer more physiologically relevant treatment times, and results from these studies will contribute to our understanding of how the risk allotype of LNK262W influences mechanistic disease progression and clinical outcomes by regulating vascular inflammatory functions and phenotypes.

10595 Frequency of Inappropriate Endovenous Ablation Therapy within the VQI Varicose Vein Registry

Michael Fassler , Ben Jacobs
Vascular Clinical/Translational

Introduction: Venous disease affects roughly one-third in the general population and encompasses a spectrum from asymptomatic to limb-threatening venous leg ulcers. Treatment of Chronic Venous Disease is among the most commonly performed surgical procedures in the United States. The management of venous disease has been altered significantly by minimally invasive options for treatment of venous reflux and the acceptance of endovenous ablation techniques as office-based procedures. Concern exists that there has been a resulting increase in the number of inappropriate ablation procedures performed.

Methods: We analyzed all procedures within the Vascular Quality Initiative Varicose Vein Registry. Appropriateness was defined by reference to American Venous Forum (AVF), Society for Vascular Surgery (SVS), American Vein and Lymphatic Society (AVLS), and Society of Interventional Radiology (SIR) published appropriate use criteria. Recommendation regarding appropriateness of endovenous ablation were mapped to variables within the VQI dataset. We compared differences in demographics, patient selection, procedure indication, device utilization, hospital, and payer data. Univariate tests were used to assess associations between proportions within each group and patient, procedure, physician and hospital factors, and logistic regression models were used to determine vein-level predictors of inappropriate treatment.

Results: We identified 55,740 procedures on 34,721 patients in the registry between 2015 and 2022. After exclusions, 54,148 total procedures on 33,752 patients were included for analysis. Total number of “May be Appropriate” was 2195; “Rarely Appropriate” was 601; “Never Appropriate” was 433. Procedures characterized as “Never Appropriate” were: 349 great saphenous vein ablation and 149 anterior accessory saphenous vein procedures performed with no reflux or with no duplex performed. There was a correlation between insurance status and likelihood of “May be Appropriate” intervention (OR 1.4, $p < .0001$), but no correlation with “Rarely Appropriate” or “Never Appropriate” procedures. Office-based procedures carried a odds ratio of 2.7 ($p < .0001$) for “Never Appropriate” procedure and 1.7 ($p = .003$) for “Rarely Appropriate”. Number of veins treated was associated with an increased likelihood of inappropriate intervention ($p < .0001$). Among centers with 10 or more cases in the registry ($n = 36$), 4 centers accounted for 38% of “Rarely” or “Never” appropriate treatments.

Conclusions: Analysis of a large national database demonstrates relatively low incidence of inappropriate endovenous ablation procedures. Office-based procedures and number of veins treated were associated with an increased odd ratio of off-guideline intervention. Contrary to our hypothesis, no association was found with private-payer insurance. Education and quality improvement efforts should focus on appropriate indications for ablation treatment.

10592 What is the weakest point of a secured aortic cannula in central extracorporeal membrane oxygenation?

Kayla Lucas , Giles Peek

Thoracic/Cardiac Basic Science

Purpose: Institutional variation and surgeon preference account for variability in the techniques used to safely secure the aortic cannula during central veno-arterial extracorporeal membrane oxygenation (V-A ECMO) in patients with an open chest. The purpose of this study is to evaluate and compare the stability and mechanisms of failure associated with each of these techniques during application of excessive force.

Methods:

Stand Model: The experimental stand was constructed using a Fisher Castaloy laboratory clamp tool holder and three-prong extension clamps. Ethicon Prolene® (polypropylene) sutures were snared around vinyl sleeves of gripping rods. Three experimental groups were used and varied by polypropylene size and aortic cannula type.

- Group 1: Prolene® 3-0, Medtronic Arterial Cannula EOPA™ 20 Fr.
- Group 2: Prolene® 4-0, Medtronic Arterial Cannula DLPTM Pediatric 16 Fr.
- Group 3: Prolene® 5-0, Medtronic Arterial Cannula DLPTM Pediatric 8 Fr.

Each Prolene® suture was secured within tourniquets (Surge Cardiovascular) using either a hemostat or medium hemostatic clips (Ethicon Ligaclip). The cannula was snared with silk ties (Ethicon PERMA-HAND Silk Suture Tie 2-0) to either one or two tourniquets. Force was applied to a three-way stopcock connected to the side port of the aortic cannula. The force applied was 9.8 Newtons (1 kg) initially and increased exponentially if the cannula remained secure.

Animal Model: Animal experiments were approved by UF IACUC 201910972. Five Yorkshire X pigs' aortas (weight, mean \pm standard deviation: 44 \pm 1.8 kg) were cannulated in a standard fashion for central V-A ECMO. Similar to the stand model, force was applied to a three-way stopcock connected to the aortic cannula, and the force applied progressively increased starting with 9.8 Newtons (1 kg).

Results: In the stand model, two purse-string sutures secured by two clips held cannulae most reliably at the highest forces. In animal experiments, applied force led to cannula dislodgement from the aortic lumen while leaving sutures and ties intact.

Conclusions: Larger diameter suture can withstand higher forces. Two hemostatic clips can secure Prolene® within tourniquets with the same efficiency as a mosquito. In the stand model, the weakest point of a secured aortic cannula was the number of ties around the cannula and tourniquets. In the animal model, excessive force led to Prolene® stretching and cannula dislodgement, which can lead to catastrophic bleeding in a clinical scenario.

10589 Analyzing the Incidence of Retained Surgical Items Detected in Intraoperative X-Rays for Missing Counts in Plastic Surgery

Nicky Trieu , Sarah Virk

Plastic Surgery Basic Science

Introduction: In the event of missing surgical counts, obtaining x-rays to rule out retained surgical items (RSI) is a standard practice. However, these additional safety measures come with risks. This study investigated the incidence of actual RSI on plastic reconstructive surgery (PRS) intraoperative x-rays and its associated modifiable risk factors.

Methods: X-rays with indication of “foreign body” in PRS procedures from 2012 to 2022 were obtained. Reports with “incorrect surgical counts” and associated perioperative records were retrospectively analyzed to determine the incidence of RSI.

Results: Among 257 x-rays, 55 (21.4%) indicated incorrect counts during PRS operations. None were positive for RSIs. The average number of staff (physicians, nurses and technicians) present was 12.01. This correlated to an average of 6.98 staff turnovers.. The average case lasted 8.7 hours. X-rays prolonged the time under anesthesia by an average of 24.3 minutes ($p < 0.0001$). Free flap surgeries had 70.9% prevalence of missing counts (lower extremity 43%, breast 27%), followed by craniofacial (12.7%), hand (12.7%), breast reductions (3.6%), and lipo-abdominoplasty (3.6%).

Conclusions: While x-rays for missing counts intend to prevent catastrophic sequela of inadvertent RSIs, study results suggest the true incidence of RSI in PRS is negligible. However, intraoperative x-rays have potentially harmful and pervasive consequences for patients including increased anesthesia time, radiation exposure, and overall cost. Case complexity, duration and staff turnover appear to correlate with incorrect counts. Therefore, addressing modifiable risk factors to minimize unnecessary intraoperative x-rays is imperative.

10586 Comparison of Different Porcine Models Simulating Myocardial Cold Ischemia of the Pediatric Donor Heart

Yuriy Stukov , Jeffrey Jacobs
Thoracic/Cardiac Basic Science

Background: Our team previously identified a cardioprotective additive that can extend myocardial viability during prolonged myocardial cold ischemic time (CIT) in rodent models. The purpose of this study was to utilize a porcine model to compare in-vivo versus ex-vivo simulation of CIT in order to extend our studies to larger animals.

Methods: Eight 39-55kg Yorkshire X pigs were randomly assigned to either in-vivo or ex-vivo simulation. After administration of general anesthesia and endotracheal intubation, baseline measurement of left ventricular performance was obtained via transesophageal echocardiography (TEE). After midline sternotomy and heparin administration, the aorta was cross-clamped and 2 liters of HTK-Custodiol was introduced via the aortic root. After CIT, measurements of post-ischemic left ventricular performance were obtained. Results are presented as : Mean \pm Standard Deviation (Median, Minimum–Maximum).

Results: Weight (kilograms) was similar in the in-vivo and ex-vivo group: 44 ± 1.8 (44, 42–46) versus 44 ± 5.1 (43.5, 39–51), respectively. Cold ischemic time (minutes) was longer in the ex-vivo group: 360 ± 0.360 (360–360) versus 141 ± 26.7 (149, 102–163). Temperature (OCentrigrade) was colder in the ex-vivo group: 8 ± 0 (8, 8–8) versus 16.5 ± 4.2 (16, 12–16)

In the in-vivo group, baseline ejection fraction and ejection fraction after CIT were: $48.25\% \pm 14.95\%$ (48.5%, 33%–63%) and $41.25\% \pm 22.32\%$ (41.5%, 20%–62%), respectively. In the ex-vivo group, baseline ejection fraction and ejection fraction after CIT were: $56.4\% \pm 5.9\%$ (57%, 50%–67%) and $60.4\% \pm 7.7\%$ (61.5%, 51.9%–67%), respectively.

Conclusion: The ex-vivo technique is suitable to evaluate cardioplegia additives that may substantially extend myocardial tolerance to cold ischemia.

10583 Factors impacting the patient-reported outcomes in children treated for velopharyngeal insufficiency within the cohort of orofacial cleft patients

Nicky Trieu , Jessica Ching

Plastic Surgery Basic Science

Introduction: Velopharyngeal dysfunction is a condition in which the soft palate fails to tightly close against the posterior pharyngeal wall when speaking, allowing air to escape through the nares and subsequently causing hypernasal speech. Even post palatoplasty, children born with cleft palates are predisposed to developing velopharyngeal insufficiency (VPI) that requires further intervention. Numerous studies have explored the superiority of VPI surgical treatments using quantitative measures such as anatomical improvement of velopharyngeal port, decreased hypernasality and increased intelligibility. However, there is more to be known about the psychological effects surgery, medical care, and speech therapy have on these children. The purpose of this study is to investigate factors that may impact the patient-reported speech outcomes in children treated for VPI, ultimately improving the patient education resources.

Methods: All orofacial cleft patients who underwent surgical intervention at the University of Florida Craniofacial Surgery Department and enrolled in ACCQUIREnet from 2020 to 2022 were identified. Patient demographics, past medical history, CLEFT-Q patient reported outcome, and assessments by speech language pathologists (SLP) were retrospectively analyzed from records of 73 patients.

Results: We studied 73 patients, 22 of which had a diagnosis of VPI and 51 without. Comparison between two groups yielded no significant difference in their percentage of intelligibility as evaluated by the SLP ($p = 0.1$). There was no significant difference in the CLEFT-Q speech distress and function scores between the two groups ($p = 0.35$ and $p = 0.30$, respectively).

Among all patients that underwent surgical cleft palate intervention, high distress scores were significantly correlated with high function scores ($p < 0.0001$), but neither was closely associated with percent intelligibility assessed by SLP. Patients who had other speech disorders, such as articulation errors and ankyloglossia, as well as those who received SLP intervention at time of speech evaluation were assessed as less intelligible by SLP ($p = 0.005$, $p < 0.0001$, respectively). Lower CLEFT-Q scores were significantly correlated with patient comorbidities such as developmental disabilities, autism spectrum disorder, hearing loss and learning disabilities ($p = 0.024$, 0.001), psychiatric symptoms ($p = 0.002$, 0.01), and other speech disorders ($p = 0.038$, 0.042).

Conclusions: The results of our study demonstrate that VPI patients who undergo interventions are as intelligible as patients who undergo palatoplasty without developing VPI. However there are other factors may play a role in shaping the patients' self-perception. These factors include other comorbidities, psychiatric symptoms, and other speech disorders. With this knowledge, we can better inform the patients and their families and recommend measures that can improve patient reported outcomes.

10580 Shadow Surgery: Definition and Quantification of Anthropometric Shadow Facets

Jonathan Butts MD, Jessica Ching MD

Plastic Surgery Basic Science

Introduction: The human visual system has evolved to process and model shadows in depth perception and for identifying features. In rhinoplasty, several methods have been proposed to quantify nasal anatomy for preoperative planning and postoperative critique such as 2D measurement of anthropometric points or commercially available 3D scans. However, these methods are limited by expense, practicality, accuracy, and precision. Here we propose a novel method of nasal aesthetic analysis relying on a reliable system of topographic shadow facets and compare 2 methods, photogrammetric and in silico.

Methods: A gold standard photogrammetric approach was performed using iPhone 13 Pro Max (Cupertino, CA), 5.7mm lens with an equivalent focal length of 26mm F1.5 lens at a distance of 1m from an equivalent 60W LED bulb 5700deg at a 45-degree angle to the nasal dorsum. Four images were taken at each angle for one subject.

For the in silico model, the front-facing iPhone FaceID scanner was utilized using the ScandyPro app (Scandy, New Orleans, LA). This generated a 3D point mesh that was exported to Blender (Blender Institute, Amsterdam, The Netherlands). Simulated area illuminants and camera were placed at 1M. 2D renders were created with the cycles rendering engine.

All images were processed in ImageJ (NIH, Bethesda, MD) with scales normalized to an externally measured ala-ala width.

Results: A total of 23 unique shadow facets were identified on the photogrammetry and simulated image for the nose and upper lip. There was high correlation between matched mean areas between the two groups ($r=0.90$). The greatest variability for the photo group was associated with the largest areas (lateral philtrum, 241.25 sqmm, $sd=51$). Overall, there was a trend in the simulated group showing greater concordance in variation between paired lateral facets.

Conclusion: Nasal anatomic quantification presents a challenge for reliable, practical, and standardized measurements. Here we define a new topographic anatomic system based on analysis of shadows and highlights that is repeatable and easy to work into a clinical workflow. However, this is still at an early phase and requires further research to determine consistency across illuminant angles, patients, and define clinical implications that this data may best inform.

10577 Animal Related Injuries in Children – Barking Dogs Do Bite

Julia Thielhelm , Saleem Islam MD

Pediatric Surgery Clinical/Translational

Introduction: Animal bites are one of the leading causes of emergency room visits in children and tend to be more severe than animal bites in adults. The rate of dog-bite related Emergency Department visits are highest among pediatric patients, representing 158 per 100,000 visits. These injuries can result in substantial morbidity manifesting in both physical and traumatic stress disorder. Patterns of injuries as well as the inflicting animal vary, and we hypothesize that age plays a role in the distribution and severity of injury. The purpose of this study was to better understand the injuries sustained, animals involved, and potentially recognize modifiable events.

Methods: Following IRB approval, a retrospective cohort analysis of all children presenting with animal bite injuries over 10 years was performed. Data regarding the clinical presentation, demographics, and outcomes were collected and analyzed. The cohort was divided into 0-5 years of age and 6-18 years of age, and comparative statistics performed.

Results: Out of 173, 167 (96.5%) bites were canine. A majority of cases were male (60.7%), less than 6 years old (52.6%), white (79.2%), and had public insurance (74.6%). The bites tended to occur at home (59.0%) and with dogs that were known (81.5%), and 62% presented directly to our facility. Of the known breeds, Pit bull comprised 57.6% (72/125). The patients less than 6 years age had a significantly higher proportion of white children, home attacks, and head and neck wounds compared to the older cohort. Only 1.7% of the bites occurred on the torso, and all occurred in patients 5 or younger. Older children had significantly higher number of learning disabilities (77.4%) and extremity wounds (68%). Notably, the number of children bitten multiple times and the Dunbar severity of the bite did not vary significantly by age. A relative majority of the bites were labeled as Level 3 on the Dunbar scale, which is defined as 1 to 3 puncture wounds without lacerations. A majority (57%) required operative repair under general anesthesia. 64.2% of patient's wounds required follow-up.

Conclusions: This is one of the largest series of canine injuries in children. We noted that the most common victim is a young, white boy attacked at home by dogs known to them. Younger patients had a higher proportion of head and neck bites. Education of parents and pit bull owners may ameliorate these events. Multi center studies would improve understanding.

10574 Pyroptosis is a significant contributor to the formation of thoracic aortic aneurysms and dissections

Alex Hung , Zhihua Jiang PhD
Thoracic/Cardiac Basic Science

Aortic aneurysms and dissections (AADs) are the 15th leading cause of death in the US and the leading cause of death in men over 65 years old. Currently, surgery is the only effective treatment for thoracic AADs (TAADs); and despite the number of potential pharmacological therapies undergoing clinical trials, no effective drugs are on the market currently. While the underlying mechanisms that cause TAAD formation are unclear, a hallmark of TAADs is medial degeneration, a phenomenon characterized by vascular smooth muscle cell (VSMC) apoptosis in the medial layer of the aorta. Interestingly, aortic wall integrity has been shown to remain intact when up to 60% of VSMCs undergo apoptosis – a non-immunogenic regulated cell death (RCD) program – suggesting that apoptosis itself or apoptosis alone is not responsible for the VSMC death observed in medial degeneration. In addition, growing evidence generated by our laboratory and in the literature demonstrate the important role of inflammation in TAAD formation. Recent studies have implicated another cell death mechanism, inflammatory cell death (ICD), as a potentially significant contributor to medial degeneration and TAAD formation. ICD pathways differ from apoptosis in that ICD programs lyse the dying cell, thereby diffusing the internal and often immunogenic contents into the extracellular space. Pyroptosis is a recently discovered ICD pathway that is activated by damage-associated molecular patterns (DAMPs) released by endogenous damage and mediated by the executioner molecule gasdermin-D (GSDMD). The N-terminus of GSDMD is cleaved by the cysteine protease caspase-1, which then oligomerizes to form transmembrane pores that facilitate cell lysis and the release of pro-inflammatory cytokines such as IL-1 β , IL-18, and other inflammatory signaling molecules including DAMPs. Our data point towards pyroptosis as a promising candidate for TAAD therapies. Using an aortic dissection model (angiotensin-II+BAPN) and an aortic aneurysm model TAAD models (topical porcine elastase), we found that *Gsdmd*^{-/-} mice had fewer ruptures ($p=0.035$) and reduced rate of aortic dilation ($p=0.052$) during the early stages of TAAD formation (d0-d14), respectively. In addition to our experimental data, we show that pyroptosis also occurs in human TAAD patients as well via immunohistochemistry staining and western blot. Thus, we hypothesize that pyroptosis promotes TAAD development and serves as a potential target for TAAD therapies.

10571 The Role of Skeletal Muscle Stem Cell Behavior in Vascular Disease

Aria Harding , Scott Berceci MD.Ph.D.

Vascular Basic Science

Background: Patients with chronic kidney disease (CKD) have a high prevalence of peripheral arterial disease (PAD) and patients with concomitant CKD and PAD experience worse limb outcomes even after surgical revascularization. Skeletal muscle stem cells (MuSCs) are integral for skeletal muscle homeostasis and respond to acute muscle stress by rapidly proliferating and differentiating in the mature myocytes. Significant oxidative stress (OS) in the tissue of CKD and PAD patients may dysregulate MuSCs, negatively altering their function. We propose that MuSCs are adversely affected by uremic and ischemic environments due to excessive oxidative stress.

Methods: Renal disease was modeled in a C1C12 (murine myoblast) cell culture through addition of the uremic toxins p-cresol and indoxyl sulfate in various concentrations representing differential levels of CKD to the culture media. Hypoxia was modeled by exposing cells to an atmospheric environment of 94% N₂, 5% CO₂, and 1% O₂ gas in a hypoxia chamber. We used BrDU calorimetric, mitochondrial and cytoplasmic reactive oxygen species, and cell death assays to evaluate MuSC proliferation in control, uremic, hypoxic, and hypoxic + uremic environments. All assays were measured using a microplate reader at predefined levels of absorbance.

Results: MuSC proliferation was greatest in uremic media at concentrations of 10 ng/mL (1.38 ± 0.73) and lowest in media with concentrations of 100 ug/mL (0.45 ± 0.19). Proliferation rates in 10 ug/mL ("low-dose) of renal toxins were greater compared to control (1.38 ± 0.7 vs 0.77 ± 0.25 , $p < 0.001$). Only cells grown in media with uremic toxins at concentrations of 75 ug/mL and 100 ug/mL ("high-dose") showed decreased growth rates relative to control (0.59 ± 0.16 and 0.45 ± 0.18 , respectively; $p < 0.001$). During repeat testing, proliferation was similar in control and high-dose uremic media (0.65 ± 0.28 vs 0.57 ± 0.21 , $p = 0.876$). However, proliferation was greater in hypoxic media compared to control media (0.96 ± 0.44 vs 0.65 ± 0.28 , $p = 0.018$). Proliferation rates were not different between hypoxic media with or without uremia (0.96 ± 0.44 vs 0.96 ± 0.50 , $p = 0.900$). Cytoplasmic nor mitochondrial oxidative stress levels were not different among groups ($p = 1.0$). Cell death was lower in hypoxic environments with and without uremia (0.25 ± 0.03 and 0.26 ± 0.02 , respectively) compared to control (0.33 ± 0.02 , $p < 0.001$). Cell death in uremic media alone was greater than control (0.55 ± 0.04 , $p < 0.001$).

Conclusions: High-dose uremic environments negative affect MuSC proliferation and cell death independent of oxidative stress. Low-dose uremic and hypoxic environments appear to stimulate MuSC proliferation, with hypoxia being protective against cell death. More work is needed to understand the mechanisms underlying MuSC regulation in uremic and hypoxic environments.

10565 Center Specific Characteristics in Top 20th percentile Liver Transplant Centers in Graft and Patient Survival Using SRTR Reports

Kristi Bears , Ali Zarrinpar

Transplant/Hepatopancreatobiliary (non-cancer) Basic Science

Background: Previous studies show that liver transplant center volume is associated with patient liver transplant outcomes. We sought to determine center-specific characteristics reported by the Scientific Registry of Transplant Recipients (SRTR) correlated with being in the top 20th percentile of centers in graft and patient survival in liver transplantations.

Methods: Center-specific characteristic data for adult deceased donor liver transplants were obtained from the semi-annual SRTR 6-month program specific reports released on July 6th, 2022. All centers that performed a liver transplant in the reporting period published were reviewed; total transplant volume of ≤ 15 in the reporting period were excluded (n=104 centers). Center performance was determined using observed and expected counts from the reports in both graft and patient survival to calculate separate O/E ratios. Tests for differences were conducted in SAS 9.4 software

Results: The top 20th percentile of centers in graft loss O/E ratios had significantly longer mean hospital stay (p-value= $<.0001$), MELD at Transplant (P-value=0.02), and higher SRTR rating of 1-year liver survival (p-value= $<.0001$). Similar results were seen in top 20th percentile of centers in patient survival. However, mean expected patient death and graft loss were similar amongst the top 20% and lower 80% (graft loss 8.60 vs 10.18 and patient death 7.46 vs 6.93)

Conclusions: The top 20% of liver transplant centers as measured by the O/E ratio also have lower overall graft loss and patient deaths as expected. These centers also have high SRTR ratings in 1-year survival. The type of center or centers that train fellows had no difference on center performance. It is interesting to note that the expected mean graft loss and patient death for centers is very similar, possibly indicating that regardless of center performance the margins are very narrow.

10562 Preoperative MR staging improves with implementation of a Total Neoadjuvant Therapy Protocol for locally advanced rectal cancer

Angel Charles , Johan Nordenstam
Oncology Clinical/Translational

Introduction: Accurate staging is paramount when tailoring the optimal therapy for rectal cancer patients. Patients without distant metastases, with node positive disease and/or T-stage of 3 or greater are offered neoadjuvant chemoradiotherapy prior to re-staging and surgical resection. Re-staging is the cornerstone in the evaluation that determines surgical strategy. At our institution we started the transition from long course chemoradiotherapy (LCCRT) to total neoadjuvant therapy (TNT) in 2018. This study was undertaken to find out whether re-staging accuracy differs between LCCRT and TNT. Our local institutional review board approved the study.

Methods: Retrospective review of data regarding patients treated for rectal cancer 2018-2021 identified in our institution's cancer registry, who were clinically staged as T3-4, and/or N+, without distant metastatic disease (clinical stage II or III). All pelvic MR were performed using a rectal cancer protocol sequence on 3T MR. MR images were interpreted by radiologists who are members of our multi-disciplinary rectal cancer program, accredited by the National Accreditation Program for Rectal Cancer. The study population consisted of patients who underwent both restaging MR and subsequent proctectomy at our institution. Staging accuracy was defined as concordance of both mrT and mrN stage.

Results: 115 patients were cT3-4 and/or N+. Nine were excluded because of lack of preoperative MR at our institution and 35 were excluded as they did not undergo proctectomy at our institution, two did not complete neo-adjuvant therapy and one transferred care to an outside facility, leaving a study population of 68 patients. Of these, 45 patients underwent long course chemoradiotherapy and 23 patients underwent total neoadjuvant therapy with short course radiotherapy (5x5Gy) followed by 8 cycles of FOLFOX chemotherapy. Restaging MR was performed approximately one month after completion of neoadjuvant therapy.

6/23 (26%) of patients in the TNT group and 10/45(22%) in the LCCRT group had complete pathological response to therapy. Patients who underwent TNT were more than twice as likely to be accurately staged with MRI 9/23 (39%), when compared to LCCRT patients 8/45 (17.8%). 3/6 (50%) TNT patients who had a complete pathologic response were accurately staged with MRI; 1/10 (10%) LCCRT patients with complete pathologic response was accurately staged.

Conclusion: In our single center retrospective analysis, restaging MR in patients with clinical stage II or III rectal cancer overall was prone to inaccuracy; however, in the TNT subgroup, there were more patients with accurate restaging. One possible explanation for this finding is the increased time between RT and the re-staging MRI in the TNT group. Ultimately future studies will tell us whether TNT will result in more favorable oncologic outcomes.

10559 Contemporary Patient Blood Management in Acute Type A Aortic Dissections: Reducing Intraoperative Blood Product Usage and Waste

Patrick Kohtz , Thomas Beaver

Thoracic/Cardiac Clinical/Translational

Introduction: Type A aortic dissection (TAAD) repair produces a significant coagulopathy. Blood product administration, especially fresh frozen plasma (FFP) and platelets, is associated with dose-dependent pulmonary complications, stroke, and mortality. We compared intraoperative blood product usage/waste in TAAD repair before and after a contemporary patient blood management (PBM) program, including point-of-care viscoelastic testing, education to reduce transfusion, guided concentrated fibrinogen administration and monitoring to reduce blood product waste (ordered but not administered).

Methods: Single-center retrospective review of adults (≥ 18 years) with acute TAAD repair between April 4, 2018 and December 29, 2019 (controls) and June 2, 2021 and June 19, 2022 (PBM group). Statistical analysis included Chi-Square tests for categorical variables and Wilcoxon two-sample tests for continuous variables.

Results: There were 142 patients with blood product data available, including 74(52%) historical control patients and 68(48%) PBM patients. Mean age for cohort was 59.0 ± 13.7 years. PBM patients had higher body mass index (31.3 ± 6.9 versus 29.3 ± 5.6 , $p=0.055$), lower preoperative hemoglobin (12.5 ± 2.3 versus 13.2 ± 1.8 , $p=0.040$), and less peripheral vascular disease ($26.8\%[n=15]$ versus $46.4\%[n=32]$, $p=0.025$). PBM group had more complex operations with more zone 2 debranchings ($50.0\%[n=34]$ versus $27.0\%[n=20]$, $p=0.005$) and fewer hemi-arch procedures ($39.7\%[n=27]$ versus $63.5\%[n=47]$, $p=0.005$). Fewer patients in the PBM group had intraoperative FFP transfusions ($1.5\%[n=1]$ versus $18.9\%[n=14]$, $p<0.001$) and Factor 7 transfusions ($0\%[n=0]$ versus $8.1\%[n=6]$, $p=0.016$) with more prothrombin complex concentrate (PCC) ($41.2\%[n=28]$ versus $18.9\%[n=14]$, $p=0.004$) and more fibrinogen concentrate ($5.9\%[n=4]$ versus $0\%[n=0]$, $p=0.034$). Despite higher surgical complexity in the PBM cohort, there were no differences in major complications or mortality and no differences in the percentage of patients transfused with red blood cells (RBCs), cryoprecipitate, platelets, or cell salvage blood. Blood product waste was lower in the PBM group for the four principal blood products (RBCs, FFP, platelets, cryoprecipitate).

Conclusions: A contemporary Patient Blood Management program in acute TAAD with point-of-care viscoelastic testing reduced FFP transfusion and blood product waste without any adverse effects on postoperative outcomes.

10556 Outcomes and Complications Associated with Operative Fixation of Perilunate Dislocations: A systematic review

William Powers MD, Ellen Satteson MD
Plastic Surgery Clinical/Translational

Purpose: Perilunate dislocations are rare, yet serious, high-energy injuries with many limiting functional sequelae including residual pain, stiffness, and arthritis of the wrist. While surgery is recommended to mitigate these sequelae, there is a dearth of literature describing clinical outcomes following operative fixation of perilunate dislocations and associated fracture. In this study, we review clinical outcomes and their tools for measurement following operative fixation of perilunate fracture and dislocation.

Methods: A systematic review of studies pertaining to clinical outcomes following operative management of perilunate dislocations was conducted by querying Web of Science, PubMed/MEDLINE, Cochrane, and Embase databases. PRSIMA guidelines were followed. After removal of duplicates, 246 articles were screened by two independent reviewers.

Results: Fifty-six studies met inclusion criteria for the study. Most were retrospective, single center studies, encompassing 1368 patients and 1379 wrists. Clinical outcomes were assessed primarily using the Mayo Wrist Score (N= 26 studies), as well as the Disabilities of Arm, Shoulder, and Hand (DASH) score (N= 12 studies), Quick DASH score (N=8 studies), Cooney Score (N= 5 studies) and Patient-Related Wrist Evaluation (PRWE) score (N= 10 studies). The most commonly reported complications postoperatively were posttraumatic arthritis and residual wrist pain.

Conclusions: Overall, our systematic review of the literature suggests that measurement of clinical outcomes following surgical intervention for perilunate dislocations are not standardized, with a range of clinical assessments being used. Furthermore, even with operative fixation, clinical outcomes for patients with perilunate dislocation remain overall varied, with some patients reporting residual pain and chronic osteoarthritis.

10553 Hashtags in Plastic Surgery: A Sentiment Analysis of over 1 Million Tweets

Mustafa Chopan ,

Plastic Surgery Clinical/Translational

Background: Current literature has sparse recommendations that guide social networking practices in plastic surgery. To address this, we used natural language processing and sentiment analysis to investigate the differences in plastic surgery-related terms and hashtags on Twitter.

Methods: Over 1 million tweets containing keywords #plasticsurgery, #cosmeticsurgery, and their non-hashtagged versions plastic surgery and cosmetic surgery were collected from the Twitter Gardenhose feed spanning from 2012 to 2016. We extracted the average happiness/positivity (h-avg) using hedonometrics and created word-shift graphs to determine influential words.

Results: The most popular keywords were plastic and cosmetic surgery, comprising more than 90% of the sample. The positivity scores for plastic surgery, cosmetic surgery, #plasticsurgery, and #cosmeticsurgery were 5.72, 6.00, 6.17, and 6.18, respectively. Compared to plastic surgery, the term cosmetic surgery was more positive because it lacked antagonistic words, such as "fake," "ugly," "bad," "fails," and "wrong." For similar reasons, #plasticsurgery and #cosmeticsurgery were more positively associated than their non-hashtagged counterparts.

Conclusion: Plastic surgery-related hashtags are more positively associated than their non-hashtagged versions. The language associated with such hashtags suggests a different user profile than the public and, given their underutilization, remain viable channels for professionals to achieve their diverse social media goals.

10550 A Retrospective Review of 58 Patients Undergoing Multi-Organ Cardiac Transplantation: A Single-Center Experience

Matthew Purlee , Jeffrey Jacobs MD

Thoracic/Cardiac Clinical/Translational

Introduction: Multi-organ transplants involving cardiac transplantation present unique management challenges, and outcomes of this rare cohort have not been well-defined. We reviewed our management strategy and outcome data for all patients undergoing multi-organ transplant involving cardiac transplantation since initiation of our transplant program.

Methods: A single-center retrospective study of pediatric and adult patients who underwent multi-organ transplants involving cardiac transplantation from 03/27/1992 to 12/31/2022 was conducted. Continuous variables are presented as mean±standard deviation or median[interquartile range](range). Categorical variables are presented as N(%). The Kaplan-Meier method was used to estimate longitudinal survival.

Results: Fifty-eight patients underwent multi-organ transplantation involving cardiac transplantation at our institution. Most patients were male (62.1%, n=36), and mean age at transplantation was 40.5±18.1 years. Cardiac transplantation was due to acquired heart disease in most patients (75.9%, n=44), and most transplants were in adult patients (89.7%, n=52). These patients represented a high risk cohort at transplantation, with 82.8% (n=48) requiring inotropic support, 63.8% (n=37) presenting with renal failure, and 43.1% (n=25) requiring prior cardiac surgery. Thirty-four (58.6%) patients underwent heart-kidney transplantation, 15 (25.9%) underwent heart-lung transplantation, 6 (10.3%) underwent heart-liver transplantation, and 3 (5.2%) underwent triple organ transplantation (heart-lung-liver, heart-liver-kidney, heart-lung-kidney). Postoperative length of stay in this high-risk cohort was 31.9±24.8 days. At latest follow-up, 37 (63.8%) patients were alive with a median follow-up time of 3.7[0.6,13](0,26.2) years.

Figure 1 displays longitudinal Kaplan-Meier survival, with a 1-year survival estimate of 84.2% (95% confidence interval [CI], 75.3-94.2%), 5-year survival estimate of 79.4% (95% CI, 69.1-91.2%), and 10-year survival estimate of 67.8% (95% CI, 55.1-83.5%).

Conclusion: Our single-center analysis of all 58 patients who underwent multi-organ transplants including cardiac transplantation reveals that these high-risk patients have acceptable longitudinal survival with Kaplan-Meier survival estimates of 84.2% (95% CI, 75.3-94.2%) at 1 year, 79.4% (95% CI, 69.1-91.2%) at 5 years, and 67.8% (95% CI, 55.1-83.5%) at 10 years. Multi-institutional analyses may provide large enough sample sizes to provide contemporary survival rates for these patients, and we should strive to achieve longitudinal survival in these patients similar to that achieved in patients undergoing isolated cardiac transplantation.

10547 Complete Margin Control Surgery for the Treatment of Malignant Tumors

Caroline Sachse , Rainer Sachse MD,FACS

Oncology Case Report

Introduction: Complete Margin Control Surgery is a method in which the complete surgical margin is evaluated for the presence of pathological changes as opposed to current standard surgical/pathological procedures, in which this critical information is extrapolated from representative margins. Review of the literature reveals dramatically (3 to > 20 times) lower local recurrence rates when this method is used, with the greatest treatment advantage being realized in those tumors which have the least predictable and most aggressive growth patterns – unless the tumor has already metastasized. Unfortunately, with the exception of Dermatological Surgeons, who have utilized the Mohs variant of this technique extensively as their gold standard in the treatment of complex malignant skin cancers, this methodology so far has rarely, if at all, been utilized by physicians in other operative specialties.

Method: After briefly describing the standard tissue management of a pathology specimen as well as that utilized in Complete Margin Control Surgery (CMCS), the authors introduce and illustrate in a step-by-step fashion a straightforward novel technique of CMCS, which can be readily learned and implemented by any surgeon, preferably in close cooperation with an Anatomical Pathology colleague. The key components to this method are, that the surgeon obtains an intact/complete margin specimen, which they then prepare and embeds for the subsequent histological analysis by their pathology colleague, and that both maintain an excellent level of communication.

Results: Complete Margin Control Surgery has shown to have far superior outcomes compared to any other known modality in the treatment of nonmetastatic (TxNoMo) malignant tumors, with relative benefits increasing particularly with the complexity of the lesion.

Conclusion: The presented method of Complete Margin Control Surgery has a very fast that allows surgeons to achieve far lower local recurrence rates and superior outcomes, compared to any current (surgical, radiation or medical) treatment modality.

10544 A Gravid Situation: Faculty Support for Pregnant Surgical Residents

Andrea Riner , Jose Trevino

Medical Education Clinical/Translational

Introduction: Pregnancy during general surgery training has become more commonplace, yet pregnant residents encounter stigma that can threaten their education and workplace environment. Despite the daily interactions between residents and teaching faculty, the perceptions of faculty towards pregnant general surgery residents have been overlooked. The aims of this study were to examine these perceptions and identify areas of improvement.

Methods: A 32-question survey was designed with questions about surgeon demographics and perceptions toward pregnant residents. The survey was distributed electronically via the Association of Program Directors in Surgery listserv from March 2022 to April 2022. Perceptions were measured with responses to statements, including Likert-scale questions and a free response question. Descriptive statistics were used to characterize responses and differences in perceptions by surgeon sex and age using Fisher's exact tests. Qualitative analysis identified recurring themes from free text responses.

Results: In total, 191 respondents accessed the survey and 178 (95.2%) identified as general surgery teaching faculty and were permitted to complete it. Of these, 163 (91.6%) responses had $\geq 80\%$ complete data and were included in the final analysis. Among the respondents, 58.5% were male and 41.5% were female, with a majority (52.8%) having practiced 10 years or less. Despite 99.4% of surgeons feeling comfortable if a resident told them they were pregnant, 22.4% of surgeons disagreed that their institutions have supportive cultures towards pregnancy. Almost half of surgeons (45.4%) have witnessed negative comments about pregnant residents and half (50.3%) believe that they are discriminated against by co-residents. Nearly two-thirds of surgeons (64.8%) believe that someone should have a child whenever they wish during training. Almost unanimously (97.5%) surgeons agreed that pregnant residents should seek schedule modifications if they are experiencing difficulties during pregnancy. Despite recent reports, only 80.2% of surgeons recognized that female surgeons have increased risks of infertility and pregnancy complications, which varied significantly by surgeon sex (Female: 89.4% vs. Male: 72.8%, $p=0.015$) and age (<50 years old: 89.2% vs. ≥ 50 years old: 65.0%, $p<0.001$). Recurring themes of normalizing pregnancy, improving policies, and creating culture change were expressed, along with acknowledging that many pregnant residents function under "unspoken expectations" that may be to their detriment.

Conclusions: Overall, there appears to be positive perceptions of pregnancy in surgical training, but with acknowledgment that normalization of pregnancy and implementation of supportive policies are needed. These data provide further evidence that although perceptions may be improving, changes are needed to better support pregnant residents during training and teaching faculty are largely supportive of such changes.

10541 BCG VACCINATION AT BIRTH INDUCES A REGULATORY RESPONSE, WHICH PREVENTS EXCESSIVE INFLAMMATORY RESPONSES ASSOCIATED WITH MURINE NEONATAL SEPSIS AND DEATH

Valerie Polcz , Shawn Larson

Pediatric Surgery Basic Science

Introduction: Sepsis remains a leading cause of neonatal morbidity and mortality requiring prolonged hospitalization. Growing evidence suggests that newborns have a 'distinct' immune response linked to a high risk of developing sepsis and sepsis-related mortality. Neonates are heavily reliant on innate immunity which exhibits antigen non-specific memory following exposure to live attenuated vaccines. High amounts of S100 alarmins in newborns are protective from hyperinflammation. During sepsis, IL-10 induces S100A9 production in turn reprogramming myeloid precursors to differentiate into MDSCs. Using a murine model of neonatal sepsis, we have previously demonstrated that BCG administration immediately following birth induces MDSC expansion; however, the significance of this observation in neonates remains unknown. The purpose of this study is to delineate mechanisms by which antigenically complex molecules like BCG, when used in early life, may reduce neonatal sepsis through immunomodulation.

Methods: Neonatal B6 mice received 10⁶ CFUs of live-attenuated BCG vaccine or vehicle subcutaneously at birth and were challenged with intraperitoneal cecal slurry (CS) to induce sepsis on day of life 7 (P7). Blood and splenocytes were collected prior to sepsis (P6) and 6- and 18-hours post-CS (n=7/group/timepoint). Splenic MDSCs (CD11b+MHCII-F4/80-), DCs (CD11c+MHCII+), DC activation markers (CD80, CD86) and inflammatory monocytes (CD11b+Ly6G-Ly6Chi) were quantified by flow cytometry. MDSC metabolism and function were assessed using an extracellular flux analyzer and via suppression of T cell proliferation ex-vivo, respectively. Circulating cytokines were quantified in plasma.

Results: BCG administration improved survival to sepsis. Splenic inflammatory monocyte expansion was reduced on P6 in BCG treated pups (vs control; p<0.01). Both prior to and following sepsis challenge, BCG treated pups had increased levels of systemic IL-6, IL-10, and S100A9 and increased numbers of splenic MDSCs (p<0.05). Following CS challenge, CS-induced DC expansion and activation was blocked in BCG treated pups (vs control). Compared to naïve pups, BCG treatment increased both glycolytic (ECAR) and mitochondrial respiration (OCR) in neonatal MDSCs (p=X.XX) and induced metabolic switching from OxPhos towards glycolysis ex vivo. Finally, BCG administration suppressed ex-vivo T-cell proliferation.

Conclusions: We show here that early life administration of BCG in a neonatal murine model induces expansion of MDSCs, increases anti-inflammatory cytokines and suppresses proinflammatory innate immune responses. These findings suggest that perinatal BCG administration leads to immunomodulation preventing excessive inflammatory responses and may offer a promising strategy to prevent sepsis and reduce newborn mortality.

10538 Directing Tryptophan Immunometabolism to Ameliorate Ischemia-Reperfusion Injury

Sherene Lattimore MD, Ali Zarrinpar MD-PhD

Transplant/Hepatopancreatobiliary (non-cancer) Basic Science

Background: Ischemia reperfusion injury (IRI) can lead to poor outcomes including delayed graft function and graft loss. However, despite its clinical importance, effective therapies to prevent or treat this condition remain elusive. The catabolism of tryptophan by indoleamine 2,3-dioxygenase (IDO) is known to induce anti-inflammatory and immunosuppressive metabolic reprogramming of some immune mediated pathologies. This effect is in part achieved via the role of its metabolite, kynurenine, on Aryl hydrocarbon receptor mediated promotion of the regulatory T-cell population. In this study we aim to show that PEGylated IDO (PEG-IDO) therapy has hepatic anti-inflammatory potential during liver IRI.

Methods: Ten week old male Balb/c mice were used in a model of partial warm liver IRI. The mice were treated with one of two drugs, human recombinant IDO (rIDO) or human PEG-IDO; saline was used as a control. All treatments were administered via retroorbital i.v. injections 48 hours prior to IRI. After 90 minutes of partial hepatic ischemia, the liver was reperfused for 6 and 24 hours. The mice were then euthanized and systemic blood and livers were taken for further analysis.

Results: After 6 hours of reperfusion, serum AST and ALT levels in mice treated with PEG-IDO were significantly lower than those treated with saline or with rIDO indicating a lower level of hepatocellular injury. PEG_IDO therapy also improved AST and ALT levels in the experimental group that underwent 24hr of reperfusion. PEG-IDO treated livers, assessed by histological Suzuki criteria, showed less congestion, necrosis and vacuolization than the livers of mice treated with saline or rIDO in the 6hr model but did not show similar results in the 24hr. The expression of inflammatory markers such as IL-6, TNF- α , IL- β and IFN- γ was also significantly lower in livers of mice subject to PEG-IDO therapy. Interestingly, flow cytometry analysis of whole mouse blood after 6hrs of IRI demonstrated that PEG-IDO therapy did not alter the composition of the circulating CD3+, CD4+, CD8+ T cell, Neutrophil and macrophage milieu. In contrast, PEG-IDO's therapeutic effect was localized to the liver with less infiltrating CD3+ T cells, Ly-6G+ neutrophils and CD68+ macrophages in the hepatic parenchyma.

Conclusion: The development of inflammatory response associated with hepatic IRI is suppressed in a mouse model when treated with PEGylated-IDO at both 6 and 24 hours of reperfusion. These results indicate that redirecting tryptophan immunometabolism via PEG-IDO therapy is an effective immunomodulatory strategy for the treatment of hepatic inflammatory conditions and represents a new class of anti-inflammatory biologic drug.

10535 Impact of Routine Genetic Testing in Breast Cancer Patients

Andrea Riner , Jose Trevino

Medical Education Clinical/Translational

Introduction: Genetic testing guidelines for patients with breast cancer still rely on age, Ashkenazi ancestry, personal and family cancer history, and tumor biology despite evidence that heritable cancers may be missed with these guidelines. Routine use of genetic testing may guide personalized medicine and prompt cascade testing. We aimed to investigate the use of routine genetic testing, potential disparities in testing, and implications on surgical management in breast cancer patients.

Methods: In this retrospective study, we identified patients treated by a single surgeon who began routinely offering genetic testing in 2019. Patients who established care with this surgeon from Jan. 1 – Dec. 31, 2019 were included. Patients were excluded if surgery was performed by another surgeon. Demographic data, genetic testing, pathogenic or likely pathogenic (P/LP) variants, and surgical procedure were obtained from medical records. Statistical analysis included Fisher's Exact and Mann-Whitney U Tests.

Results: Among 223 patients who met inclusion criteria, 86.1% were offered genetic testing, despite only 71% of patients meeting guidelines. Patients offered testing were significantly younger (60.9 ± 12.0 years vs 71.0 ± 12.3 years; $p=0.0002$). Genetic testing was offered equally to patients of different ethnic and/or racial backgrounds. Among those offered testing, 84.4% completed testing and this was not associated with race/ethnicity. Completion of testing was associated with younger age (59.6 ± 12.1 years vs 67.7 ± 8.6 years; $p=0.0007$). The positivity rate for P/LP variants was 17.3%. Of 28 patients with P/LP variants, 15 (53.6%) were not associated with breast cancer risk, whereas 35.7% were high-risk, 7.1% moderate risk and 3.6% low risk for breast cancer. 14% of patients with P/LP variants did not meet testing guidelines, one of whom had a CHEK2 variant (moderate penetrance). 39% of patients with pathogenic variants underwent breast conservation therapy, one of which was of older age with a CHEK2 variant. 60.7% of patients with P/LP variants underwent mastectomy, most of which had moderate to high risk variants. However, 43% had no or low risk variants. Among 17 women who underwent mastectomy, 11 (64.7%) received contralateral prophylactic mastectomy (CPM), 5 selected unilateral therapeutic mastectomies, and one previously had a mastectomy. Four women underwent CPM without a variant associated with increased risk of breast cancer. Among the total sample, 43% of patients underwent mastectomy, of which 45% also had CPM. Interestingly, 75% of those who had CPM had negative genetic testing.

Conclusions: When offered, most patients complete genetic testing after a diagnosis of breast cancer, which does not appear to be associated with racial/ethnic disparities, yet is associated with younger age. Routine offering of genetic testing may inform surgical treatment, surveillance and risk reduction of other diseases, as well as cascade testing.

10532 MONOCYTE ANISOCYTOSIS (MDW) IS INCREASED IN SURGICAL SEPSIS, IS ASSOCIATED WITH MDSC EXPANSION, BUT DOES NOT IMPROVE PREDICTION OF ADVERSE CLINICAL OUT

Valerie Polcz , Lyle Moldawer

Acute Care/Trauma/Sepsis/Burns Clinical/Translational

Introduction: Early sepsis biomarkers are growing in appeal and utility not only for sepsis screening, but also as prognostic and personalized medicine tools. Monocyte distribution width (MDW), a biomarker indicating monocyte anisocytosis, has shown promise in accurately predicting sepsis in the emergency room. Its utility in identifying sepsis and predicting longer-term outcomes in hospital-acquired sepsis, however, is unknown. This study aims to 1) determine whether early MDW values could reliably distinguish sepsis versus sterile inflammation among critically ill surgical patients, 2) determine whether MDW predicts adverse clinical outcomes, and 3) examine the relationship between MDSC expansion and MDW.

Methods: This is a post-hoc pilot analysis of a prospective observational study of critically ill, patients admitted to a surgical ICU with sepsis (n=77) or considered to be at high risk of sepsis (n=81). Healthy control subjects (n=31) were also studied. MDW was obtained from complete blood counts at multiple time points, with a subset of patients undergoing further MDW quantification of PBMC-enriched and CD66b-isolated PBMCs (low density PMN-MDSCs). MDSC phenotyping was performed via flow cytometry.

Results: At the time of ICU admission, MDW was increased in septic patients versus those at risk ($p=0.0006$). Even after balancing sepsis and at risk patients by SOFA and APACHEII scores by propensity score matching (n=61 each), MDW was significantly higher in sepsis patients ($p<0.0001$). Among patients who survived to hospital discharge, MDW levels declined over time. Multivariate regression analysis incorporating APACHEII and SOFA scores demonstrated MDW was not an independent predictor of mortality, chronic critical illness or unfavorable discharge disposition in our study population. Both PMN- and MO-MDSCs were also increased in septic patients as compared with healthy adults ($p<0.05$). MDW from blood, PBMC and CD66b isolated cell samples were all positively correlated (all $p<0.05$), and there was a positive correlation between monocytic MDSCs and whole blood MDW (Pearson correlation coefficient: 0.512, $p=0.0074$).

Conclusions: As demonstrated previously for community-acquired sepsis, MDW values are elevated in surgical sepsis when compared with critically ill surgical ICU patients who are at high risk of becoming septic. Furthermore, MDW can reliably discriminate between sepsis and sterile inflammation among surgical patients, even after adjusting for validated measures of organ dysfunction. While future formal sample size determination is necessary, in our pilot analysis, MDW could not independently predict in-hospital or long-term mortality. Finally, these findings suggest that MDSCs from septic patients have higher MDWs, and MDSC expansion may contribute to monocyte anisocytosis.

10529 BCG INDUCES GESTATIONAL AGE-INDEPENDENT INNATE IMMUNE STIMULATION IN NEONATES: A VALIDATION OF FUNCTIONAL IMMUNOLOGIC BATTERY WITH SMALL VOLUME BLOOD(S)

Valerie Polcz , Shawn Larson

Pediatric Surgery Clinical/Translational

Introduction: Despite its significance as a leading cause of infant mortality, improving outcomes in neonatal sepsis has lagged behind adults. While increased infectious susceptibility in early life may be partly due to a tolerogenic immune phenotype, investigations of neonatal immune function are largely understudied. For preterm infants, the limitations caused by low blood volume (80-100mL in a typical 1000 gram neonate) have largely contributed to the paucity of research on their immune function. This study aims to 1) establish a protocol for a functional immunologic testing battery using peripheral blood (PB) microsampling, and 2) to test for age-dependent effects of BCG stimulation, a known immunoadjuvant, on innate immune function.

Methods: Preterm (PT) and full term (FT) infants were recruited in addition to healthy adults (HA). A 250-300 μ L blood sample was obtained, of which 50 μ L were allocated for innate immune function testing. TNF α -secreting cells were quantified using enzyme-linked immunosorbent (ELISPOT) assays, and LPS, BCG, or a combination were used as innate immune stimulants. After 24-hour incubation, ELISPOT supernatants were collected from two subjects per group, and ELISA (Milliplex) was performed for additional cytokine quantification. Remaining samples were used for PBMC isolation to quantify HLA-DR expression, myeloid-derived suppressor cell (MDSCs) and subpopulation proportions via flow cytometry.

Results: 10 HA, 14 FT and 9 PT blood samples were obtained. BCG stimulation resulted in significant increases in TNF α spot count, size and intensity in FT infants ($p < 0.05$). Co-stimulation with BCG+LPS, and LPS alone also resulted in significant increases in these parameters across age groups ($p < 0.05$). Further cytokine analysis showed BCG stimulation and LPS co-stimulation led to higher concentrations of pro-inflammatory cytokines, including TNF α , IL-12p70, and CXCL8 compared to unstimulated or LPS-stimulated samples, regardless of age. Flow analysis revealed similar mHLA-DR expression levels, with significantly higher proportions of total and granulocytic MDSCs in PT and FT subjects compared to HA, with elevated proportions of early MDSCs in HA subjects ($p < 0.05$).

Conclusions: Our results confirm elevated total and granulocytic MDSC proportions in peripheral blood in PT/FT compared to HA, which may contribute to the overall immunotolerant phenotype seen in early life. BCG stimulation augmented the pro-inflammatory innate immune response in PT/FT, and shows promise as a potential future therapy for neonatal sepsis prevention. Furthermore, our findings demonstrate successful implementation of a novel battery of functional immune assays utilizing microsampling of PB, with the potential for broadening functional testing capabilities to broaden our understanding of the unique complexities of the neonatal immune system.

10526 Assessing the Incidence of Retained Objects in Intraoperative X-Rays for Missing Counts in Plastic Surgery

David Kerekes , Sarah Virk

Plastic Surgery Clinical/Translational

Introduction: Retained surgical items (RSIs) are considered a “never event” in the world of surgery with significant medical, legal and financial implications. The aim of our study was to determine the incidence and characterization of retained objects in plastic surgery procedures.

Methods: We completed a retrospective review of all plastic surgery procedures performed at the University of Florida between 2012 and 2022. Procedures in which an intra-operative x-ray was performed due to incorrect surgical counts were included. Procedure characteristics and status of foreign body on imaging was obtained from the electronic medical record.

Results: Fifty-five (55) intra-operative x-rays were performed during the study period for incorrect surgical counts. Needles comprised the most common missing object. Free tissue transfer comprised the most common procedure (50.9%). There was an average of 12.01 staff per case with an average of 6.98 staff turnovers. The average case duration was 8.42 hours and x-rays prolonged the procedure by an average of 24.3 minutes. All 55 x-rays were negative for a foreign body.

Conclusion: Retained surgical items have significant negative implications to the patient and surgeon. Complex procedures and high number of staff turnovers may increase the likelihood of incorrect surgical counts. Education, effective communication and having a consistent surgical team may help prevent these errors.

10523 Aluminum adjuvant induces the expansion of splenic M-MDSCs in experimental neonatal polymicrobial sepsis

Valerie Polcz , Shawn Larson
Pediatric Surgery Basic Science

Introduction: Sepsis remains a leading cause of neonatal morbidity and mortality, particularly in preterm (<37 weeks) and low birth weight (LBW; <2500g) infants. This is due in part to a distinct neonatal immune phenotype, characterized by an attenuated inflammatory response and an abundance of regulatory and tolerogenic immune cells. Myeloid-derived suppressor cells (MDSCs) are a heterogeneous population of innate immune cells with potent immunosuppressive capability. MDSC's role in neonatal sepsis remains controversial, but may be protective against excessive inflammation. Our study examines the effects of alum, a known immune adjuvant, on MDSC expansion in a murine model of neonatal sepsis.

Methods: Neonatal mice received 100µg of alum subcutaneously at day of life 6 (DOL6), 24 hours prior to the induction of polymicrobial sepsis via intraperitoneal administration of cecal slurry (CS) at DOL7. Spleens were collected prior to sepsis (naïve or alum pre-treated [A-PT]), and at 6 and 24h post-CS. Splenic MDSCs were phenotyped and quantified using flow cytometry.

Results: Induction of sepsis resulted in a significant reduction of total splenic MDSCs at 6h and 24h compared to naïve (DOL6) mice. Further assessment of MDSC subpopulations revealed that CS led to a significant increase in percent of PMN-MDSCs (CD11b+MHCII-Ly6G+) at 6h, which decreased 24h post-CS. Conversely, percent of splenic M-MDSCs (CD11b+MHCII-Ly6C+) were reduced at 6h post-CS, with an increase by 24h. Alum administration had no effect on splenic MDSC numbers prior to or following induction of sepsis. Further, while A-PT mice showed similar trends in MDSC subpopulations, A-PT resulted in an increased percent of splenic M-MDSCs in early as well as late sepsis and reduced the percent of splenic PMN-MDSCs in early sepsis.

Conclusions: MDSCs were reduced after induction of sepsis in neonatal mice, with early granulocytic (PMN-MDSC) and late monocytic (M-MDSC) MDSC expansion. While alum had no effect on overall percentages of splenic MDSCs, pretreatment with alum attenuated the effects of polymicrobial sepsis on monocytic and granulocytic MDSC subpopulations. While further study is necessary, our findings may represent one of many unique pathways by which alum exerts its protective effects, and contributes to improved survival in murine neonatal sepsis^{1,2}.

10520 Type II Inflammation and Thoracic Aortic Aneurysm pathology: Novel findings from Tbx21^{-/-} AngII Mouse Model

MuhammadJawad Javed , Zhihua Jiang
Vascular Basic Science

Background: Chronic inflammation is known to propagate abnormal vascular remodeling in aortic aneurysms, ultimately leading to aortic rupture. Studies have shown that, depending on the microenvironmental cues, the immune response may be skewed towards a specific inflammatory type, which can either slow down or aggravate the pathological vascular remodeling. However, the results of these studies remain inconclusive and heterogeneous, warranting further research for the development of targeted therapeutics for improving human AA outcomes. Tbx21 encodes the transcription factor Tbet, which regulates the type I immune response. Without Tbet, inflammatory response is preferentially skewed towards type II inflammation. We used Tbx21 ^{-/-} mice to test our hypothesis that type II inflammation is associated with worse outcomes in AngII-BAPN TAA mouse model.

Methods: TAA(Thoracic Aortic Aneurysm) mice models were developed by using AngII infusion pump and BAPN administration. ATA (Ascending thoracic aortic diameter) was determined by performing transthoracic ultrasound at set points. For the determination of TAA rupture related mortality, every deceased animal underwent necropsy.

Results: Tbx 21 ^{-/-} mice (n=10) exhibited significantly lower survival rates(p=0.027) and increased ATA diameter (p=0.002), rate of ATA dilation(p<0.001) and rupture (p=0.024) as compared to the C57 control group (n=15) between time point Day 8 and day 28 of being administered with Ang II and BAPN. Aortic tissue extracted on day 14 exhibited significantly elevated CD4⁺ GATA3⁺ T cells along with decreased CD4⁺Tbet⁺ and CD4⁺IFN- γ ⁺ T cells in Tbx21^{-/-} group. Furthermore, Immunofluorescence staining of these tissues displayed increased concentration of CD4⁺ GATA3⁺ T cell, CD19⁺ B cells, and Ly6b.2⁺ neutrophils along with decreased CD68⁺ macrophages and alpha actin⁺ smooth muscle cells in Tbx21^{-/-} group. Further analysis of these specimen revealed elevated active MMP-2 in Tbx21^{-/-} relative to the wild type. Interestingly, depletion of CD8⁺ T cells instead of CD4⁺ T cells in Tbx 21 ^{-/-} group resulted in significantly decreased TAA dilatation and TAA rupture related mortality on day 20 in comparison to the Tbx21^{-/-} group receiving Iso IgG. In vitro, IL-4 increased activation of NF- κ B in AngII stimulated vascular smooth cells compared to IFN- γ .

Conclusion: Our study demonstrates that type II immunity is associated with poor outcomes in TAA AngII animal model with a striking rupture phenotype. Further analysis revealed that CD8⁺ T cells instead of CD4⁺ cells, seems to play a detrimental role in TAA pathogenesis in a skewed type II inflammatory environment. Type II inflammation associated cytokines are also observed to activate pro inflammatory pathways in vascular smooth muscle cells and up regulate MMP-2 leading to the observed TAA rupture phenotype.

10517 Surgery Faculty Knowledge and Perceptions of Breast Pumping Amongst Postpartum Surgical Residents: A National Survey

Kelly Herremans MD, Jose Trevino MD
Medical Education Clinical/Translational

Background: There is a lack of data regarding the knowledge and perceptions teaching faculty possess about breast pumping among general surgery residents despite breast pumping becoming more common in training. This study aimed to examine faculty knowledge and perceptions of breast pumping amongst general surgery residents.

Methods: A 29-question survey measuring knowledge and perceptions about breast pumping was administered online to United States teaching faculty from March-April 2022. Descriptive statistics were used to characterize responses, Fisher's exact test was used to report differences in responses by surgeon sex and age, and qualitative analysis identified recurrent themes.

Results: 156 responses were analyzed; 58.6% were male and 41.4% were female, and the majority (63.5%) were less than 50 years old. Nearly all (97.7%) women with children breast pumped, while 75.3% of men with children had partners who pumped. Men more often than women indicated "I don't know" when asked about frequency (24.7 vs. 7.9%, $p=0.041$) and duration (25.0 vs. 9.5%, $p=0.007$) of pumping. Nearly all surgeons feel comfortable (97.4%) discussing lactation needs and support (98.1%) breast pumping, yet only two-thirds feel their institutions are supportive. Almost half (41.0%) of surgeons agreed that breast pumping does not impact operating room workflow. Recurrent themes included normalizing breast pumping, creating change to better support residents, and communicating needs between all parties.

Conclusions: Teaching faculty may have supportive perceptions about breast pumping, but knowledge gaps may hinder greater levels of support. Opportunities exist for increased faculty education, communication, and policies to better support breast pumping residents.

10514 Man vs Bull: Hepatic Venous isolation in Grade V Liver Trauma

Sara Hensley , Martin Rosenthal

Acute Care/Trauma/Sepsis/Burns Case Report

Abdominal trauma from bull-riding is not an uncommon occurrence. The sport carries a risk of high-grade trauma, including hepatic and retrohepatic inferior vena cava (RHIVC) injury. Such injuries carry a significant risk of mortality secondary to hemorrhagic shock. Operative management is indicated for hemodynamically unstable patients, though there is a lack of consensus on the specific surgical approach.

A 24-year-old male presented to his local Emergency Department after being thrown from and trampled by a bull. He arrived hemodynamically unstable with abdominal pain. After resuscitation with blood products and stabilization, the patient underwent a computed tomography (CT) scan with intravenous (IV) contrast which identified a grade V liver injury, and he was subsequently transferred to a level 1 Trauma Center. Upon arrival, the patient was taken emergently to the operating room. A non-anatomic hepatectomy with Pringle maneuver was performed. However, brisk bleeding continued into the operative field, raising suspicion for retrohepatic caval injury. Proximal and distal control of the inferior vena cava (IVC) was achieved, allowing for visualization and repair of a right hepatic vein injury and retrohepatic caval injury. Interventional radiology was consulted intraoperatively for persistent bleeding, and they performed posterior hepatic artery embolization. He was transferred to the surgical intensive care unit post-operatively for ongoing resuscitation, and he returned to the operating room on post-injury day (PID) 1 and 2 for hepatic debridement and closure. The patient was discharged home on PID 16.

Best operative management of RHIVC injury lacks consensus. Our case illustrates successful management with a multifaceted approach which emphasizes situational adaptivity, resuscitation, and venous isolation.

10511 Intraoperative Thresholds for Transfusion During Burn Surgery

Evan Barrios , Ian Driscoll

Acute Care/Trauma/Sepsis/Burns Clinical/Translational

Introduction: Burn injury is associated with significant morbidity. Deep partial thickness or full thickness burns require surgical excision and skin grafting. This process results in significant blood loss and frequently requires blood transfusions. There is scarcity in published literature addressing intraoperative blood transfusion requirements. The relationship between blood product volume and patient and operative characteristics has not been clearly defined. The enhanced ability to predict blood transfusion requirements would allow for improved allocation of blood products and safer overall operations.

Methods: This is a retrospective review conducted at a large academic burn center. Inclusion criteria are adult patients admitted between December 2019 and August 2020 with burns requiring surgical excision. Prisoners, children, and non-operative burns were excluded. Operative cases requiring blood product administration were compared to cases that did not require transfusion. Mann-Whitney U tests were conducted on non-parametric data with $p < 0.05$ considered significant.

Results: There were 103 total patients who underwent 212 operations. Sixty-one percent ($n=129$) of cases required blood transfusion. The transfusion group had a significantly larger percent total body surface area (TBSA) burn (22% vs 5%, $p < 0.0001$), along with longer hospital (90 days vs 8 days, $p < 0.0001$) and ICU lengths of stay (LOS) (66 days vs 0 days, $p < 0.0001$) compared to the non-transfused group. Operatively, patients requiring blood transfusion underwent more tissue excision (approximately 10% TBSA per case compared to 1%, $p < 0.0001$) with longer case lengths (151 minutes vs 67 minutes, $p < 0.0001$), coupled with higher estimated blood loss (800mL vs 250mL, $p < 0.0001$) and a lower preoperative hemoglobin (8.2g/dL vs 12.8g/dL) and postoperative hemoglobin (9.2g/dL vs 12.8g/dL). The median blood volume received in patients requiring blood transfusion was 1200 (700,2150) mL, and the median time to transfusion was only 7 (-9,25) minutes. Multiple linear regression was conducted, and OR time and amount of tissue excised were found to significantly predict the total blood volume requirement ($R^2 = 0.44$).

Conclusions: Expected operative time, along with planned area of excision (which was 2.5x longer and 8x larger in the transfused group, respectively) can guide the surgeon in anticipating the need for perioperative administration of blood products.

10508 MerTK-dependent efferocytosis by monocytic myeloid-derived suppressor cells contributes to the resolution of lung ischemia-reperfusion injury

Victoria Leroy , Ashish Sharma MBBS, PhD

Transplant/Hepatopancreatobiliary (non-cancer) Basic Science

Introduction: Ischemia-reperfusion injury (IRI) after lung transplantation (LTx) results in primary graft dysfunction leading to acute and chronic graft rejection. Lung IRI is marked by tissue inflammation and dysregulated resolution that entails sustained pro-inflammatory cytokine production and reduced efferocytosis (clearance of apoptotic cells) Our study focused on the efferocytic role of the immunosuppressive monocytic myeloid-derived suppressor cell (M-MDSC) subpopulation via upregulation of MerTK (MER proto-oncogene tyrosine-protein kinase) in the resolution of lung IRI.

Methods: A murine model of lung IRI (via hilar ligation) was used in Balb/c (WT) and *cebpb*^{-/-} (MDSC deficient) mice. Lung function, pro-inflammatory cytokine expression in bronchoalveolar lavage fluid, immunohistochemistry staining of lung tissue and flow cytometry analysis for M-MDSC lung infiltration were assessed in mice after IRI (1hr of ischemia followed by 6hrs (6hr-IRI) or 24hrs (24hr-IRI) of reperfusion) or sham surgeries. Additionally, left LTx were performed using a murine orthotopic LTx model with C57BL/6 donors and WT or *cebpb*^{-/-} recipients to analyze lung function at 24hrs post-transplantation. In vitro studies with co-cultures of M-MDSCs and apoptotic neutrophils evaluated efferocytosis and MerTK expression. Groups were compared using Student's t test or ANOVA with posthoc Tukey's test and data is presented as mean±standard error of mean.

Results: Quantification of M-MDSCs (CD11b+Ly6G-Ly6C+iNOS+) in left lung tissue showed a significant increase in WT mice after 24hrs-IRI compared to 6hrs-IRI ($9.9 \times 10^3 \pm 1.2 \times 10^3$ vs. $6.5 \times 10^3 \pm 0.4 \times 10^3$; $p=0.02$; $n=8$ /group). The infiltration of M-MDSCs after 24hr-IRI was accompanied by increased pulmonary compliance (5.3 ± 0.2 vs. 2.9 ± 0.1 μ l/cm H₂O; $p<0.0001$; $n=12$ /group), decreased pro-inflammatory IL-6, CXCL1, MCP-1, and MIP-2 secretion, decreased neutrophil infiltration and increased MerTK expression compared to 6hr-IRI. The lung IRI resolution was absent in *cebpb*^{-/-} mice, as demonstrated by a decrease in pulmonary compliance compared to WT mice at 24 hrs (3.1 ± 0.1 vs. 5.3 ± 0.2 μ l/cm H₂O; $p<0.02$; $n=3-5$ /group). Pro-inflammatory cytokines also remained significantly elevated at 24hr-IRI in *cebpb*^{-/-} mice compared to WT mice. Similarly, *cebpb*^{-/-} recipients of LTx had significant deterioration in lung function (PaO₂) compared to WT recipients (75.3 ± 7.1 vs. 147.0 ± 14.6 mmHg; $p=0.01$; $n=3-4$ /group). In vitro analysis revealed a significant increase in the efferocytic uptake of apoptotic neutrophils by M-MDSCs compared to control co-cultures ($32.7 \pm 4.0\%$ vs. $5.9 \pm 0.8\%$; $p<0.0001$; $n=15$ /group), which was associated with a significant increase in MerTK expression of M-MDSCs ($36.5 \pm 1.3\%$ vs. $32.0 \pm 1.4\%$; $p=0.002$; $n=15$ /group).

Conclusions: Our results demonstrate a previously uncharacterized role for M-MDSCs in the resolution of post-LTx IRI, that is mediated by MerTK-dependent efferocytosis to mitigate primary graft dysfunction.

10505 The Increasing Public Interest of Off-Label Use of Glucagon-Like Peptide 1 Agonists (Ozempic) for Cosmetic Weight Loss: A Google Trends Analysis

Sabrina Han , Sarah Virk MD

Plastic Surgery Clinical/Translational

Introduction: Glucagon-like peptide 1 (GLP-1) agonists are a group of drugs used for the treatment of diabetes that have recently gained FDA approval for medical management of obesity. Particularly, the off-label use of Ozempic, brand name of GLP-1 agonist semaglutide, for cosmetic weight loss has been largely popularized by social media and celebrity influence. Here, Google Trends was utilized to analyze the recent search popularity of the drug and related GLP-1 agonists.

Methods: The term “Ozempic” was analyzed using Google Trends. Search popularity was assessed in terms of relative search volume (RSV) over a five-year time period in addition to regional search trends by state. Data were evaluated in correspondence with major calendar events that popularized “Ozempic” searches. Changes in RSV were further compared with other popular GLP-1 agonists, “Wegovy” and “Mounjaro.”

Results: Between March 2018 to February 2023, the overall RSV in “Ozempic” grew exponentially in the United States. Simple linear regression analysis showed significantly increased RSV over time with an R² of 0.915 and a regression coefficient of 0.957 ($p < 0.001$). A significant increase was found in each month’s average RSV ($p < 0.01$) compared to the defined baseline time point (December 2021) with an exponential growth rate of $y = 9.2964e0.1342x$. The states associated with the most search interest in “Ozempic” were Mississippi, West Virginia, Louisiana, Alabama, and Oklahoma. When comparing “Ozempic,” “Wegovy,” and “Mounjaro” between June 2021 (FDA approval of Wegovy) and February 2023, Ozempic remained at the greatest RSV. One-way ANOVA found statistically significant differences between the three search terms at all time points between December 2021 and February 2023 ($p < 0.001$).

Discussion: This study demonstrates a significant and growing public interest in “Ozempic” and related GLP-1 agonists. As the use of GLP-1 agonists for weight loss becomes more prevalent, plastic surgeons, particularly in the aesthetic setting, must be prepared for the downstream implications. Increased awareness, understanding, and further scientific studies led by plastic surgeons will help deliver the safest possible patient outcomes.

10502 Safety and efficacy of immediate lymphatic reconstruction in patients with melanoma: a systematic review

Sabrina Han , Bruce Mast MD

Plastic Surgery Clinical/Translational

Introduction: Secondary lymphedema is one of the biggest complications of lymph node dissection and causes serious morbidity to the affected patients. As such, focuses have shifted towards the prevention of lymphedema. While immediate lymphatic reconstruction for breast cancer patients has been widely studied, reconstruction for patients with melanoma is lacking. We sought to review the safety and efficacy of immediate lymphatic reconstruction for preventing lymphedema in patients with melanoma.

Methods: A systematic review of studies reporting lymphedema outcomes in patients with melanoma who underwent immediate lymphatic reconstruction was performed in accordance with the PRISMA guidelines using the following databases: PubMed, Embase, Web of Science, and Cochrane Central Register of Controlled Trials (CENTRAL). A total of 37 titles and abstracts were screened, and six articles were extracted for analysis. Repeat search found an additional study that met partial inclusion.

Results: The six studies that met true inclusion criteria included 257 patients who underwent either axillary or groin lymphatic dissection for melanoma treatment. 115 patients (44.7%) underwent immediate lymphatic reconstruction via lymphovenous anastomosis (intervention group) and 142 patients (55.3%) had no lymphatic reconstruction (control group). Follow-up length ranged from 6 to 67 months. One study met partial inclusion criteria due to lack of reported lymphedema occurrence but was included based on its melanoma recurrence and mortality outcomes. The study included 23 intervention patients and 22 control patients. Of the six studies, Lymphedema developed in 6 patients (5.2%) of the intervention group and 41 patients (28.9%) of the control group ($p < 0.001$). Melanoma recurred in 33 (33.3%) and 74 (52.1%) patients, respectively ($p = 0.003$). Reported complications in the intervention group included wound infections (1.7%), seromas (1.7%), and transient lymphedema (0.9%). In the control group, 5.5% of patients developed wound infections. There were no differences in complication rates ($p = 0.652$). A significant difference was found in terms of mortality, with 28 deaths (24.3%) in the intervention group and 70 deaths (49.3%) in the control group ($p < 0.001$). Factoring in the study with partial inclusion, melanoma recurred in 42 (34.4%) patients of the intervention group and 87 (53.0%) patients of the control group ($p = 0.001$). Complication rates were unchanged ($p = 0.237$). There were 43 deaths (31.2%) in the intervention group and 88 (53.7%) in the control group during the study periods ($p < 0.001$).

Conclusion: In patients with melanoma who undergo lymph node dissection, immediate lymphatic reconstruction is effective for the prevention of secondary lymphedema. Recurrence of melanoma and mortality outcomes were also improved. No differences in complication rate were noted, demonstrating safety of immediate intervention. Further studies are needed to concretely validate these findings.

10499 A Novel Set of Screening Parameters to Augment Identification of Pediatric Non-Accidental Trauma

Emily Astarita , Shawn Larson

Pediatric Surgery Clinical/Translational

Introduction: Pediatric non-accidental trauma (NAT), particularly abusive head trauma, is a major cause of morbidity and mortality in young children. It is crucial that these patients be accurately identified and evaluated. Previously developed screening tools rely overwhelmingly on clinical signs and imaging, with little attention paid to laboratory values and measured data. These additional parameters could aid providers when evaluating children. Identification of differences between accidental and abusive head trauma followed by the creation of an associated screening tool can lead to effective mobilization of social resources to improve children's safety.

Methods: This retrospective review includes patients aged 6 and younger presenting to a large tertiary care center from 1/1/2018 to 7/31/2022 with a reported head injury. Exclusion criteria include lack of pathology after workup, mechanism of injury via motor vehicle/burning/drowning, or prior cancer diagnosis. A total of 220 patients met inclusion criteria. Patients were designated as victims of NAT if they were sheltered by child protective services, discharged with safety personnel, or required additional outpatient investigation. Injuries were deemed accidental if designated by physicians or if the caregiver was cleared following inquiry. The two populations were compared via Chi-square analysis for categorical variables and two-tailed student's t-tests for continuous variables. A p-value of <0.05 was considered significant.

Results: Out of 220 patients, 66 (30%) were deemed abused. A total of 7 clinical and imaging variables were associated with abuse, including concerning history, subdural hematoma, facial soft tissue injury, ecchymosis, concurrent long bone fractures, respiratory compromise, and seizure-like activity. Numerical values associated with NAT included a lower Glasgow Coma Scale score, age, hemoglobin, and hematocrit, as well as a higher lactate and base deficit. Previous screens used hemoglobin and age, as well as D-dimer, but none appear to incorporate lactate or base deficit. The variables were then plotted on a receiver-operating characteristic (ROC) plot with an area under the curve of 0.918, 95% CI [0.883, 0.953]. Children presenting with two or more associated variables result in the identification of NAT with a sensitivity of 97.0% and specificity of 54.9% (PPV=47.4%, NPV=97.6%). ROC plots were also made separating clinical and numerical variables without substantial loss in efficacy.

Conclusion: This study represents a shift in focus in screening for NAT. Expanded incorporation of common labs with clinical findings gives the physician additional information to improve identification of abuse. Next steps include prospective validation of the screening tool.

10496 The Influence of Social Determinants of Health on Outcomes in Severe Necrotizing Enterocolitis

Alya Barq , Robin Petroze

Pediatric Surgery Clinical/Translational

Introduction: Socially disadvantaged patients have increased risk of preterm birth and infant mortality. Prematurity is a significant risk factor for necrotizing enterocolitis (NEC). This study explores metrics of socioeconomic stress and the role of neighborhood on outcomes in patients with severe NEC.

Methods: Retrospective review of patients with severe NEC at a single institution between 2016-2022. Development of NEC-totalis, surgical intervention, and mortality were recorded outcomes. Home addresses were used to measure proximity to zones of air pollution, healthcare facilities, and healthy food retailers. Geocodes were used to catalog Social Vulnerability Index, Child Opportunity Index (COI), and Area Deprivation Index (ADI) as conglomerate metrics of neighborhood. Univariate and multivariable regression analyses were conducted.

Results: Eighty patients were included: 53.8%(n=43) female, 58.75%(n=47) non-white, and 85%(n=68) with public insurance. Median gestational age and birth weight were 25 weeks (IQR=24-29) and 808 grams (IQR=649-1364), respectively. All-cause mortality was 46.3%(n=37) with 81.1%(n=30) attributable to NEC. Surgical intervention was required in 77.5%(n=62) with 17.8%(n=11) NEC-totalis. Multivariate regression found no independent predictors of mortality (AUC 0.76). High ADI(p= 0.041) and low COI(p=0.014) were associated with the presence of NEC-totalis. This overall cohort represented a socially disadvantaged population with ADI decile and COI medians of 9(IQR 7-10) and 24(IQR 15-47), respectively.

Conclusions: This study suggests a strong link between social disadvantage and NEC outcomes, particularly the development of devastating NEC-totalis. Further studies are needed to investigate interventions for neighborhood stress to impact outcomes in the most vulnerable members of society.

10493 The Rising Trend of the Reverse BBL and the Implications for Aesthetic Surgeons: A Google Trends Analysis

Jonathan Dang , Bruce Mast
Plastic Surgery Clinical/Translational

Introduction: Aesthetic surgery trends continue to evolve and are often popularized by social media, particularly with celebrity influence, as exemplified by gluteal fat grafting or Brazilian Butt Lift (BBL). There appears to be a trend for reversal of this procedure, but there is a paucity of research describing associated operative techniques and precautions, with most discussion limited to media publications. The aim of this study was to evaluate public interest in reverse BBL surgery over a 5-year period using Google Trends and bring attention to this emerging trend in aesthetic surgery.

Methods: A Google Trends analysis was completed using the term “reverse BBL”. Trends were analyzed over a 5-year time period and included an assessment of regional searches by state. Changes in search frequency were further analyzed based on media articles describing reverse BBL trends, with the first mention being in August 2021, followed by another series of publications from November-December 2021, and June 2022.

Results: There was a steady increase in the relative search volume (normalized search volume in comparison to total search volume over 5 years) for “reverse BBL” beginning in January 2020, with a peak in December 2021 and June 2022 (Figure 1). The states associated with the most search interest in BBL reversal were: Florida, New York, California, Texas, and Illinois (Figure 2). Average relative search volume significantly increased with media publication of reverse BBL procedures among celebrities, corresponding with August 2021, November- December 2021 and mid-2022 ($p < 0.05$) (Figure 3).

Conclusions: These data indicate there is increasing public interest in reversal of gluteal fat grafting, which appears to correlate with social media trends. As patient’s remorse trends surrounding reverse BBL’s rise, aesthetic surgeons should counsel patients accordingly prior to gluteal augmentation surgery. Furthermore, for patients having undergone gluteal augmentation seeking reversals, pre-operative consultation of risks associated with reverse BBL procedures should be discussed. More research is needed regarding best operative approach for BBL reversal, including approaches with liposuction and additional revision surgeries, and strategies to mitigate postoperative complications, while enhancing cosmetic outcomes.

10487 Virtual Patient Rounds: Maintaining Student Education in the COVID Era of Social Distancing

Wes Khan , Rishindra Reddy

Medical Education Clinical/Translational

Introduction: The COVID-19 pandemic presents a significant challenge to medical education. During early stages of the pandemic, medical students were excluded from the care of patients with suspected or confirmed COVID-19. Therefore it is imperative that new modalities for including students remotely in patient care are developed, especially as the number of people examining patients is minimized to limit the risk of viral transmission. We evaluated the creation and effectiveness of virtual bedside rounds for student education.

Methods: A pilot study to operationalize virtual patient rounds was implemented. For the camera, a GoPro Hero 8 camera was selected for its affordability, portability, and varied mounting options. Several mounts were trialed, including a chest harness, head mount, and handheld. The chief resident conducted rounds as usual while maintaining camera focus on presentations and patients. Key findings and clinical decision-making were also vocalized. Students viewed rounds concurrently in real-time. Rounds were also uploaded to a secure computer and later viewed by a focus group of sixteen second year medical students.

Results: The Chief residents leading virtual rounds unanimously preferred wearing the GoPro with a chest harness and reported minimal discomfort or change to traditional bedside round routines. In contrast, the head mount was unanimously found to be both uncomfortable and intrusive on rounds. The handheld GoPro mount was deemed to be impractical, as camera positioning was a more active and challenging task. From the focus group, 80% agreed that virtual rounds improved their ability to perform physical exams, 100% agreed that virtual rounds improved their ability to communicate with patients, 100% strongly agreed that virtual rounds improved their ability to inspect and manage wounds, and 80% strongly agreed that virtual rounds improved their knowledge of diseases and their management. All students strongly agreed that they felt engaged and would recommend virtual rounds.

Conclusions: The chest-mounted GoPro allowed students to participate in rounds with minimal changes to the resident workflow.

The student response to virtual bedside rounds was overwhelmingly positive and rounds could be viewed concurrently or later with persistent educational value. This strategy can be more widely adopted as needed.

**10484 Micrographic/Complete Margin Control Breast Surgery -
A Novel Approach for the Surgical Management of Breast Cancer**

Caroline Sachse , Rainer Sachse MD,FACS
Oncology Case Report

Introduction: In the USA >260 000 women are diagnosed yearly with breast cancer, of which about 170 000 are treated with a localized tumor resection, or lumpectomy. Unfortunately, this procedure has a significant recurrence rate which has been reported to be in the range of 20-25 %. This recurrence rate can be reduced by about half with the addition of radiation therapy, which does not seem to increase the overall disease specific survival rate and carries a significant spectrum of side effects and high cost. In this case presentation, the authors describe the use of complete margin control surgery for the treatment of a patient with an extensive, low-grade nonmetastatic breast cancer.

Method/Results: Our patient was a 48-year-old previously healthy female with an extensive (> 8 cm) ductal carcinoma in situ with multiple areas of invasion, imageable only with MRI during her workup for unilateral nipple discharge. The patient underwent a modified radical mastectomy with resection of her nipple areolar complex, and the specimen was reported to have extensive low-grade DCIS with multiple areas of invasion but negative margins. During the immediate reconstructive procedure with a subpectoral tissue expander an additional incidental specimen from the skin flap overlying the mastectomy specimen unexpectedly contained residual "multifocal" ductal carcinoma in situ. After considering her options and the associated risks, the patient, who was aware of her surgeon's experience in Mohs Surgery, requested micrographically controlled resection of the involved area in favor of current standard modalities. This procedure, which resected diseased tissue from the inside out, was subsequently performed. Two stages were necessary to obtain clear margins, while leaving reconstruction intact. The patient subsequently was started on hormone therapy and has been in remission for more than 10 years.

Discussion: There is overwhelming evidence in the medical literature, that Micrographic/Complete Margin Control/Mohs surgery, commonly performed for cutaneous lesions, has far lower local recurrence rates and better outcomes than any other form of treatment for nonmetastatic malignant disease. There seems to be no good reason, to not apply this technique to other malignancies, as long as these are not metastatic or proven to be truly multifocal.

In this report, the authors report the successful use of Micrographic Surgery in the management of breast cancer with the hope that this method will become available for a broad range of patients with localized malignant disease. This method appears to have true potential to not only significantly improve clinical outcomes and reduce short- and long-term morbidity, but result in overall cost savings - with the understanding, that expected increased costs for the higher procedural and pathological complexity can be readily offset by the avoidance of expensive adjuvant therapy modalities and their associated morbidities.

10481 How Physicians would treat their own family's malignant melanoma in an anatomically delicate area

Caroline Sachse , Rainer Sachse MD,FACS
Oncology Clinical/Translational

Introduction: Over the decades the treatment of melanoma has changed from extremely radical to increasingly tissue sparing with the recent literature being supportive of resection with minimal margins in combination with complete margin control surgery. Conversely official guidelines are still relatively rigid regarding the width of surgical margins, regardless of the location of the malignancy and thus making informed consent for patients extremely difficult.

Method: The authors created a survey which investigates which treatment options physicians would choose, if a melanoma of a beloved family member or themselves would be in an anatomically sensitive area such as the lips, the nose, or eyelids. This survey was emailed to physicians actively engaged in the treatment of Malignant melanoma including Oncologic Surgeons, Plastic Surgeons, Mohs Surgeons, Dermatologists, Oncologists, and Dermatopathologists, both in private as well as in academic practice.

Results: At this time, preliminary data of this ongoing study shows a substantial diversity regarding the recommended extent of resection for melanomas in anatomically sensitive areas, and many physicians would no longer recommend to follow current NCCN guidelines if a family member or they themselves had a malignant melanoma in such an anatomically sensitive area. The authors will present current data of the preferred treatment modality not only with regards to tumor stage but also comparing the preferred approach favored by colleagues in different medical specialties.

Conclusion: Resection of melanomas with complete margin control techniques has become a respected treatment option. The presented data-set will allow the treating surgeon to give the patients a wider choice of accepted treatment options during informed consent.

10478 The Role of Surgery for Management of Radiation-Induced Brachial Plexopathy: A Systematic Review

Fady Marji , Harvey Chim

Plastic Surgery Clinical/Translational

Introduction: The role of surgery remains unclear in management of Radiation-induced brachial plexopathy (RIBP), with the predominant approach being conservative therapy.

Methods: A literature search was performed using the main online databases to find all related articles. Systematic review was performed including 29 studies (n=580) that described the clinical features of RIBP patients and outcomes after surgery.

Results: The most commonly reported symptom was sensory loss (n=295,59.8%), followed by motor deficits (n=279,56.6%), and neuropathic pain (n=267,54.1%). Sixty-five (56.0%) patients had panplexal involvement, and 51 (44.0%) patients had partial plexus involvement. The most common surgical interventions were neurolysis with omental or other flaps (n=108,45.6%), followed by neurolysis alone (n=71,29.9%). Overall, out of 237 patients that underwent surgery, 125 (52.7%) reported improved neuropathic pain. Motor and sensory deficits were improved in 46 (19.4%) and 39 (16.4%) patients, respectively. In patients that underwent surgical neurolysis with omental or other flaps, 57 (52.8%) patients had improvement in pain, followed by improvement in sensory and motor deficits in 17 (15.7%) and 13 (12.0%) patients, respectively. In patients that underwent surgical neurolysis alone, pain (n= 55, 77.5%) was most commonly improved, followed by motor (n= 17, 23.9%) and sensory deficits (n= 15, 21.1%), respectively.

Conclusion: Surgery is most effective in alleviating pain, but has less satisfactory outcomes for motor and sensory improvement. For motor deficits, ulnar nerve fascicular transfer to the biceps branch and cable grafting of the musculocutaneous nerve have shown encouraging results.

10475 Abandoning Immediate Use/Flash Sterilization - A critical analysis

Caroline Sachse , Rainer Sachse MD,FACS

Plastic Surgery Case Report

Introduction: Surgeons frequently use specialized instruments during a procedure, which may be available only in a very limited quantity in a given healthcare setting and may incidentally get contaminated during a procedure. Immediate Use Sterilization, formerly known as Flash Sterilization, has been used to mediate this situation by rapidly sterilizing or re-sterilizing such critical instruments in a very timely fashion. Unfortunately, this method has come under intense pressure to be abandoned as a means of instrument sanitation both nationally as well as internationally. As there appears to be a major discrepancy between the intellectual concept and validating data of medical instrument sterilization using this method on the one side, and the push by operating room personnel to eliminate this cost-saving practice on the other side, the authors decided to evaluate the science and evidence surrounding this method:

Method: The authors reviewed the medical literature as well as manufacturers' validation reports, FDA, AORN, AAMI and Accreditation Agencies' data, recommendations and guidelines, and operating room manuals with regards to the safety and effectiveness of Immediate Use Sterilization.

Results: While there are several studies clearly demonstrating the effectiveness and safety of Immediate Use Sterilization as well as some reports suggesting that Immediate Use Sterilization might be the cause for iatrogenic infections, the authors could not find a single study in the medical literature in which Immediate Use Sterilization was shown to be the cause of a bacterial or viral infection directly. Conversely, thermal burns have been reported when instruments were not cooled properly when using this method during an operation.

Following accreditation agencies' policies appear to be extremely cumbersome and are likely to have contributed to many hospitals abandoning a proven method of sterilization and the associated substantial cost increases.

Conclusions: 1. Immediate Use Sterilization in itself is a very safe method to eliminate infective agents from surgical instruments and has the backing of basically all regulating agencies including the FDA.

2. In order to be effective, it has to be done appropriately without the omission of critical steps by properly trained personnel, as recommended in AORN, FDA, or AAMI guidelines.

3. The efforts to eliminate Immediate Use Sterilization are not backed by scientific evidence.

4. The use of Immediate Use Sterilization as an inverse metric for Quality of Care lacks evidence and appears to be inappropriate.

5. Immediate Use Sterilization, when done properly, remains a valuable method of surgical instrument preparation which can contribute to substantial cost savings and quality patient care.

10466 Outcomes after Operative Management of Suprarenal and Thoracoabdominal Aortic Infections

Erik Anderson , Thomas Huber

Vascular Clinical/Translational

Outcomes after operative management of suprarenal and thoracoabdominal aortic infections are poorly characterized due to their rare presentation and high morbidity and mortality. Surgical treatment involves excisional debridement of infected tissues, extirpation of native aortic or prosthetic material, and revascularization of renal/mesenteric vessels and lower extremities. Herein, our experience with the surgical management of suprarenal and thoracoabdominal aortic infections is reported.

A single-center retrospective review of patients who underwent operations for primary and secondary suprarenal or thoracoabdominal aortic infections from 2002-2021 was performed. Isolated thoracic, juxtarenal, and infrarenal aortic infections, as well as aortic infections managed with medical or endovascular therapy were excluded. A subgroup analysis was performed to compare primary(e.g. mycotic aneurysms[MA]) and secondary(e.g. graft infections[GI]) aortic infections.

56 patients with suprarenal(n=22) and thoracoabdominal(n=34) aortic infections were included. Mean age was 65±13 years and a majority were male(79%, n=44). 57%(n=32) presented with rupture, and 20%(n=11) involved an aorto-enteric fistula(AEF). *S. aureus* was the most commonly isolated organism(29%, n=16) from blood or intra-operative cultures. In situ aortic reconstruction was performed using antibiotic-soaked prosthetic graft(75%, n=42), cadaveric allograft(7%, n=4), or femoral-popliteal vein(5%, n=3). Extra-anatomic bypass with aortic ligation was performed in 14%(n=8). Mean target vessels revascularized was 2.1±1.3 including 67-renal, 30-SMA, and 15-celiac artery bypasses. Renal and/or mesenteric vessel ligation occurred in 36%(n=20). Overall 30-day mortality was 16%(n=9) including 2 intraoperative deaths(4%). Major complications included renal failure(20%, n=11), hemorrhage(16%, n=9), respiratory failure(14%, n=8) and graft thrombosis(9%, n=5). 5%(n=3) had documented clinical persistence/recurrence of infection. Compared to GI, MAs were more likely to present ruptured(76% vs. 37%, p=0.008) but less likely to have concurrent AEF(3% vs. 37%, p=0.005). MAs were more commonly repaired with in situ prosthetic graft(83% vs. 67%) and required more renal/visceral reconstructions(2.5±1.4 vs. 1.7±1.2, p=0.02). Outcomes were similar between primary and secondary aortic infections, including 1-year survival(MA:58±10% vs. GI:66±9%;log-rank p=0.9) and freedom from reintervention(MA:51±10% vs. GI:60±10%;log-rank p=0.5).

Suprarenal and thoracoabdominal aortic infections are rare and operative management results in significant morbidity but acceptable perioperative mortality. Distinct phenotypes between primary and secondary infection were identified. Using a complementary approach to reconstruction configuration and conduit choice can lead to comparable results for different infectious indications; however, reintervention is common underscoring the need for surveillance postoperatively.

10460 Role of YAP-TAZ signalling in abdominal aortic aneurysms: in human pathology and an experimental model.

PaoloAntonio Bellotti MD, GilbertR. Upchurch MD
Vascular Basic Science

Introduction: Abdominal aortic aneurysm (AAA) represents a potentially fatal disease, which upon rupture can cause a mortality of about 60-80%. YAP and TAZ, the Hippo pathway effectors, are transcription factors and mechanotransducers involved in various disease pathologies. However, the detailed role of YAP/TAZ signalling in AAA formation remains to be deciphered. We hypothesized that the expression of YAP and TAZ would be altered in human AAA samples and that inhibition of YAP and TAZ would attenuate AAA phenotype in an established murine model.

Methods: Aortic tissue from human AAA patients and healthy controls aortas were collected and YAP and TAZ mRNA expression was evaluated by RT-PCR. Additionally, wild-type (WT) 8–12-week-old C57BL/6 male mice (Jackson Laboratory, Bar Harbor, ME) were used in the topical elastase AAA model. The treatment group was administered with Verteporfin (a YAP/TAZ inhibitor; 50mg/kg) i.p. or vehicle control (0.2 ml of 50% DMSO, 50% saline solution) from post-operative day 1 through day 13. Murine aortas were harvested on post-operative day 14 and measurements of aortic diameter were made by video micrometry. Data is presented as mean \pm SEM and statistical analysis was performed using or Wilcoxon Rank Sum test for mRNA expressions or ANOVA followed by posthoc Tukey's test for aortic diameter (phenotype).

Results: A multifold increase in the expression of TAZ mRNA was observed in male AAA tissue compared to controls (2.3 ± 0.4 fold; $n=16/\text{group}$; $p=0.01$) while a trend towards increased YAP mRNA expression was also observed in male AAA tissue compared to controls (1.7 ± 0.4 fold; $n=16/\text{group}$; $p=0.3$). In the murine AAA model, we observed a significant increase in aortic diameter after elastase-treatment compared to controls ($110.2 \pm 17.7\%$ vs. $5.8 \pm 1.7\%$ $n=7-10/\text{group}$; $p<0.0001$). Treatment with Verteporfin significantly reduced the aortic diameter compared to the vehicle injected mice ($70.35 \pm 6.1\%$ vs. $110 \pm 17,7\%$ $n=7-10/\text{group}$; $p=0.01$).

Conclusions: These results underscore the importance of YAP-TAZ mediated Hippo signaling pathway in the pathogenesis of AAA formation. Ongoing investigations are focused on delineating cell-specific effects of YAP-TAZ phosphorylation in AAA formation.

10457 Translocation of oral microbiota into the pancreatic ductal adenocarcinoma tumor microenvironment

Kelly Herremans MD, Steven Hughes MD
Oncology Basic Science

Introduction: Dysbiosis of the oral cavity has long been associated with the development of pancreatic ductal adenocarcinoma. However, little remains known about if or how oral bacteria may impact the pancreatic tumor microenvironment. In this exploratory study, we aim to characterize the oral and pancreatic microbiomes of patients diagnosed with pancreatic ductal adenocarcinoma.

Methods: Saliva and tumor samples were collected from twenty-seven patients diagnosed with pancreatic ductal adenocarcinoma. Initial bacterial profiling was carried out using standard 16S rRNA v3-v4 PCR and Illumina MiSeq 2x300 sequencing. Confirmatory rrn sequencing was then performed on a subset of patients. *Veillonella atypica* was cultured and long read sequencing was performed. Deep sequencing of pancreatic tumor DNA was performed using the NovaSeq 6000 platform. Pathway analysis was performed using KEGG.

Results: Oral microbiome profiles of PDAC patients exhibited typical salivary profiles with *Veillonella*, *Streptococcus*, *Megasphaera*, *Prevotella*, *Actinomyces*, TM7x, *Leptotrichia*, *Oribacterium*, *Lachnoanaerobaculum*, and *Atopobium* in 90% of samples. However, taxa found in the pancreatic microbiome varied widely between patients as compared to saliva. The most prevalent genera within saliva samples were also found in the pancreatic tumor microbiome with *Veillonella* and *Streptococcus* present in 92% and 64% of samples, respectively. Furthermore, *Lactobacillus*, *Klebsiella*, *Prevotella*, *Stentrophomonas*, and *Devosia* were present among at least 35% of tumors. Patient matched tumor and saliva samples resulted in a 7-patient subset. *Veillonella*, *Streptococcus*, and *Megasphaera* were found in nearly all matched sample pairs with *Veillonella* present in all matched sample pairs. Rrn sequencing confirmed *Veillonella* and *Streptococcus* as the dominant genera with *Veillonella atypica*, *Veillonella dispar*, and *Streptococcus mitis* as the most prevalent species. Given its prevalence, *Veillonella atypica* was cultured from saliva and deep sequencing was performed to compare it with pancreatic tumor *Veillonella atypica*, yielding 99% (rrn operon) and 100% (Novaseq) sequence similarities. Genes from this bacterium were implicated in LPS biosynthesis, nitrogen metabolism and quorum sensing and biofilm formation.

Conclusion: This study elucidates the composition of the oral and pancreatic tumor microbiomes in patients diagnosed with PDAC. It further establishes a relationship between these two sites, specifically identifying the presence of oral *V. atypica* and exploring its translocation to PDAC tumors and role in tumorigenesis.

10454 Superthin Profunda Artery Perforator Flap for Extremity Reconstruction: Suprafascial Radiological Characteristics and Clinical Application

Brianne Sullivan , Harvey chim
Plastic Surgery Clinical/Translational

Introduction: Traditional subfascial harvest of the profunda artery perforator (PAP) flap results in a thick flap, which routinely requires secondary thinning. This issue can be avoided by harvesting the flap in the superthin plane.

Materials and Methods: Suprafascial profunda artery perforator anatomy was reviewed in CTAs in 159 thighs. Using an approach of preoperative perforator localization with CTA, color and handheld doppler, we subsequently describe our experience with thin/ superthin PAP flaps using a single dominant perforator, for extremity reconstruction in 25 consecutive patients.

Results: In the radiological study (n=159), two main suprafascial perforator patterns, a "T" (superficial bifurcation) and "Y" (deeper bifurcation) were identified. A dominant "T" perforator (n=97) was more common than "Y" (n=62). In the clinical study (n=25), we found an almost perfect correlation between the skin thickness of the bifurcation point of a dominant "T" perforator and the thickness of the superficial fascia where a thin PAP flap is elevated. There were 18 "T" perforators and 7 "Y" perforators. Mean flap thickness was $0.7 + 0.2$ cm. All flaps were successful except for two failures, one due to recipient artery spasm and one delayed venous failure due to high pressure in the recipient vein.

Conclusions:

1. A dominant "T" perforator on preoperative CTA accurately predicts thickness of a PAP flap elevated at the level of the superficial fascia.
2. A thin or superthin PAP flap provides a new option with a concealed donor site for reconstruction of extremity wounds.

10451 National Adoption of Neoadjuvant Chemotherapy: Paradigm Shift in the Treatment of Pancreatic Cancer

Kelly Herremans MD, Ibrahim Nassour MD
Oncology Clinical/Translational

Introduction: The historical standard of care in treating operable pancreatic cancer via upfront surgery followed by adjuvant chemotherapy has been challenged recently using a neoadjuvant approach. There is limited contemporary data on the widespread use of this approach at the national level. The aim of this study was to examine national practice patterns in the management of pancreatic cancer with an emphasis on the trends of neoadjuvant systemic therapy use.

Methods: This is a cross-sectional time-series study using the National Cancer Database (NCDB) from 2006-2019. Patients who underwent resection for stage I-II pancreatic adenocarcinoma were selected.

The trend of using neoadjuvant systemic therapy, its predictors, the use of radiation therapy, the resection rate and overall survival were analyzed over time.

Results: 45,020 resections were selected. Overall, 20% of patients had neoadjuvant chemotherapy followed by surgery, 51% had surgery followed by adjuvant chemotherapy and 29% had surgery alone. The rate of neoadjuvant systemic therapy has steadily increased from 6% in 2006 to 41% in 2019. This was accompanied over the same period by a decrease in the rate of surgery followed by systemic chemotherapy from 50% to 39%, and a decrease in the rate of surgery alone from 44% to 20%. The predictors of receiving of neoadjuvant systemic therapy were being non-Hispanic, having fewer comorbidities, having higher income, private insurance, younger age and treatment at academic centers in recent years. On the other hand, the rate of radiation therapy use has decreased over time, as has the resection rate, while median overall survival has steadily improved over the years.

Conclusions: In 2019, the rate of using neoadjuvant systemic therapy overtook the rate of surgery first followed by adjuvant systemic therapy, marking a pragmatic national shift in the clinical management of pancreatic cancer. There is still a high percentage of patients receiving upfront surgery especially of those receiving surgery alone. While survival has improved over time, there is still room to improve and ensure delivery of multimodal therapy to the largest proportion of patients possible.

10448 A Cause for Concern: Causal discovery reveals neoadjuvant radiation leads to increased operative time and blood transfusion in pancreatic cancer

Kelly Herremans MD, Steven Hughes MD
Oncology Clinical/Translational

Introduction: Perioperative blood transfusion is associated with increased 30-day morbidity and mortality as well as overall survival in patients undergoing pancreaticoduodenectomy (PD). As the treatment paradigm shifts toward neoadjuvant therapy in the treatment of pancreatic cancer, little remains known about how this may impact perioperative transfusion rates.

Methods: The American College of Surgeons National Surgical Quality Improvement Project (ACS-NSQIP) database was utilized to identify patients undergoing PD for PDAC from 2014-2019. Patients were divided into groups based on the type of initial treatment they received (neoadjuvant chemoradiation, neoadjuvant chemotherapy, neoadjuvant radiation or surgery first. Univariate analysis (Mann-Whitney and Fisher's exact) and Multivariate (Logistic regression) were performed. Causal discovery was conducted using the rCausalMGM package in RStudio.

Results: A total of 13,404 patients with PDAC underwent PD, with 2745 (20.5%) receiving neoadjuvant chemotherapy only, 154 (1.1%) receiving neoadjuvant radiation only, 1557 (11.6%) receiving neoadjuvant chemoradiation and 8948 (66.8%) undergoing surgery first. Compared to patients who underwent surgery first, those that received neoadjuvant chemoradiation (26.5% vs. 19.2%, $p < 0.0001$), radiation only (31.8 vs. 19.2%, $p = 0.0002$) and chemotherapy only (22.4 vs. 19.2%, $p = 0.0002$) were more likely to receive a blood transfusion intraoperatively or within 72 hours of surgery. Neoadjuvant chemoradiation and radiation alone were independently associated with blood transfusion (OR 1.8 (1.24, 2.63), $p = 0.0004$ and OR 1.3 (1.13, 1.52), $p = 0.002$) based on multivariate analysis. Causal discovery was performed, showing that preoperative radiation leads to increased transfusion rates through increased operative time. Further, transfusion was shown to be independently associated with in-hospital death (OR 3.7 (2.7, 5.13), $p < 0.0001$), discharge destination other than home (OR 2.0 (1.75, 2.25) $p < 0.0001$), complications (OR 1.7 (1.56, 1.88), $p < 0.0001$) and readmission (1.2 (1.04, 1.33), $p < 0.0001$).

Conclusions: Neoadjuvant chemoradiation and neoadjuvant radiation alone are independently associated with perioperative blood transfusion in patients with PDAC undergoing PD. This is likely caused by increased operative times, which may reflect increased difficulty of resection. Future efforts to mitigate the need for perioperative transfusion in these patients is warranted to ultimately reduce the negative short and long-term consequences of perioperative blood transfusion.

10445 SAVING THE NODES: THE USE OF MAGTRACE® FOR DELAYED SENTINEL LYMPH NODE MAPPING IN DUCTAL CARCINOMA IN SITU

Kelly Herremans MD, Lisa Spiguel MD
Oncology Clinical/Translational

Introduction: Sentinel lymph node biopsy (SLNB) is recommended for patients undergoing mastectomy for the treatment of ductal carcinoma in situ (DCIS). Magtrace, an iron-based mapping agent, was developed for delayed SLNB, a technique in which breast lymphatics are mapped, yet SLNs are preserved. If invasive cancer is identified, a delayed SLNB can be performed up to 4 weeks post-injection. The purpose of this study is to investigate our experience with Magtrace and the role for SLNB in DCIS.

Methods: A retrospective review of patients undergoing mastectomy for DCIS from 2016 to 2022 was performed. Following initiation of delayed SLNB in 2020, patients scheduled for mastectomy underwent lymphatic mapping with subareolar Magtrace injection at the time of mastectomy. Descriptive statistics were performed.

Results: Over six years, 77 mastectomies were performed in 74 patients for DCIS. Sixty-three mastectomies were performed using traditional SLNB and 14 mastectomies were performed using Magtrace for delayed SLNB. Overall, 27.3% (n=21) were found to have invasive cancer on final pathology (T1mic n=10, T1a n=9, T1c n=2), including 28.6% (n=18) of traditional SLNB and 21.4% (n=3) of Magtrace cases. In patients who underwent traditional SLNB an average of 2 SLNs were removed. Only one patient (1.5%) was found to have nodal involvement and underwent axillary lymph node dissection. In patients who received Magtrace, only one patient was recommended for SLNB and 3 SLNs were identified, all negative for metastasis. No differences in age, race, size, grade, hormone status and presence of necrosis were found in patients with invasive cancer on final pathology when compared to DCIS.

Conclusions: Magtrace is a feasible option for delayed SLNB in patients undergoing mastectomy for DCIS. Given the low rate of nodal positivity, further research is necessary to assess the utility of SLNB in DCIS.

10439 Oncologic efficacy and feasibility of robotic compared to open total pancreatectomy for pancreatic cancer

Jordan McKean , Ibrahim Nassour
Oncology Clinical/Translational

Introduction: The use of robotic surgery for pancreatic cancer resections is increasing over time. There are multiple studies comparing this approach to open surgery, specifically for Whipple and distal pancreatectomies. But there is limited data on its feasibility and oncologic efficacy in patients requiring total pancreatectomy.

Methods: This is a retrospective study from the 2010-2019 National Cancer Database comparing the postoperative, pathological, and long-term oncologic outcomes between robotic total pancreatectomy (RTP) and open total pancreatectomy (OTP) for pancreatic adenocarcinoma.

Results: 188 (5%) RTP and 3447 (95%) OTP patients were identified. The number of RTP increased from 4 in 2010 to 32 in 2019. There were no major differences in patient demographics and treatment characteristics, except that RTP patients were more likely to be performed at non-academic centers and less likely to get radiation. After adjustment, there was similar yield of examined lymph nodes, 90-day mortality and receipt of adjuvant therapy between both groups. The RTP did have a statistically significant shorter length of stay. There was no difference in median overall survival between RTP and OTP (22.3 months vs 23.3 months add p value). The 1-, 3-, and 5-year overall survival rates for RTP were 78%, 31%, and 34% and for OTP were 75%, 38%, and 30%. After adjustment, the use of robotic surgery was associated with similar overall survival to the open approach (HR 0.939, 95% confidence interval (CI) 0.760-1.161).

Conclusions: Following neoadjuvant chemotherapy, RTP is associated with similar short- and long-term mortality without sacrificing oncologic outcomes including adequate lymphadenectomy and neoadjuvant chemotherapy receipt with the advantage of shorter length of stay.

10436 Assessing the Incidence and Risk Factors of Scar Contracture Release in Pediatric Patients Receiving Hand Burn Skin Grafts

Matthew Kirchmier , Ellen Satteson
Plastic Surgery Clinical/Translational

Introduction/Background: Burns are a leading cause of accidental injury in pediatric patients. And the hands, while only representing a small portion of the body, are extremely susceptible to injury - occurring in up to 90% of major burns. Acute management of pediatric hand burns is crucial to preserving functionality and preventing long term disability. But despite the various conservative and invasive interventions known to improve outcomes, long term sequelae such as scar contractures are not uncommon. In this study we aim to assess both the management and outcomes of pediatric hand burns paying special attention to the risk factors associated with the needs for surgical intervention, the development of scar contractures, and the frequency of subsequent scar contracture release (SCR) procedures.

Methods/Materials: This is a retrospective review of a prospectively maintained burn registry of pediatric patients treated for Hand Burns at the University of Florida between 1/1/2010 and 12/31/2020. Inclusion criteria included patients less than 18 years of age and patients who suffered a burn to one or more parts of a hand or finger. Patient demographics, hand burn details, interventions, and outcomes were measured.

Results: Multivariate data analysis is still ongoing, but 799 hand burns suffered by 613 patients (186 with bilateral burns) were included for preliminary analysis. Mean patient age was 5.7 years (SD 5.2 years). Mean total body surface area (TBSA) affected was 6.4% (SD 8.25%). 162 (20%) hand burns were managed with one or more surgical interventions. A total of 262 surgeries were performed with a breakdown of surgery type as follows: Excision only – 57; STSG – 86; FTSG -9; Matrix only – 3; Xenograft – 28; Allograft – 30; Dressing change/ staple removal – 25; Matrix + graft – 17; Combination – 5; Other – 2. 57 Hand burns developed scar contractures at an average of time of 11.9 months (SD 10.9) from the date of injury. 38 scar contractures received a SCR, 17 of which required additional SCR procedures.

Conclusions: While pending data analysis will help shed light on the risk factors and hand burn characteristics associated with the need for surgical intervention and the development of long-term complications, preliminary analysis of patients treated at UF Health Shand's reveals that the acute management of pediatric hand burns often requires one or more surgical interventions. Furthermore, the post-operative period in these patients may be complicated by the development of scar contractures that require additional interventions to improve functionality.

10433 ASPS Member Reported Risk Stratification and Elective Breast Surgery Specimen Labeling Practices

Peter Vonu , Sarah Virk

Plastic Surgery Clinical/Translational

Background: The average life-time risk of developing breast cancer is approximately 13% in US women,¹ and approximately 575,000 breast surgeries were performed in the US in 2020.² The incidence of unexpected malignancy in breast reduction specimen ranges from .06 to 4.5%.³ Without specimen orientation, the default oncologic treatment unfortunately necessitates mastectomy. The purpose of this study is to report intraoperative specimen collection practices among plastic surgeons during elective breast surgery.

Methods: From November 2021 to January 2022, an anonymous survey was administered to all members of the American Society of Plastic Surgery (ASPS). The survey included 30 single and multiple response questions summarizing both breast cancer risk stratification practices and intraoperative specimen collection practices. Questions regarding respondent demographics, surgical training, and length of practice were also included.

Results: One-hundred and fifty-six respondents were included in this study. While 80.8% of respondents routinely sent breast specimen to pathology for review, only 22.3% oriented or marked specimen margins (Figure 1). Those who had encountered atypical ductal/lobular hyperplasia during elective breast surgery were more likely to routinely send breast specimen to pathology for review ($p = 0.01$). Respondents who had more experience (≥ 15 years) were more likely than those who had less experience (< 15 years) to orient their specimen or mark the specimen margins ($p = 0.02$).

Conclusions: The findings from this study indicate the potential for standardization of breast specimen labeling practices among plastic surgeons, and potentially more formal education of the possible oncologic ramifications of such in plastic surgery residency training curricula.

10430 Soluble DNA Concentration in the Perfusate is a Predictor of Post-Transplant Renal Function in Hypothermic Perfused Kidney Allografts

Anne-Marie Carpenter MD, Sergio Duarte PhD

Transplant/Hepatopancreatobiliary (non-cancer) Basic Science

Introduction: Hypothermic machine perfusion (HMP) has greatly facilitated kidney allograft preservation. However, tissue damage still occurs during HMP, deleteriously affecting post-transplant graft function. Therefore, improved methods to assess organ quality and to predict post-transplant graft function and survival are needed. We propose that soluble DNA (sDNA) measured in HMP perfusate can be used as a non-invasive biomarker for this purpose.

Methods: Perfusate samples of kidney grafts placed on HMP were collected after 5 minutes and at the conclusion of HMP. sDNA of nuclear origin within the perfusate was quantified by real-time polymerase chain reaction and correlated with HMP parameters and post-transplant clinical outcomes.

Results: Kidney grafts from 52 donors placed on HMP were studied. Perfusate sDNA concentration was significantly elevated in transplanted kidneys with delayed graft function. Grafts with higher concentrations of perfusate sDNA at 5min and at HMP conclusion also had reduced graft function in the initial post-transplant period, as measured by POD2, POD3, and POD4 creatinine reduction ratio (CRR). Standard pump parameters such as renal vascular resistance and renal vascular flow were poor indicators of early post-transplant graft function.

Conclusion: sDNA concentration in HMP perfusate of kidney grafts can predict the quality of kidney graft preservation and indicate post-transplant renal function. This biomarker should be explored further to improve renal organ assessment and transplantation outcomes.

10427 Influence of Design of Reverse Shoulder Arthroplasty on Axial Rotation: A Systematic Review

Christel Gharby , Joseph King

General Surgery Basic Science

Introduction: Restoration of external and internal rotation (ER and IR) after Grammont-style reverse shoulder arthroplasty (RSA) is often unreliable. One purported solution is the use of lateralized implants. The objective of this meta-analysis was to compare axial rotation after RSA based on the degree of implant lateralization.

Methods: We conducted a systematic review per PRISMA recommendations. A bibliographic search was performed for MEDLINE, Embase, Scopus, Web of Science, and Cochrane Library. Study quality was assessed per MINORS criterion. Inclusion criteria were studies evaluating axial rotation (ER, IR, or both) after RSA with a defined implant design. Our primary aim was to compare postoperative ER and IR between globally lateralized versus medialized implants. Implant classification was adopted from Werthel et al. Demographics and outcomes were reported as weighted means and pooled proportions. Meta-analysis was conducted using a random-effects model.

Results: Thirty-nine studies reporting 3,184 shoulders were included. Included patients had a weighted mean age of 72 years, mean follow-up of 48 months, minimum follow-up of 29 months (range: 21-62), and 64% were female. The subscapularis was repaired in 84% (n=2,690) of shoulders; this was performed at a marginally higher rate when a lateralized implant was used (88% vs. 82%, $P<0.001$). Postoperative ER was reported by 97% (n=38) of studies and had a weighted mean of 30.7° (range: 9.9-47.6°). Both pre- and postoperative ER were reported by 77% (n=30); the weighted mean improvement in ER was 12.8° (range: -0.3-42°). The weighted mean improvement in ER was 14.5° for lateralized and 9.7° for medialized implants. Meta-analysis of postoperative ER was possible for 27 studies reporting 2,213 shoulders; we found significantly greater postoperative ER with globally lateralized versus medialized implants (37°[95%CI:34-40°] vs. 26°[22-31°], $P<0.001$). Mean postoperative IR was reported by 54% (n=21) of studies. Mean postoperative IR achieved the minimum necessary internal rotation by 56% with lateralized (n=858, 8 studies) versus 35% (n=166, 4 studies) with medialized implants ($P<0.001$). Heterogeneity in reported IR prohibited quantitative analysis.

Conclusions: Lateralized RSA produces superior rotation compared to medialized designs. Standardization of IR reporting after RSA is needed for future meta-analyses.

10424 Pharmacologic Inhibition of Ferroptosis Attenuates Abdominal Aortic Aneurysm Formation

Jonathan Krebs MD, GilbertR Upchurch MD

Vascular Basic Science

Introduction: Abdominal aortic aneurysms (AAA) are characterized by thrombus formation, iron accumulation, chronic inflammation, and programmed cell death. The role of ferroptosis, an iron-dependent non-apoptotic cell death pathway, has been uncharacterized in the pathogenesis of AAA and aortic rupture. This study investigates if pharmacological inhibition of ferroptosis attenuates aortic inflammation, vascular remodeling and AAA formation.

Methods: AAAs were induced in 8- to 12-week-old male C57BL/6 mice using topical 0.4 U/ml type 1 porcine pancreatic elastase treatment, or deactivated elastase as control. Mice in the elastase group were treated with liproxstatin-1 (selective ferroptosis inhibitor, 5mg/kg, daily i.p. postoperative days 1-7). Aortic diameter was measured on postoperative day 14 using video micrometry prior to harvest. Aortic tissue was analyzed for histology. Hallmarks of ferroptosis such as increased lipid peroxidation (MDA) and glutathione (GSH) depletion were measured in aortic tissue extracts. A second model of chronic AAA and aortic rupture using elastase+BAPN treatment was used with/without administration of liproxstatin-1 from day 14-28, after formation of AAAs. Mice were harvested on day 28 and analyzed for aortic diameter and histology. Statistical analysis was performed by ANOVA followed by posthoc Tukeys test and $p < 0.05$ was considered as statistically significant.

Results: A significant increase in aortic diameter was observed in elastase-treated mice compared to controls on day 14 (156 ± 9 vs. $2 \pm 3\%$; $n=8-10$ /group; $p < 0.01$). A reduction in aortic diameter was observed in liproxstatin-1 treated mice compared to elastase treated mice (63 ± 14 vs. $156 \pm 9\%$; $n=8-10$ /group; $p < 0.01$). MDA levels in the aortic tissue were significantly decreased in liproxstatin-1 treated mice compared to elastase-treated mice alone (0.11 ± 0.04 vs. $0.75 \pm .1$ nmol/mg; $n=5-8$ /group; $p < 0.001$). GSH levels were significantly increased in liproxstatin-1 treated mice compared to elastase-treated mice alone (12.1 ± 1.2 vs. 4.7 ± 0.7 ug/mg; $n=5-8$ /group; $p=0.04$, respectively). In the chronic AAA and aortic rupture model, a reduction in aortic diameter was observed in liproxstatin-1 treated mice compared to controls (206 ± 18 vs. $392 \pm 52\%$; $n=10$ /group; $p < 0.01$). A marked decrease in immune cell (neutrophils and macrophages) infiltration, preservation of aortic morphology (increase in smooth muscle α -actin and decrease in elastin breaks) was observed in liproxstatin-1-treated mice compared to elastase-treated mice alone by histological analysis in both the acute and chronic AAA models.

Conclusions: AAA formation is characterized by hallmarks of ferroptosis and pharmacological inhibition of ferroptosis attenuates aortic inflammation, vascular remodeling and AAA formation. Ongoing studies will delineate the cell-specific roles of ferroptosis in progressive AAA formation and aortic rupture.

10418 Applying to Integrated Thoracic Surgery Residency: A Cost-Value Analysis

Fabian JimenezContreras MD, Jeffrey Jacobs MD

Thoracic/Cardiac Basic Science

Introduction: The cost of applying to Integrated Thoracic Surgery Residency (I6) has not been elucidated in the literature. The purpose of this study is to quantify the application cost burden to I6 applicants, analyze temporal cost changes, evaluate the impact of away rotations and geographic connections on receiving interviews and matching, and identify characteristics of matched applicants.

Methods: The Texas Seeking Transparency in Application to Residency (STAR) survey-based database was retrospectively reviewed for I6 applicants between 2019 and 2022. Descriptive statistics, unpaired t-tests, and Chi-square tests were performed. Away rotation analyses excluded the 2021 application cycle (n=30) as away rotations were suspended due to COVID-19.

Results: Eighty I6 applicant responses were included, of which 47 (58%) matched. The overall Texas STAR database response rate was 40.7%. Average total costs ranged from \$1554 to \$9173 with interviews as the largest contributor in 2019 and 2020. Away rotation costs were the second largest contributor in 2019 and 2020, overtaking interview costs in 2021, and becoming the largest contributor in 2022 (Figure 1). 66% (33/50) of applicants completed an away rotation; 83% (50/60) of these rotations resulted in an interview. Similar proportions of matched and unmatched applicants completed away rotations ($p=0.933$), with no difference in the mean number of rotations completed (1.31 ± 1.31 vs 1.05 ± 0.92 , $p=0.435$). There were 136 total reported geographic connections; 69% (94) of these resulted in an interview. There was no difference in the proportion of matched and unmatched applicants with at least 1 geographic connection ($p=0.404$) or the mean number of geographic connections per applicant (1.89 ± 2.43 vs 1.42 ± 2.18 , $p=0.378$). Of those who matched, 7 (15%) completed an away rotation at their matched program, and 9 (19%) had a geographic connection to their matched program. Additionally, matched applicants had a higher mean number of published abstracts and presentations (7.61 ± 3.58 vs 5.64 ± 3.70 , $p=0.020$), more frequently completed a research year (23% vs 6%, $p=0.038$), and had higher USMLE Step 2 scores ($p=0.012$).

Conclusions: I6 match rates remain low, and away rotations currently account for the greatest cost burden to applicants. Interview costs decreased with the introduction of virtual interviews during the COVID-19 pandemic. Existing geographic connections to programs seem to influence interview offers received, but not match outcomes. Most applicants perform away rotations—these are associated with favorable odds of interview invites, but not necessarily matches. However, the unmeasured benefits of away rotations should not be underestimated. Matched applicants excel in research and on standardized exams.

10415 Impact of an Enteral Nutrition Protocol in Critically Ill Patients with Burn Injuries

Pavel Mazirka , Amalia Cochran MD,FACS,FCCM

Acute Care/Trauma/Sepsis/Burns Clinical/Translational

Introduction: Adequate protein provision is essential following burn injury as the depletion of protein stores for the purposes of energy usage is associated with decreased immune function, delayed wound healing, and mortality. The optimal protein intake for burn patients remains controversial. In 2012, The University of Florida (UF) Health Shands Burn Center implemented an enteral nutrition protocol that provides recommendations on protein requirements based on total body surface area (TBSA) burned. The purpose of this study is to characterize the institution's current practice as it relates to total protein intake and clinical outcomes.

Methods: This retrospective chart review study included 99 adult patients admitted to the UF Health Shands Burn Center from January 2012 through August 2016 with burns of twenty percent or greater TBSA and required enteral nutrition supplementation.

Results: Patients received an average of 137.8 g or 2.03 g/kg protein daily. Fifteen percent of patients experienced graft loss. The median length of stay was 35 days. Seventy-six percent survived to hospital discharge. There was no significant association between total protein intake and the incidence of severe diarrhea ($p=0.132$).

Conclusion: Our institution's protocol achieved high protein administration while still being consistent with recommendations from the American Society of Enteral and Parenteral Nutrition (ASPEN).

10412 RACIAL AND SOCIOECONOMIC DISPARITY OF PREOPERATIVE OPTIMIZATION GOALS IN VENTRAL HERNIA REPAIR

Khal-Hentz Gabriel , Mazen Al-Mansour
Outcomes & Quality Clinical/Translational

Background: Preoperative optimization cut-offs are frequently utilized to determine eligibility for elective ventral hernia repair. Our objective was to assess the relationship between race and socioeconomic status in relation to preoperative optimization goals.

Methods: We retrospectively queried our institutional database for adults with a diagnosis of ventral hernia between 2016-2021. Demographics, comorbidities, laboratory and operative data were collected and analyzed. We elected to use the following cut-offs to determine eligibility for elective repair: body mass index (BMI) <40 Kg/m², glycated hemoglobin (HbA1c) <8% and smoking status. Socioeconomic status was assessed using the Distressed Communities Index.

Results: A total of 5,638 patients were included (Whites=4,321 (77%), Blacks=794 (14%), Hispanics=318 (6%) and other/unknown 205 (4%)). Median age was X years and 50% were male. Most common hernia types were umbilical (36%) and incisional (20%). 10% had BMI >40 Kg/m², 9% were active smokers and 4% had HbA1c>8%. 21% of all patients did not meet the preoperative optimization cut-offs at time of diagnosis and those were less likely to undergo hernia repair during the study timeframe compared to those to did (17% versus 27%, p<0.0001). There was a higher proportion of Blacks (22%) with BMI>40 Kg/m² compared to other races (11-15%), p=0.002. As the level of socioeconomic distress increased there was a corresponding increase in the proportion of patients who did not meet preoperative optimization cut-offs from 16% in prosperous communities to 25% in distressed communities (p<0.0001).

Conclusion: Nearly 1 of 5 patients with ventral hernias are affected by commonly used arbitrary preoperative optimization cut-offs. These cut-offs have disproportionate distribution in patients of different races and socioeconomic statuses. These disparities need to be considered when planning preoperative optimization protocols and resource allocation to ensure equitable access to elective ventral hernia repair.

10406 CITE-SEQ (CELLULAR INDEXING OF TRANSCRIPTOMES AND EPITOPES BY SEQUENCING) ILLUSTRATES A UNIQUE MYELOYDYSPLASIA AFTER SEPSIS

Evan Barrios , Philip Efron

Acute Care/Trauma/Sepsis/Burns Basic Science

Introduction: As improved critical care management of sepsis has decreased acute mortality, focus has shifted to the chronic host response to infection. Myeloid-derived suppressor cells (MDSCs) are known to influence the immune system during sepsis, but the differentiation and gene expression of septic MDSCs has not been well described. In this study, we utilized cellular indexing of transcriptomes and epitopes by sequencing (CITE-seq) to delineate gene expression profiles of myeloid subpopulations in healthy patients (day 0; n=12), acute sepsis (day 4; n=5), and chronic sepsis (days 14-21; n=5).

Methods: Peripheral blood mononuclear cells (PBMCs) were collected using density gradient centrifugation to create a myeloid and ficoll-enriched suspension which underwent CITE-seq using Chromium Single Cell 5' Beads and Library Kit v1 (10X Genomics). Cells were annotated in two steps, first using the automated Seurat pipeline Azimuth (PBMC) and then manually curated using phenotypic and genotypic cell markers. Cells across samples were integrated using the Harmony algorithm and visualized with uniform manifold approximation and projection (UMAP). Cluster-specific differentially expressed genes were identified by comparing each cluster versus remaining pooled clusters using the Wilcoxon rank sum test implemented in the Seurat R package.

Results: Compared to healthy controls, septic patients exhibited a higher proportion of G-MDSCs, M-MDSCs, and CD14+ monocytes. Over time, the differential gene expression for MDSC subtypes changed dramatically. Classically identified monocytic MDSC (M-MDSC) (CD33+CD11b+HLA-DR^{low}/-CD14+) gene expression in septic patients at day 4 was completely different than day 14 (no overlapping genes identified). This was also true of granulocytic MDSCs (G-MDSCs) (CD33+CD11b+HLA-DR^{low}/-CD14-). There were 437 M-MDSC gene identified in septic patients at day 4 (132 upregulated genes, 305 downregulated genes) and 162 G-MDSC genes (70 upregulated genes, 92 downregulated genes). Some historically identified genes associated with myeloid cells, such as ARG-1, NOS2, and IL-10 were not differentially expressed in healthy versus septic patients.

Conclusions: The myelodysplasia that occurs in sepsis survivors is very complex and is specific to time post-infection and outcome. The complete turnover of gene expression in G- and M-MDSCs over time in sepsis is a novel finding and somewhat dissimilar to other disease states. Understanding the complex genetic expression of predominant immune effector cells and the myeloid response to sepsis may allow for the development of targeted therapies in patients with adverse responses to sepsis.

10403 SINGLE CELL RNA SEQUENCING REVEALS NOVEL MYELOID-DERIVED SUPPRESSOR CELLS IN CHRONIC CRITICAL ILLNESS VS RAPID RESPONDERS SUBACUTELY AFTER SEPSIS

Evan Barrios , Philip Efron

Acute Care/Trauma/Sepsis/Burns Basic Science

Introduction: As acute mortality from sepsis continues to decrease, the phenotypes of rapid recovery (RAP) and chronic critical illness (CCI; ≥ 14 days in ICU with $\text{SOFA} \geq 2$) are becoming increasingly relevant, as CCI is associated with worse outcomes. Myeloid-derived suppressor cells (MDSCs) are well described in cancer and contribute to post-sepsis host pathology, but the differentiation and function of these cells in CCI patients remains poorly defined. Using single-cell RNA sequencing (scRNAseq), we sought to better delineate and characterize CCI myelodysplasia in the septic host.

Methods: Whole blood was obtained from 5 septic shock (Sepsis-3) patients at day 4 and 5 RAP and 5 CCI patients on days 14-21. Peripheral blood mononuclear cells (PBMCs) were collected using density gradient centrifugation to create a myeloid and ficoll-enriched suspension of cells, which were annotated in a multi-step process. First, cells were integrated at the sample level using Harmony and clustered using the Louvain unsupervised graph-based clustering algorithm. We then assigned an initial broad cell-type label to each cell probabilistically using the Azimuth reference mapping method and a reference dataset composed of 11.7k healthy human PBMCs. Cluster-specific differentially expressed genes were identified using the Wilcoxon rank sum test implemented in the Seurat R package. Using a combination of the reference labels and canonical marker genes, we manually curated the remaining annotations by subsetting the myeloid cells and splitting by sepsis status (healthy vs septic). MDSCs were then annotated in septic samples using both expression and lack of expression of marker genes from the literature. Cells are visualized using uniform manifold approximation and projection (UMAP) on the sample-level integration.

Results: The myeloid compartment after sepsis is highly heterogeneous and in CCI has a unique profile of cell subtypes. MDSC subsets identified included early MDSCs (E-MDSCs), monocytic MDSCs (M-MDSCs), granulocytic MDSCs (G-MDSCs) and a novel population of MDSCs which expressed characteristics consistent with both G- and M-MDSCs (M/G-MDSCs). This hybrid MDSC subpopulation is identified almost exclusively in CCI patients. All of the MDSC subpopulations share overlap of gene expression while having unique transcriptomic profiles. 106 significant genes were conserved across M-MDSC, G-MDSC, M/G-MDSC, and E-MDSC, and included *RETN*, *XPO5*, *S100A8*, and *S100A9*. The M/G cells distinctly expressed 13 genes.

Conclusions: Septic CCI patients have a unique and heterogeneous myeloid compartment, which distinguishes them from patients who exhibit rapid recovery. This includes potentially novel MDSC subpopulations that are potential targets for immunotherapeutics since MDSCs have different epigenetic and metabolomic profiles that are modifiable.

10400 Implementation of Ergonomic Training in Surgical Simulation at the University of Florida

Evan Barrios , Nicole Gravina

Medical Education Clinical/Translational

Introduction: Ergonomic awareness and the development of surgical tools adhering to ergonomic principles are critical to a surgeon's health (Barrios,...Gravina. Surgery. In press). Work-related musculoskeletal disorders affect a majority of surgeons, and various operative modalities (i.e. open, laparoscopic, and robotic surgery) stress the musculoskeletal system in unique ways. SoterTask (SoterAnalytics, Wilmington, DE) uses video capture and artificial intelligence to measure the injury risk of movements and provides individualized feedback to implement changes to reduce risk to an individual. We hypothesize that SoterTask can improve ergonomic practices in the surgical simulation laboratory with core Fundamentals of Laparoscopic Surgery (FLS) skill sets.

Methods: We will implement an Institutional Review Board-approved study in which general surgery residents (n=6-8) will perform FLS skill sets in a simulation center. Using SoterTask, we will measure low, medium, and high-risk positioning for neck, arms, back, and legs of individuals. The recorded videos provide a layover image of real-time risk, so users can see how their positioning affects risk. First, we will collect baseline data using the software while residents perform FLS skill sets. Next, we will intervene by showing participants their video with the risk layover. Subsequently, the user will perform the tasks again. We will evaluate their performance using single-subject multiple baseline design across participants, which demonstrate experimental control when performance changes only after the intervention is implemented. We will also analyze the change in performance using statistical analysis. These preliminary data will provide information to inform a larger scale intervention study aimed at improving surgeon ergonomics.

Results: Preliminary data has revealed that the program can alter user behavior. Starting with a simple seated task, we measured baseline posture data on two participants using SoterTask. On subsequent tasks, their neutral posture improved and risk decreased. A third participant did not improve with verbal feedback alone. However, they improved after being shown a video with the SoterTask layover.

Conclusions: Sotertask, along with targeted educational training, could potentially improve awareness of proper ergonomic principles and allow the implementation of better practices in the operating room. Our collaborative research group intends to conduct this study through the University of Florida Department of Psychology and Surgery and has already applied for potential NIH funding (Grant Number R21OH012566-01). With successful pilot studies, we intend to work with Department of Surgery Education leadership to engender transformative change in general surgery resident training.

10397 Assessment of Myeloid Derived Suppressor Cell Mitochondrial Metabolism in Septic Patients

Evan Barrios , Clayton Mathews

Acute Care/Trauma/Sepsis/Burns Basic Science

Introduction: Expansion of blood granulocytic myeloid derived suppressor cells (PMN-MDSCs) is associated with poor outcomes in septic patients. In cancer, MDSC mitochondrial metabolism plays a role in differentiation and immune suppression. This decrease in oxidative phosphorylation with compensatory increase in glycolysis has not been evaluated in MDSCs from sepsis patients.

Methods: Blood samples were collected from septic patients (n=14) at days 4 and 14, and from age/sex matched healthy subjects (n=10). PMN-MDSCs were isolated from PBMCs using CD66b+ isolation. Mitochondrial oxygen consumption and glycolysis were measured via Seahorse XFe™ and Cytation 3 analyses. ANOVA with Tukey post hoc analysis were performed.

Results: On day 4 post-sepsis, significant reductions in PMN-MDSC basal respiration (0.24 vs 0.49 pmol/min/1000 cells), maximal respiration (0.50 vs 1.25 pmol/min/1000 cells), and spare respiratory capacity (0.25 vs 0.76 pmol/min/1000 cells) were seen in sepsis subjects ($p < 0.0005$). On day 14, reductions in maximal respiration (0.63 vs 1.25 pmol/min/1000 cells) and spare respiratory capacity (0.30 vs 0.76 pmol/min/1000 cells) persisted ($p < 0.005$). No differences in glycolysis were detected.

Conclusion: Sepsis decreases PMN-MDSC mitochondrial oxygen consumption rates compared to controls, indicating a lower capacity to generate energy and reactive oxygen intermediates both subacutely and chronically. Whereas cancer patient MDSCs exhibit increased glycolysis, our data suggest an overall suppression of metabolism in MDSCs from sepsis. These findings strongly suggest that MDSCs from sepsis patients are fundamentally different from phenotypically similar cells in cancer. Abrogating MDSC-induced inflammation and immune suppression in sepsis will require a personalized approach to therapeutics.

10391 Operative Fixation of Perilunate Dislocations: A systematic review of clinical outcomes and complications

Rachel Safeek , Ellen Satteson

Plastic Surgery Clinical/Translational

Introduction: Perilunate dislocations are rare, yet serious, high-energy injuries with many limiting functional sequelae, including residual pain, stiffness, and arthritis of the wrist. In this study, we review clinical outcomes and their tools for measurement following operative fixation of perilunate fracture and dislocation.

Methods: A systematic review of studies pertaining to clinical outcomes following operative management of perilunate dislocations was conducted by querying Web of Science, PubMed/MEDLINE, Cochrane, and Embase databases. PRSIMA guidelines were followed. After removal of duplicates, 246 articles were screened by two independent reviewers.

Results: Forty-four studies met inclusion criteria for the study. Most were retrospective, single center studies, encompassing 885 patients (896 wrists). Most (99.4%) were male, with a mean age of 32.3. Mean follow-up was 50.3 months (minimum average 22.4 months), with 93.3% of wrists having undergone open reduction and internal fixation (ORIF). Most (86.3%) studies reported grip strength (mean: 36.0 kg; 76.4% of contralateral side). The most used clinical scoring assessment was the Mayo Wrist Score (MWS) (N=24 studies; mean: 75.6), followed by the Disabilities of Arm, Shoulder, and Hand (DASH) score (N=15 studies; mean= 21.51) and Patient-Related Wrist Evaluation (PRWE) score (N= 12 studies; mean= 26.7). The most reported complications postoperatively were posttraumatic arthritis and residual wrist pain. Nonunion rate did not differ significantly across surgical technique (dorsal vs. volar vs. combined vs. arthroscopic).

Conclusion: Our systematic review suggests that measurement of clinical outcomes following surgical intervention for perilunate dislocations is not standardized, with a range of clinical scoring assessments being used. Furthermore, even with operative fixation, clinical outcomes for patients with perilunate dislocation remain overall varied, with some patients reporting residual pain and chronic osteoarthritis.

10388 Short-term Dietary Restriction Potentiates an Anti-inflammatory Circulating Mucosal-associated Invariant T-cell Response

Brian Fazzone , Scott Berceli

Vascular Basic Science

Mucosal-associated invariant T-cells (MAITs) are enriched in the gut and blood and produce a proinflammatory T-cell receptor-mediated response to gut microbial ligands through TNF α , IL2, IL17, proapoptotic, and IFN γ signaling. Preoperative short-term dietary restriction (StDR) is thought to attenuate the postoperative inflammatory response. We hypothesized that StDR would induce an anti-inflammatory genomic response in circulating MAITs.

Immune cells were isolated from blood of 7 healthy patients before (baseline), during (days 2 and 4), and after (day 7) 4 days of StDR. Single-cell RNA sequencing was used to generate single cell libraries. Quality control, normalization, dimensional reduction, and clustering were performed on sequenced libraries using the Seurat package (V 4.3.0) for R. MAITs were identified by manual and automated annotation. A linear mixed model accounting for within-subject variability was used to compare differentially expressed genes, defined an absolute LogF c >0.4. Expression of CD69 was used to evaluate MAIT activation. Canonical pathways and regulators were identified with Qiagen Ingenuity Pathway Analysis software using a Fisher's exact test with a Benjamini-Hochberg corrected p-value of overlap threshold for significance set to <0.05. Significantly activated or inhibited pathways and regulators were identified by an absolute Z-score \geq 2.0.

65372 cells were isolated across all samples with a mean of 85595 reads per cell and a median of 2335 genes per cell. MAITs accounted for 2.4% (n=1351) of cells. StDR induced a differential downregulation of genes compared to baseline. Upregulated genes included 93 on day 2, 24 on day 4, and 85 on day 7. Downregulated genes included 139 on day 2, 148 on day 4, and 60 on day 7. Expression of CD69 (activation marker) was downregulated during days 2 and 4 of StDR (LogF c = -0.66 and -0.44, p<0.001). IPA identified 29 and 21 canonical pathways that were enriched (p<0.001) during days 2 and 4 of StDR, but no enriched pathways on day 7. TNF, pro-apoptotic, IL2, and IL17 signaling pathways were inhibited (Z-score \leq -2.0), and IL10 signaling was activated during StDR (Z-score \geq 2.0). The acute phase response, iNOS, IL-1, and IL-6 signaling were additional notable inhibited anti-inflammatory pathways on days 2 and 4. 149, 182, and 12 significant regulators were identified on days 2, 4, and 7, respectively. 111 (81%) were inhibited on day 2, and 125 (82%) were inhibited on day 4. CD3, TNF, CD40, IL2, and IL4 were among the most functionally significant inhibited chemokines on days 2 and 4 (p <0.0001 for all). In general, the most inhibited regulators were involved in the TCR complex, antigen-presenting cell co-stimulation, and proinflammatory downstream signaling.

StDR potentiated an anti-inflammatory MAIT immunophenotype. MAIT activation was decreased, and proinflammatory signaling pathways were inhibited, likely through diminished TCR-mediated MAIT stimulation.

10385 Variability in resident and fellow operative performance and autonomy in surgical oncology procedures

Jeremy Balch , Tyler Loftus

Oncology Clinical/Translational

Background: As surgical training moves toward Entrustable Professional Activities (EPAs), it is increasingly important to understand and optimize the progression of surgical trainees toward autonomous, practice-ready operative performance. This exploratory analysis benchmarks senior resident and fellow operative performance and autonomy for surgical oncology procedures.

Methods: Data were obtained from the Society for Improving Medical Professional Learning (SIMPL) collaborative. Subjects included senior (\geq PG4) residents, fellows, and attending evaluators from 98 training programs. We identified evaluations for common breast, melanoma, endocrine, hepatobiliary, and pancreatic procedures. Operative performance was recorded on the validated five-point Performance Scale (5=best); operative autonomy was measured on the validated four-point Zwisch scale (4=greatest autonomy). Nominal data are presented as median [interquartile range].

Results: 880 residents and 52 fellows completed 4,406 evaluations. Case complexity was similar between residents and fellows. Fellows had slightly higher performance (3.0 [3.0-4.0] vs. 3.5 [3.0-4.0], $P<0.01$, Figure 1a) but similar autonomy (2.5 [2.0-3.0] vs. 2.5 [2.0-3.0]). Subgroup analyses of breast/melanoma, endocrine, and hepatopancreatobiliary procedures followed similar patterns. Incidence of practice-ready performance with supervision-only was low for both residents and fellows (26% v45%, $P<0.01$). Similarly, few attendings provided “supervision only” to these high-performing residents and fellows (5.5 vs. 10.0% $P<0.05$, Figure 1b).

Conclusion: Trainee performance and autonomy increased with post graduate year for common oncologic procedures. Practice-ready performance was observed for few residents and fellows, and few of the high performing trainees performed operations with supervision only. These results suggest opportunities to improve current processes for trainees achieving competence in performing common surgical oncology procedures prior to fellowship graduation.

10382 Area Deprivation Index versus Other Predictors of Postoperative Readmission and Long-term Survival

Jeremy Balch , Tyler Loftus

Acute Care/Trauma/Sepsis/Burns Clinical/Translational

Introduction: The Area Deprivation Index (ADI) is a well-validated indicator of socioeconomic stress. We test the hypothesis that ADI predicts long-term postoperative mortality and hospital readmission with accuracy similar to that of validated indicators of acute and chronic disease severity.

Methods: We identified 226,888 surgical inpatient admissions at three university hospitals from 9/1/2014-9/1/2021. We collected electronic health record data representing basic demographics, ADI, highest sequential organ failure assessment (SOFA) score within 24h of admission, and Charlson Comorbidity Indices (CCI). Primary outcomes were postoperative readmission and long-term (up to 7-year) survival. Cox proportional hazards models estimated the ability of ADI, SOFA, and CCI to predict survival and readmission, reported as c-statistics.

Results: Patients were divided into top (N=77,628), middle (N=73,447), and bottom third (N=75,811) ADI cohorts, which had similar age and gender distributions. The top third ADI cohort (most socioeconomic stress) had greater proportions of patients self-identifying as Black or African American compared with middle and bottom third cohorts (49% vs. 26% vs. 14%, respectively, $p < .001$), higher CCI but lower SOFA scores (both $p < .001$), and higher incidence of readmission and lower survival (Figures 1A and 1B). CCI was a good predictor of long-term survival (c-statistic 0.75); ADI and eSOFA were not (both c-statistics 0.51). All three variables were weak predictors of readmission (CCI: 0.56, SOFA: 0.54, ADI: 0.52).

Conclusions: In this longitudinal, multicenter dataset, ADI had limited utility in predicting long-term postoperative survival or readmission. Chronic disease burden correlated with ADI and had the strongest associations with survival and readmission.

10379 IMMUNOLOGICAL ENDOTYPES IN INTENSIVE CARE PATIENTS WITH SEPSIS OR AT-RISK OF SEPSIS

Jeremy Balch , Lyle Moldawer

Acute Care/Trauma/Sepsis/Burns Basic Science

Introduction: Sepsis is a complex, heterogenous syndrome, with limited therapeutic options beyond organ support, antibiotics, and source control. Development of rapid diagnostic metrics to predict clinical trajectories and immunological endotypes may identify targeted interventions. This study seeks to validate immunological endotypes and their associated risk for death in patients with sepsis or at-risk of sepsis using multiplex transcriptomic metrics obtained on admission, and at set intervals, to a surgical intensive care unit (ICU).

Methods: This is a secondary analysis of two prospective, observational studies conducted in the surgical ICUs of an academic health science center. The analysis included 377 critically ill adult patients admitted during a 5-year period ending July 2020 with sepsis, along with 145 similar patients considered at high-risk for developing sepsis. Whole-blood measurements of a 29-messenger RNA transcriptomic classifier for likelihood of 30-day mortality (IMX-SEV-3, sepsis severity) and a 33-messenger RNA transcriptomic endotype classifier, both of which were previously developed and here measured in a hospital-based, clinical-diagnostic laboratory. Transcriptomic data were assessed using an FDA-cleared analytical platform (nCounter FLEX®, NanoString, Inc.) in a hospital clinical and diagnostic laboratory.

Results: Sepsis was associated with a significantly higher predicted and actual hospital mortality. At enrollment, the predominant endotype for septic and non-septic patients was adaptive (40% vs 51%, $p < 0.01$). Of patients admitted with sepsis and a predicted high likelihood of mortality, 72% were inflammopathic, 28% were coagulopathic, and none were adaptive. Patients at low risk of clinical severity almost uniformly presented with an adaptive endotype. Endotypes evolved during ICU hospitalization and patients who remained or became inflammopathic or coagulopathic experienced higher rates of chronic critical illness (13.4% vs 2.3%, $p = 0.02$), longer length of stay (2-4 days vs 5-6.5 days, $p < 0.01$), and trended towards higher 30- and 90-day mortality compared with patients who remained or transitioned to an adaptive endotype (3% vs 11%, $p = 0.05$; 14% vs 5%, $p = 0.05$).

Conclusions: Critically ill patients admitted to the ICU express different and evolving immunological endotypes depending upon both the predicted severity of their clinical course as well as their sepsis status. Endotyping critically ill, septic patients may help identify individuals who would benefit from targeted therapeutic interventions.

10370 Perioperative cerebrospinal fluid drain placement does not increase venous thromboembolism risk after complex endovascular aortic repair

Walker Ueland MD, Michol Cooper MD, PhD
Vascular Clinical/Translational

Introduction: Incidence of venous thromboembolism (VTE) after thoracic and fenestrated endovascular aortic repair (TEVAR/FEVAR) is high (2-10%) and associated with increased mortality. Conversely, VTE occurrence after infrarenal EVAR is <1%; however, the etiology for this discrepancy remains unknown. Notably, patients undergoing TEVAR/FEVAR commonly undergo cerebrospinal fluid drain (CSFD) placement for neuroprotection, which requires interruption of perioperative anticoagulation and prolonged immobility. We hypothesized that CSFDs are a risk factor for VTE after complex endovascular aortic surgery.

Methods: All consecutive patients undergoing TEVAR and FEVAR at a single center were reviewed (2011-2020). Patients undergoing concomitant open surgery were excluded. CSFDs were placed based on surgeon preference preoperatively or for spinal cord ischemia (SCI) rescue therapy postoperatively. VTE was defined as any new extremity deep venous thrombosis (DVT) or pulmonary embolism (PE) confirmed on imaging within 30 days postoperatively. Univariate analysis was used to compare patients with and without VTE, as well as patients with and without CSFDs. Multivariate analysis was used to explore risk-adjusted associations between VTE incidence and CSFD placement.

Results: 932 patients underwent TEVAR/FEVAR. 42%(n=389) received a CSFD at some point in their care (pre-emptive, 94%[n=367/389]; post-operative SCI rescue therapy, 6%[n=22/389]). Patients with spinal drains were more likely to have a prior history of aortic surgery (44% vs. 35%, p=0.005) and receive more postoperative blood products (800 vs. 450mL, p=0.02). The overall incidence of VTE was 2.7%(n=25); DVT, 1.8%(n=17); PE, 1.7%(n=16). Among patients experiencing a postoperative VTE complication, 52%(n=13) were symptomatic. VTE occurrence trended higher in patients who underwent either TEVAR alone or TEVAR+FEVAR compared to subjects receiving FEVAR (3.3% vs. 1.1%, p=0.07). Patients with VTE were younger (60 vs. 67 years, p=0.001), more likely to undergo non-elective surgery (96% vs. 43%, p<0.0001), have higher ASA classification (4.1 vs. 3.7, p=0.0007), require longer ICU admission (24 vs. 12 days, p<0.0001), and receive more blood products (1764 vs. 569mL, p<0.0001). Overall, VTE incidence was 1.8% in patients with CSFDs compared to 3.3% in those without (OR 0.47 [95%CI 0.19-1.13, p=0.10); yet, patients receiving CSFDs postoperatively for SCI rescue therapy had a higher incidence of VTE (9.1% vs. 1.1%, p=0.04). Overall survival for patients with VTE was not different compared to patients without VTE (36±36 vs. 46±32 months).

Conclusions: CSFD placement was not associated with an increased risk of VTE in patients undergoing complex endovascular aortic repair. VTE incidence was higher in patients presenting non-electively and those with more complicated perioperative courses which identifies a high-risk phenotype that may justify different VTE prophylaxis and/or surveillance postoperatively.

10361 Assessing Median Lethal Dose of Falls by Field-Relevant Categories at an Urban Level I Trauma Center

Christopher Gross , Marie Crandall

Acute Care/Trauma/Sepsis/Burns Clinical/Translational

Introduction: Little research has focused on assessing the median lethal dose (LD50) for fall height based on field-relevant categories like falls from greater than standing (FFGS), falls from standing (FFS), and falls from less than standing (FFLS).

Methods: This retrospective observational study included patients evaluated for a fall incident at an urban Level I Trauma Center Medical Examiner's log from 1/1/15-6/31/17. Descriptive statistics characterized the sample based on demographic variables such as age, race, sex, and insurance type, as well as injury characteristics like relative fall height, Glasgow Coma Scale (GCS), Injury Severity Score (ISS), traumatic brain injury (TBI), ICU length of stay, and mortality. Bivariate analysis included Chi-square tests for categorical variables and Student t-tests for continuous variables. Subsequent multiple logistic regression modeled significant variables from bivariate analyses, including age, race, insurance status, fall height, ISS, and GCS.

Results: When adjusting for sex, age, race, insurance, ISS, and GCS, adults ≥ 65 who FFS had 1.93 times the odds of mortality than those who FFGS. However, those <65 who FFGS had 3.12 times the odds of mortality than those who FFS when adjusted for the same covariates. Additionally, commercial insurance was not protective across age groups.

Conclusion: The LD50 for FFS may be higher than FFGS under certain circumstances, particularly among those ≥ 65 years. Therefore, prehospital collection should include accurate assessment of fall height and surface (i.e. water, concrete). Lastly, commercial insurance was likely a proxy for industrial falls, accounting for its surprising lack of protection against mortality.

10355 Historically High Insulin Requirements: A case report of massive insulin requirements in a patient with severe burns

Dominique Szymkiewicz , Amalia Cochran

Acute Care/Trauma/Sepsis/Burns Basic Science

Patients with severe burns that cover more than 40% total body surface area (TBSA) experience a period of stress, inflammation, and hypermetabolism. Although seen in other critically ill patients, the severity and length of the hypermetabolic and hyperglycemic stress response is especially pronounced in burn patients.

Historically, the literature has been mixed on whether tight glucose control improves outcomes, and for years hyperglycemia was expectantly managed. However, the NICE-SUGAR trial established a blood glucose goal in intensive care units as less than 180 mg/dl due to proven morbidity and mortality benefits. Nevertheless, management strategies addressing hyperglycemia in patients with burns remain underreported.

In this case report, we present a critically ill patient with 45% TBSA mixed thickness burns with a drastic hypermetabolic and hyperglycemic response. In the attempt to decrease blood sugar levels to 180 mg/dl or less, the patient received a maximum of 5739 units of insulin in 24 hours, an insulin dose that has not been reported in the literature since 1943. This case report not only underscores the uniquely severe hypermetabolic state present in burn patients, but also emphasizes the safety of insulin even in massive doses, when physiologically required by the patient.

10352 Investigating effects of acute polymicrobial sepsis on emerging amyloid pathology

Isaac Smith , Paramita Chakrabarty

Acute Care/Trauma/Sepsis/Burns Clinical/Translational

Introduction: Sepsis is thought to accelerate age-related neurocognitive decline, such as with incipient Alzheimer's disease (AD). We hypothesized that pre-existing AD neuropathology will synergize with systemic inflammation to accelerate pathological trajectory in AD mouse models.

Methods: To initiate a proof-of-concept paradigm, we conducted acute polymicrobial infection in young mice in order to produce a cytokine storm in the systemic circulation. 3-month-old APP transgenic mice (TgCRND8) and their nontransgenic (nTg) littermates underwent cecal ligation and puncture with daily constraint stress (CLP+DCS) model of polymicrobial sepsis. Mice were analyzed 7 days later to assess the effects of sepsis on peripheral and brain-resident immune cells.

Results: We noted sex-stratified differential changes in peripheral immune cells in both TgCRND8 and nTg mice. In particular, we observed that B cells were preferentially reduced in septic female TgCRND8 mice, and myeloid derived suppressor cells increased in septic male TgCRND8 mice relative to sex-matched sham mice. We did not find that sepsis triggers changes in brain amyloid plaques in young mice in an acute setting. Interestingly, we found that though astrogliosis increased following sepsis for all relative to sham-treated genotype-matched mice, increased microgliosis was noted only in the nTg septic mice. Male mice (both TgCRND8 and nTg) were more vulnerable to sepsis-induced astrogliosis than females. A focused transcriptomic study revealed that sepsis reduced synaptic gene expression in serotonergic and dopaminergic systems in TgCRND8 mice. On the other hand, sepsis causes more robust changes in microglia and cytokine signaling pathways in nTg mice.

Conclusions: Overall, our data shows that acute systemic inflammation following sepsis induces distinctive changes in the young adult mouse brain according to sex and amyloid plaque presence.

10328 Utilization of Visual Artificial Intelligence to Improve Intraoperative Identification of Biliary Anatomy

Alexandra Ladd , Ali Zarrinpar

AI/Artificial Intelligence Clinical/Translational

Introduction: Misinterpretation of biliary anatomy due to errors in visual perception leads to adverse events such as common bile duct injury (BDI). Insufficient acquisition of the critical view of safety (CVS) is one of the causal factors of BDI during a laparoscopic cholecystectomy (LC). Artificial intelligence (AI) models trained on LC videos can provide real-time guidance on intraoperative interpretation of biliary anatomy and may reduce the incidence of BDI and therefore improve the safety of the operation. An objective method to identify biliary anatomy is the use of indocyanine green (ICG) and near-infrared fluorescence cholangiography (NIRFC) imaging. With the use of AI models, interpretation of biliary anatomy could be improved. We hypothesize that data obtained from NIRFC and visible light images during LC can be used to train AI models to interpret biliary anatomy without the use of NIRFC.

Methods: NIRFC was routinely performed on adult patients undergoing LC. Intraoperative videos were used to train image-to-image (I2I) translation AI models using the pix2pix neural network architecture to identify biliary anatomy. We used 214 images from 26 LC operations. A random number generator assigned images into train/test/validation sets in a .6/.2/.2 distribution. Models were trained to produce simulations of NIRFC images from visible light images only, using paired white light and NIRFC images. Models were tested on an unseen subset of data. Accuracy was measured by calculating the mean squared error (MSE) of the test set NIRFC image and the corresponding synthetic NIRFC image generated by AI.

Results: The model successfully produced a simulation of NIRFC and biliary anatomy, even when it was obscure to human visualization. The model located the common bile duct with sensitivity of 71% and specificity of 92%. Separate models were used for different timepoints of dissection in relation to obtaining the CVS. The MSE scaled to average brightness of the test set NIRFC image (sMSE) was significantly lower before dissection of the CVS compared to during dissection (5.6 vs 31.8, $p=0.006$) or after dissection (5.6 vs 85.3, $p=0.005$). Separate models were also used for different doses of ICG. The sMSE was lower for the low dose model compared to the combined dose model (9.3 vs 9.7, $p=0.04$). However, no significant differences were found between standard dose and combined dose, or between low dose and standard dose models.

Conclusion: Visual AI can be developed to accurately and precisely identify the common bile duct during LC using only standard white light video, thus obviating the need for ICG administration and NIRFC imaging. Success in this study provides evidence that AI can be routinely integrated for real-time, accurate, and efficient identification of biliary anatomy during this operation.

10325 Impact of CYP3A4, CYP3A5, and ABCB1 genotypes on tacrolimus dosing and monitoring in liver transplant patients

Alexandra Ladd , Ali Zarrinpar

Transplant/Hepatopancreatobiliary (non-cancer) Clinical/Translational

Introduction: Tacrolimus is a widely used immunosuppressant in liver transplantation. Its blood trough levels after transplantation must be closely controlled due to its narrow therapeutic range. It is a substrate for P-glycoprotein, a transmembrane efflux pump encoded by the ABCB1 gene, and for cytochrome P450 (CYP) 3A, an enzyme that oxidizes small organic molecules. ABCB1, CYP3A4, and CYP3A5 have single nucleotide polymorphisms (SNPs) that affect drug transport and drug metabolism. We aim to determine how single nucleotide polymorphisms (SNPs) in these genes affect tacrolimus blood trough level variability immediately after liver transplantation. We hypothesize that polymorphisms will impact the ease and predictability of short-term post-transplant immunosuppression dosing.

Methods: Donor and recipient genotypes for CYP3A4, CYP3A5, and ABCB1 in 61 adult liver transplant recipients were analyzed. Outcomes compared included percentage of each patient's hospital stay in which tacrolimus trough level was greater than 2 ng/ml out of range, average tacrolimus dose per kilogram, and tacrolimus dose and level at discharge.

Results: Recipient ABCB1 SNPs significantly affected the percentage of each patient's hospital stay in which tacrolimus trough level was greater than 2 ng/ml out of range. Donor ABCB1 SNPs affected the average tacrolimus dose per kilogram, as well as tacrolimus level at discharge. Recipient CYP3A4*1B SNPs affected average tacrolimus dose per kilogram and tacrolimus dose at discharge. Recipient CYP3A5*3 SNPs affected average tacrolimus dose per kilogram and tacrolimus dose at discharge.

Conclusions: This study is the first demonstration that the feasibility of achieving and maintaining tacrolimus levels within therapeutic range in the immediate post-transplant period is influenced by genetic polymorphisms in drug metabolizing enzymes and drug transporters. These polymorphisms not only determine the ultimate immunosuppression dose, but they also impact the ease and predictability of post-transplant dosing, while the patient and the organs are recovering from the transplantation process.

10298 Cryopreserved umbilical tissue as an adjunctive therapy to promote healing of high risk wound complication patients undergoing breast reconstruction

Kyle Ockerman , Sarah Sorice-Virk

Plastic Surgery Case Report

Introduction: Mastectomy skin necrosis (MSN) is a common complication occurring in up to 50% of patients. In patients with risk factors for poor wound healing such as immunosuppression, prior radiotherapy (XRT) and high BMI (> 30.0), this number is even higher. MSN can lead to poorer aesthetics, infection, loss of reconstruction and delay in adjuvant cancer therapy. Instead of forgoing reconstruction, adjunctive therapies to optimize wound healing are necessary. The purpose of this study is to introduce the use of cryopreserved umbilical tissue (vCUT) as an adjunct therapy for high risk wound healing breast reconstruction patients to illustrate its pro-regenerative capabilities.

Methods: All patients who underwent breast reconstruction with vCUT as an adjunctive therapy were identified and retrospectively analyzed.

Results: Six patients who underwent breast reconstruction with vCUT placement were identified. These patients had risk factors for delayed healing such as obesity, immunosuppression and XRT. The mean postoperative follow-up was 119 days (range 74-196). 3/6 patients demonstrated postoperative complications: 2/6 developed seromas, 2/6 developed wound dehiscence, and 1/6 developed MSN and infection.

Conclusion: As undergoing immediate breast reconstruction has been linked with superior aesthetic outcomes and improved mental health, efforts to expand current indications for safe immediate reconstruction to traditionally poorer reconstructive candidates are imperative. Results of this case series demonstrates vCUT as a promising novel adjunctive tool in the reconstructive surgeons' armamentarium in managing the less ideal reconstructive breast candidate.

10295 Comparison of abdominal donor site scar between staples versus sutures in autologous breast reconstruction

Kyle Ockerman , Sarah Sorice-Virk
Plastic Surgery Clinical/Translational

Introduction: A secondary benefit of deep inferior epigastric perforator (DIEP) flap breast reconstruction may be improving the abdominal contour, however poor scarring can lead to aesthetic dissatisfaction and complications. While studies have demonstrated favorable aesthetic results and decreased operative time using dermal stapling, no reports exist regarding epidermal stapling. The aim of this study is to compare the aesthetic scar outcomes and postoperative complications of abdominally based breast reconstruction patients who have undergone suture closure versus epidermal staple closure.

Methods: A total of 217 patients who underwent abdominal-based autologous breast reconstruction from 2011 to 2022 were included and retrospectively analyzed (staples= 41, suture= 176). Twenty-four patients' postoperative abdominal scar photographs were randomly chosen (staples=12, sutures=12) and assessed by three board-certified plastic surgeons using a modified Patient Observer Scar Assessment Scale (POSAS) and Visual Analogue Scale (VAS).

Results: Assessment of abdominal scars closed by dermal staples revealed significant improvements in thickness ($p=0.033$), relief ($p=0.033$), surface area ($p=0.017$), overall opinion ($p=0.033$), POSAS score ($p=0.034$), and VAS scar score ($p=0.023$) in comparison to scars closed by sutures. Surface area (ICC=0.637), overall opinion (ICC=0.744), POSAS (ICC=0.671), VAS (ICC=0.700), pigmentation (ICC=0.535), and thickness (ICC=0.526) ratings showed moderate interrater reliability, while relief (ICC=0.256) rating showed poor interrater reliability. Staple and suture closure had similar postoperative complication rates.

Conclusions: Abdominal donor site scar quality was superior using the dermal and epidermal staple compared to traditional suture closure.

10292 Changes in Mental Health in Partners of Transgender Nonconforming Patients Post Gender Transition

Kyle Ockerman , Sarah Sorice-Virk
Plastic Surgery Clinical/Translational

Introduction: To date, no study has evaluated the psychosocial impact of gender transitioning on partners of transgender nonconforming (TGNC) individuals. Here, we assessed psychosocial distress, quality of life, and internal resilience of partners of TGNC individuals.

Methods: Anonymous surveys were administered via Amazon Mturk. Eligible participants were over 18 years with a partner who transitioned genders. Relationship satisfaction and mental health was assessed via the Self-Esteem and Relationship Questionnaire (SEAR), General Anxiety Disorder (GAD-7), and Personal Health Questionnaire Depression Scale (PHQ-8), Difficulties in Emotion Regulation Scale (DERS) and Resilience Scale. Multivariable linear regression assessed associations between relationship satisfaction and degree of partner transitioning.

Results: Among 337 participants who completed the study, 42.4% were male, with a mean age of 35.8. Nearly half (44.4%) had partners who transitioned from cis male to trans female (MTF), while a third (36.8%) had partners who transitioned from cis female to trans male (FTM). Most (72.4%) reported their partner underwent surgical transitioning (15.1% top surgery; 5.6% bottom; 51.6% top and bottom) versus 27.6% non-surgical transitioning. Sexual satisfaction and Resilience Scale scores were higher among respondents whose partners underwent non-surgical transitioning ($p < 0.001$). Sexual satisfaction scores differed significantly among participants whose partners underwent top only versus bottom only surgery ($p = 0.004$).

Conclusion: This is the first study to report the psychosocial impact of TGNC transitioning on their partners. Partner sexual satisfaction, depression, and anxiety scores were impacted by surgical transitioning of their TGNC partner. Supportive services for partners of TGNC individuals should be considered during the transition process to protect these romantic relationships for the benefit of both parties.

10232 Functional Outcomes Following Submuscular Transposition for Persistent Ulnar Neuropathy: A Case Series

Markos Mardourian , Harvey Chim
Plastic Surgery Clinical/Translational

Introduction: The prevalence of recurrent and persistent cubital tunnel syndrome (CuTS) following primary ulnar nerve decompression is significant and patients frequently require revision procedures. The optimal surgical technique for revision has been widely debated, and literature exploring submuscular transposition (ST) as a method for revision is insufficient. The purpose of this study was to evaluate functional outcomes in participants with recurrent CuTS who underwent submuscular transposition.

Materials and Methods: All participants (n=18) that underwent ST for recurrent CuTS at an academic medical center from November 2018 to August 2021 were identified using procedural codes. Data was extracted from the medical records including preoperative Dellon's score, subjective complaints, physical exam findings, EMG results, previous treatments, patient demographics, and associated conditions in the upper extremity. Eligible patients were scheduled for an in-person physical examination at least one year after revision surgery to assess functional outcomes. Standardized disability scores including the Disabilities of the Arm, Shoulder, and Hand (DASH) questionnaire, Michigan Hand Outcomes (MHQ) questionnaire and Visual Analogue Pain Scale (VAS), and a patient satisfaction scale were also collected. Functional outcomes were graded using the Modified Bishop Rating System (MBRS) and Dellon's classification.

Results: Thirteen patients were eligible for inclusion and seen in clinic for follow-up. Mean duration of follow-up was 598.23 days (SD 284.16 days). All patients had a severe Dellon's score preoperatively and improved to mild or moderate postoperatively. There were no complications identified. 76.92 % of the patients had a satisfaction score of 3 or higher. Twelve out of Thirteen patients underwent additional procedures at the time of the revision cubital tunnel release and ST. Outcomes for each patients' survey responses and physical exam results, reported via the MBRS score, are included in Table 1.

Conclusions: To date, there is no surgical treatment for revision surgery that has been shown to be superior and there is no consensus on unified outcome measures. Our data thus far demonstrates ST can be used as a safe technique for patients undergoing a revision procedure for recurrent CuTS. All patients demonstrated objective improvement in functional outcomes. Further research is needed to compare various operative techniques and determine superiority of one over the other

10196 Clinical Outcomes of the Over-the-Top Subscapularis Repair During Reverse Shoulder Arthroplasty

Marlee Mallat , Joseph King

General Surgery Clinical/Translational

Introduction: Benefit of subscapularis tendon repair during reverse shoulder arthroplasty (RSA) is debated. Previous biomechanical work demonstrated that when the upper two-thirds of the subscapularis tendon was repaired over-the-top of the center of rotation (OTTR), it functioned as an abductor through a greater range-of-motion (ROM). The purpose of this study was to assess the clinical outcomes of patients undergoing RSA with concomitant OTTR of subscapularis and compare them to patients undergoing no repair.

Methods: Ninety-seven consecutive RSAs with either concomitant OTTR of the subscapularis (N=75) or no repair of the subscapularis (N=22) at a single institution were retrospectively reviewed. Patients with a preoperative diagnosis of cuff tear arthropathy, osteoarthritis, massive cuff tear, or inflammatory arthritis and minimum 2-year follow-up were included. Active ROM (forward elevation, abduction, external rotation, internal rotation) at preoperative and follow-up visits were recorded. Improvements in ROM were compared to the minimal clinically important difference (MCID) and substantial clinical benefit (SCB) for RSA. Clinical outcome scores were assessed at final follow-up. Additionally, complications and reoperations were evaluated.

Results: RSAs were evaluated at a mean follow-up of 3.8 ± 1.6 years. Demographics were similar between groups. Preoperatively, patients undergoing subscapularis repair had greater external rotation when compared to those without repair ($15 \pm 16^\circ$ vs. $5 \pm 12^\circ$, $P=.003$). Postoperatively, patients undergoing subscapularis repair had greater forward elevation ($132 \pm 21^\circ$ vs. $126 \pm 22^\circ$, $P=.268$) and abduction ($114 \pm 26^\circ$ vs. $106 \pm 23^\circ$, $P=.193$) with both exceeding the MCID (-2.9° and -1.9° , respectively); however, these differences were not statistically significant. Further, patients that underwent subscapularis repair had a significantly larger proportion of patients that were able to reach the small of their back postoperatively (65% vs. 21%, $P=.006$). Patients with subscapularis repair had less improvement in external rotation (13 ± 20 vs. $24 \pm 20^\circ$, $P=.028$). Postoperative outcome scores were similar between the two groups. Neither the rate of complications nor reoperations significantly differed between patients with and without subscapularis repair (11.8%[n=9] vs. 13.6%[n=3], $P=.729$ and 3.9%[n=3] vs. 4.5%[n=1], $P=1.000$).

Conclusions: The OTTR of the subscapularis tendon in RSA had similar ROM and outcome scores compared to no repair at mean 3.8-year follow-up, but a significantly larger proportion of patients with repair achieved functional internal rotation to the small of the back. Limitation of external rotation seen after conventional subscapularis repair techniques may also apply to our novel OTTR technique, but without a corresponding detrimental effect on forward flexion or abduction. Larger studies are needed to further evaluate the role of this repair technique.

10094 Hardware Salvage in the Lower Extremity following Pedicled or Free Flap coverage: Ten-Year Single Center Outcomes Analysis

Markos Mardourian B.S, Harvey Chim MD
Plastic Surgery Clinical/Translational

Background: An unanswered question with open tibial fractures is whether the type of flap used affects hardware retention. Flap survival may not equate hardware retention or limb salvage. Nevertheless, hardware failure or infection would at the very least necessitate multiple repeat surgeries and long-term intravenous antibiotics with a decreased chance of limb salvage. In this study, we performed a 10-year single-institution review and analysis of all patients who had placement of hardware for open tibial fractures followed by flap coverage. The primary aim of the study was to investigate if there was a relationship between flap type (pedicled vs free and muscle vs fasciocutaneous flaps) and primary and secondary outcome measures. A secondary aim of the study was to determine if there was any difference in primary and secondary outcome measures when comparing the period of time from 2012 to 2016 (where there was not a formal orthoplastic collaboration) and from 2017 to 2021, where our institution had a formal orthoplastic team.

Methods: Inclusion criteria consisted of patients who underwent pedicled or free flap coverage of Gustilo IIIB or IIIC tibial fractures requiring ORIF. An initial cohort of 100 unique patients was retrieved based on EMR analysis by CPT codes. After individualized chart review, a cohort of 58 patients had sufficient data for inclusion in the study. Of these 31 had pedicled flap reconstruction, while 27 had free flap reconstruction. In addition, in this cohort, 36 had reconstruction with muscle flaps, while 22 had reconstruction with fasciocutaneous flaps. Within the pedicled flap cohort, there were 14 fasciocutaneous and 17 muscle flaps. Within the free flap cohort, there were 8 fasciocutaneous and 19 muscle flaps. Outcomes and complications were statistically analyzed based on flap type. Flap type was stratified into free vs pedicled flaps and muscle vs fasciocutaneous flaps. Primary outcome measures included hardware failure and infection requiring hardware removal. Secondary outcome measures included limb salvage, flap success, and fracture union.

Results: Overall primary outcome measures were better for pedicled flaps (n=31), with lower rates of hardware failure and infection (25.8%; 9.7%) compared to free flaps (n=27) (51.9%; 37.0%). Limb salvage and flap success were not different comparing pedicled and free flaps. There was no significant difference in outcomes between muscle and fasciocutaneous flaps. Multivariable analysis showed that patients who had free vs pedicled flaps or muscle vs fasciocutaneous flaps had a higher chance of hardware failure. A formal orthoplastic team was established in the second 5 years, after which flap numbers were higher and hardware failure less for pedicled and fasciocutaneous flaps.

Conclusions: Pedicled flaps were associated with lower rates of hardware failure and infection requiring hardware removal. A formal orthoplastic team improves hardware-related outcomes.

10085 Flotillin-2 Associates with Proliferation and DNA Damage in Pancreatic Ductal Adenocarcinoma In Vitro

Jakob Hamilton , Ryan Thomas
Oncology Basic Science

Introduction: Upregulation of the lipid raft marker Flotillin-2 (FLOT-2) is associated with both a poor prognosis and enhanced genomic instability in several human cancers but its role in pancreatic ductal adenocarcinoma (PDAC) is not well characterized. We hypothesized that human PDAC cells would highly express FLOT-2 and lipid raft inhibition would reduce FLOT-2 expression while suppressing cell growth.

Methods: Plasma membrane (PM) lipid raft and whole cell (WC) lysate proteins were extracted from four human PDAC cell lines (BxPC-3, L3.6pl, MIAPaCa-2, PANC-1) with the Minute Plasma Membrane-Derived Lipid Raft Isolation Kit and FLOT-2 expression visualized by immunoblot. Lipid raft integrity was disrupted in the PDAC cell line with the greatest FLOT-2 expression using Dynasore in a dose- and time-dependent fashion after overnight serum starvation. Proliferation was measured using the alamarBlue Cell Viability assay. PM lipid raft protein levels and DNA damage were assessed by immunoblotting for FLOT-2 and γ H2AX, respectively.

Results: Human PDAC cells differentially expressed WC and PM lipid raft FLOT-2 protein, with L3.6pl and BxPC-3 displaying the highest and lowest expression, respectively. L3.6pl cells treated with Dynasore later demonstrated that WC FLOT-2 expression remained unchanged, while PM lipid raft FLOT-2 decreased by 50%. Dynasore reduced L3.6pl proliferation in both a dose- and time-dependent fashion, with the largest inhibition observed at 100 μ M and proliferation decreased by 23% ($p=0.02$), 45% ($p<0.001$), and 61% ($p<0.001$) after 24, 48, and 72 hours of exposure, respectively, compared to DMSO vehicle control. Three-fold increased expression of γ H2AX was also observed in a dose-dependent manner after 48 hours.

Conclusions: FLOT-2 is differentially expressed in PDAC cell lines in vitro and the reduced proliferation associated with its inhibition may result from concomitant DNA damage. Additional studies are planned to further assess the utility of planar lipid raft inhibition in the treatment of PDAC.

10070 Plasma extracellular vesicles released after burn injury associated with length of hospital stay in women.

Micah Willis , Robert Maile PhD

Acute Care/Trauma/Sepsis/Burns Clinical/Translational

Introduction: Extracellular microvesicles (MVs) have emerged as key regulators of immune function across multiple diseases and potential biomarkers. Severe burn injury is a devastating trauma with significant immune dysfunction that results in an ~12% mortality rate due to sepsis-induced organ failure, pneumonia, and other infections. Severe burn causes a biphasic immune response: an early (0-72 hrs) hyper-inflammatory state, with release of pro-inflammatory damage-associated molecular pattern molecules (DAMPs), such as HMGB1, and cytokines (e.g. IL-1 β), followed by an immunosuppressive state (1-2 weeks post injury), associated with increased susceptibility to life-threatening infections. We have reported that early after severe burn injury HMGB1 and IL-1 β are enriched in plasma microvesicles (MVs), suggesting a role for MVs in post-burn immune activation. Here we assessed if the cargo of MVs following burn injury in humans could predict length of hospital stay.

Methods: To test this hypothesis we used our in vivo model of burn injury and our biorepository of blood samples from human burn patients, admitted to the North Carolina Jaycee Burn Center and recruited into an IRB-approved repository protocol were collected and stored. EVs were isolated from plasma of human burn patients collected 0-72 h post injury and isolated from mice that underwent a 20% TBSA 72 h post injury.

Results: Unbiased LC-MS / MS proteomic analysis of early EVS (<72 h post-injury) showed differential expression of various proteins including similarities in human and mice. For example, we saw differential expression in Serum amyloid A-1 protein (Saa1) and various coagulation proteins shared within the first 72 hours after injury in both human and mice. In our sample of large burn injury, EV concentration and concentrations of SAA1 and CRP within the EVs correlated with TBSA injury in both sexes. EV concentrations of SAA1 and CRP were correlated with length of hospital stay in women.

Conclusions: These findings suggest that EVs are drivers of immune response following burn injury and their contents may be used as predictive biomarkers.

10067 Post-injury Pneumonia Induces a Unique Blood Microbiome Signature

Jennifer Munley , Alicia Mohr

Acute Care/Trauma/Sepsis/Burns Basic Science

Introduction: Previous preclinical studies have demonstrated an altered gut microbiome after traumatic injury; however, the impact of post-injury sepsis on gut epithelial permeability and particularly the consequent blood microbiome remains unknown. We hypothesized that a preclinical model of polytrauma with post-injury pneumonia would result in impaired gut permeability leading to specific blood microbiome arrays that may differ between sexes.

Methods: Male and proestrus female Sprague-Dawley rats (n=16/group) aged 9-11 weeks were subjected to either polytrauma (PT+PNA) (lung contusion, hemorrhagic shock, cecectomy, bifemoral pseudofractures) or PT plus 2-hours daily chronic restraint stress (PT/CS+PNA) with postinjury day 1 inoculation with pseudomonas pneumonia or naive controls. Infected cohorts were treated with twice daily imipenem. Whole blood microbiome was measured on day 2 using high-throughput 16S rRNA sequencing and QIIME2 bioinformatics analyses. Microbial alpha-diversity was assessed using Chao1 (number of different unique species) and Shannon (species richness and evenness) indices. Beta-diversity was assessed using principle coordinate analysis. Intestinal permeability was evaluated by plasma occludin and lipopolysaccharide-binding protein (LBP) assays. Pairwise comparisons were performed in 'R' or GraphPad, with significance defined as $p < 0.05$ between males versus females.

Results: PT+PNA and PT/CS+PNA had increased intestinal permeability with significantly elevated LBP and occludin in plasma compared to naïve ($p < 0.03$). Accordingly, bacteremia was not detected in naïve controls but both PT+PNA and PT/CS+PNA had bacteremia on day 2. The PT/CS+PNA blood biome showed dominance of Streptococcus compared to PT+PNA ($p < 0.01$). Females PT/CS+PNA had a significant abundance of Staphylococcus in the blood biome compared to male counterparts ($p < 0.01$).

Conclusions: Multicompartmental trauma with post-injury pneumonia results in increased intestinal permeability and bacteremia with a unique blood biome. In particular, sexual dimorphisms are evident in the blood biome after severe injury with unique bacterial species in males and females. These findings suggest that post-injury sepsis has clinical significance and could influence outcomes after severe trauma and critical illness.

10064 Black and Hispanic Disparities in Abdominal Aortic Aneurysm (AAA) Repair

Amin Mirzaie , Samir Shah

Vascular Clinical/Translational

Introduction: Abdominal aortic aneurysms (AAA) are a life-threatening condition. Racial disparities have been documented in an array of medical conditions. As such, we sought to determine if there were racial disparities in the presentation, repair strategy, and outcomes for surgically treated AAA in a contemporary national population. We hypothesized that Black and Hispanic patients would be more likely to present emergently and have worse postoperative outcomes compared to White patients.

Methods: We used the National Inpatient Sample (NIS) from 2016-2019 to identify all patients who received an open/endovascular repair for ruptured and non-ruptured AAA. We used United States Census data from 2016-2019 to identify the number of people over the age of 50 categorized by race: White, Black, and Hispanic. We performed univariate analyses and multivariable modeling using mixed-effects logistic and linear regression.

Results: Our final cohort included 30,678 patients. Black patients were 2 years younger than White and Hispanic patients (71 vs. 73 years old, $p < .0001$). Black patients had higher rates of peripheral vascular disease (PVD) and renal failure, while White patients had higher rates of chronic obstructive pulmonary disease (COPD) (all $p < .0001$). Black patients were also twice as likely as White patients to live in the lowest income quartile (52.1% vs 25%, $p < .0001$). AAA repair rates (/100,000 people) varied significantly with race: White patients received AAA repair at twice the rate of Black patients and nearly three times the rate of Hispanic patients (38.7 vs. 17.2 vs 13.3, $p < .0001$); This racial pattern was also seen for both ruptured (3.2 vs. 1.6 vs. 1.2, $p < .0001$) and non-ruptured (35.5 vs. 15.6 vs. 12.2, $p < .0001$) AAA repairs. There was no significant racial difference in AAA repair strategy, $p = .213$. Black and Hispanic patients had more urgent/emergent presentations than White patients (36.1% vs. 34.8% vs. 21.6%, $p < .0001$). Multivariable modeling showed no difference in in-hospital mortality or postoperative complications. However, on average, Black patients had a 10.2% longer post-operative length of stay (LOS) than Whites (95%CI 7.25-13.4%, $p < .0001$).

Conclusions: These national data demonstrate lower rates of ruptured and unruptured AAA repair among Black and Hispanic patients, who were also more likely to present urgently/emergently. Moreover, Black patients were younger, disproportionately came from lower-income areas, and had higher rates of PVD and renal failure. While repair strategy did not vary by race, Black patients had longer LOS. Future efforts should focus on understanding the relative contributions of differences in underlying AAA incidence and disparities in AAA diagnosis and surveillance.

10061 BMP-6 Promotes Type 2 Immune Response During Enhancement of Rat Mandibular Bone Defect Healing

Xizhao Chen MD, Abhijit Dighe Ph.D.
Plastic Surgery Basic Science

Introduction: Bone morphogenetic proteins (BMPs) are used as key therapeutic agents for the treatment of difficult fractures. While their effects on osteoprogenitors are known, little is known about their effects on the immune system.

Methods: We used permutations of BMP-6 (B), vascular endothelial growth factor (V), and Hedgehog signaling pathway activator smoothed agonist (S), to treat a rat mandibular defect and investigated healing outcomes at week 8, in correlation with the cellular landscape of the immune cells in the fracture callus at week 2.

Results: Maximum recruitment of immune cells to the fracture callus is known to occur at week 2. While the control, S, V, and VS groups remained as nonunions at week 8; all BMP-6 containing groups - B, BV, BS and BVS, showed near-complete to complete healing. This healing pattern was strongly associated with significantly higher ratios of CD4 T (CD45+CD3+CD4+) to putative CD8 T cells (CD45+CD3+CD4-), in groups treated with any permutation of BMP-6. Although, the numbers of putative M1 macrophages (CD45+CD3-CD11b/c+CD38high) were significantly lower in BMP-6 containing groups in comparison with S and VS groups, percentages of putative - Th1 cells or M1 macrophages (CD45+CD4+IFN-g+) and putative - NK, NKT or cytotoxic CD8T cells (CD45+CD4-IFN-g+) were similar in control and all treatment groups. Further interrogation revealed that the BMP-6 treatment promoted type 2 immune response by significantly increasing the numbers of CD45+CD3-CD11b/c+CD38low putative M2 macrophages, putative - Th2 cells or M2 macrophages (CD45+CD4+IL-4+) cells and putative - mast cells, eosinophils or basophils (CD45+CD4-IL-4+ cells). CD45- non-haematopoietic fractions of cells which encompass all known osteoprogenitor stem cells populations, were similar in control and treatment groups.

Conclusions: This study uncovers previously unidentified regulatory functions of BMP-6 and shows that BMP-6 enhances fracture healing by not only acting on osteoprogenitor stem cells but also by promoting type 2 immune response.

10027 Sex-Specific Differential Expression of Exosomal miRNA Following Severe Trauma

Jennifer Munley , Alicia Mohr

Acute Care/Trauma/Sepsis/Burns Basic Science

Introduction: Severe trauma disrupts bone marrow function and is associated with persistent anemia and altered hematopoiesis. Previously, plasma-derived exosomes isolated after trauma have been shown to suppress in vitro bone marrow function. However, the cargo contained in these vesicles has not been studied. We hypothesized that trauma plasma-derived exosomes exhibit microRNA (miR) changes that impact bone marrow function after severe injury.

Methods: Plasma was collected from a prospective, cohort study of trauma patients (n = 15; 7 males, 8 females) with hip and/or femur fractures and an injury severity score (ISS) ≥ 15 ; elective total hip arthroplasty (THA) patients (n = 8; 4 males, 4 females) served as operative controls. Exosomes were isolated from plasma with the Invitrogen Total Exosome Isolation Kit and RNA was isolated using a miRNeasy Mini Kit. Direct quantification of miRNA was performed by NanoString Technologies on a human miRNA gene panel and analyzed with nSolver with significance defined as $p < 0.05$.

Results: There were no differences in age or sex distribution between trauma and THA groups; the average ISS was 23. Trauma plasma-derived exosomes had 60 miR identities that were significantly downregulated and 3 miR upregulated when compared to THA ($p < 0.05$). Thirteen miR have a direct role in hematopoiesis regulation, including miR-223 and miR-451a. Further, male trauma plasma-derived exosomes demonstrated downregulation of 150 miR compared to male THA ($p < 0.05$). Female trauma plasma-derived exosomes demonstrated downregulation of only four miR and upregulation of two miR compared to female THA ($p < 0.05$).

Conclusions: We observed sexual dimorphism in miR expression from- plasma-derived exosomes following severe trauma. Understanding sexually dimorphic miR expression provides new insight into sex-based changes in postinjury systemic inflammation, immune system dysregulation, and bone marrow dysfunction and will aid us in more precise future potential therapeutic strategies.