MARCH 18-20

CELEBRATING 70 years 1952-2022

LOUISIANA CHAPTER
2022 ACS ANNUAL MEETING

MINI ABSTRACTS

New Orleans, LA f:@LouisianaACS t:@LA_ACS #LAACS2022 LAACS.org

PROMININ 1 - EXPRESSING HEPATIC PROGENITOR CELLS PROMOTE LIVER FIBROGENESIS VIA MMP-7 MEDIATED SIGNALING PATHWAYS DURING CHOLESTATIC LIVER INJURY

Celia Short, MD, Allen Zhong, MD, Jiabo Xu, BS, Kinji Asahina, Phd and Kasper S. Wang, MD, LSU Health - New Orleans

Background: In Biliary Atresia (BA), intrahepatic biliary fibrosis commonly progresses to cirrhosis despite treatment. Matrix Metalloprotease-7 (MMP7) expression has been strongly linked to BA. We previously demonstrated that Prominin-1 (Prom1)-expressing hepatic progenitor cells (HPCs) give rise to profibrogenic intrahepatic ductular reactions associated with cholestatic injury, such as with BA.

Objective: Hypothesis: Prom1+ HPCs and their lineage express MMP7 as part of signaling pathway activation associated with fibrogenesis.

Methods: RNA-Seq transcriptomic analysis was performed on PROM1-expressing HPCs from wildtype mice (WT), and their GFP-expressing progeny isolated from tamoxifen-treated Prom1Cre-Ert2;Rosa26Gfp C57BL/6J mice, after bile duct ligation (BDL, vs sham). BDL was also performed following targeted Diphtheria (DTA)-mediated ablation of Prom1-expressing cells in Prom1Cre-Ert2;Rosa26Dta transgenic mice with further analysis via qPCR.

Results: RNA-Seq analysis revealed top canonical pathways including leukocyte adhesion/diapedesis, hepatic fibrosis signaling, colorectal cancer metastasis signaling, and tumor microenvironment pathway. Mmp7 was significantly upregulated in BDL across the abovementioned canonical pathways. Mmp7 expression was significantly upregulated in PROM1+ HPC 5.79-fold with a False Discovery Rate (FDR)=0.008 and in GFP+ lineage of Prom1-expressing cells 18.41-fold, FDR=0.003 compared to sham. DTA-mediated ablation of Prom1-expressing cells resulted in decreased Collagen-1α (Col1a) expression following BDL compared to BDL alone (0.34±0.54 vs 7.55±4.26, p=0.002) similar to sham (0.60±0.40, p=0.96). Mmp7 was also lower in DTA/BDL ablated mice compared to BDL alone, but not significantly (0.17±0.17 vs 1.13±1.2, p=0.43).

Conclusion: Prom1-expressing HPCs may promote fibrogenesis during cholestatic liver injury in part via activation of MMP7-mediated pathways.

PAN-CANCER STUDY ON VARIANTS IN CANONICAL MIRNA BIOGENESIS PATHWAY COMPONENTS: AWAKEN THE DORMANT BEAST

Eman A. Toraih, Rami M. Elshazli, Mohammad H. Hussein, Emmanuelle Ruiz, Emad Kandil, Manal S. Fawzy, Tulane School of Medicine

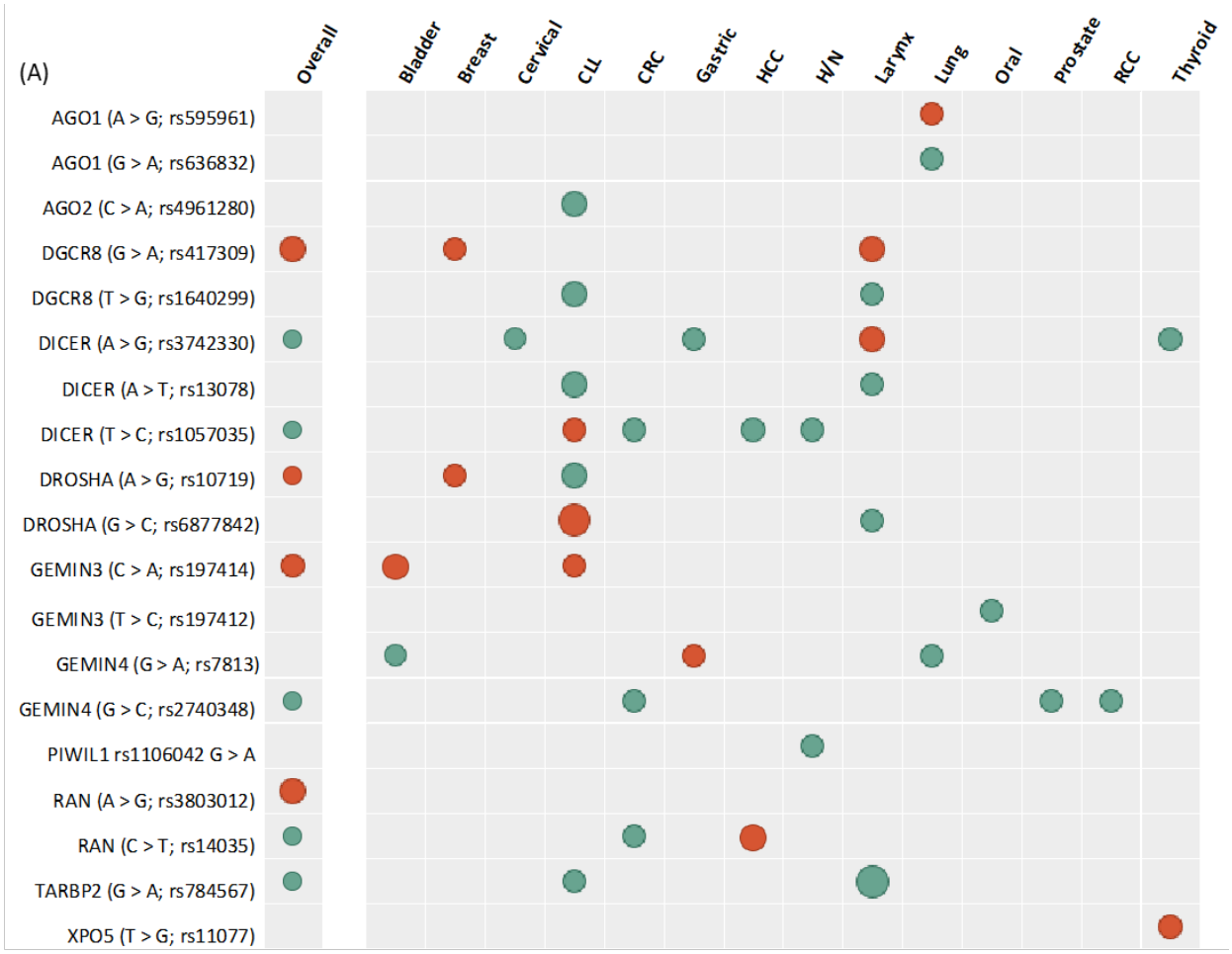
Background: MicroRNAs (miRNAs) have emerged as key players that promote the development and progression of human cancers via modulating tumor suppressive and oncogenic mRNAs. Single nucleotide polymorphisms (SNPs) in genes involved in the miRNA processing and maturation may deregulate the overall expression levels of microRNAome.

Objective: We conducted a meta-analysis to assess the associations of these genetic variants with human cancer risk and applied integrative bioinformatics methods to identify the role of these genes in cancer aggressiveness.

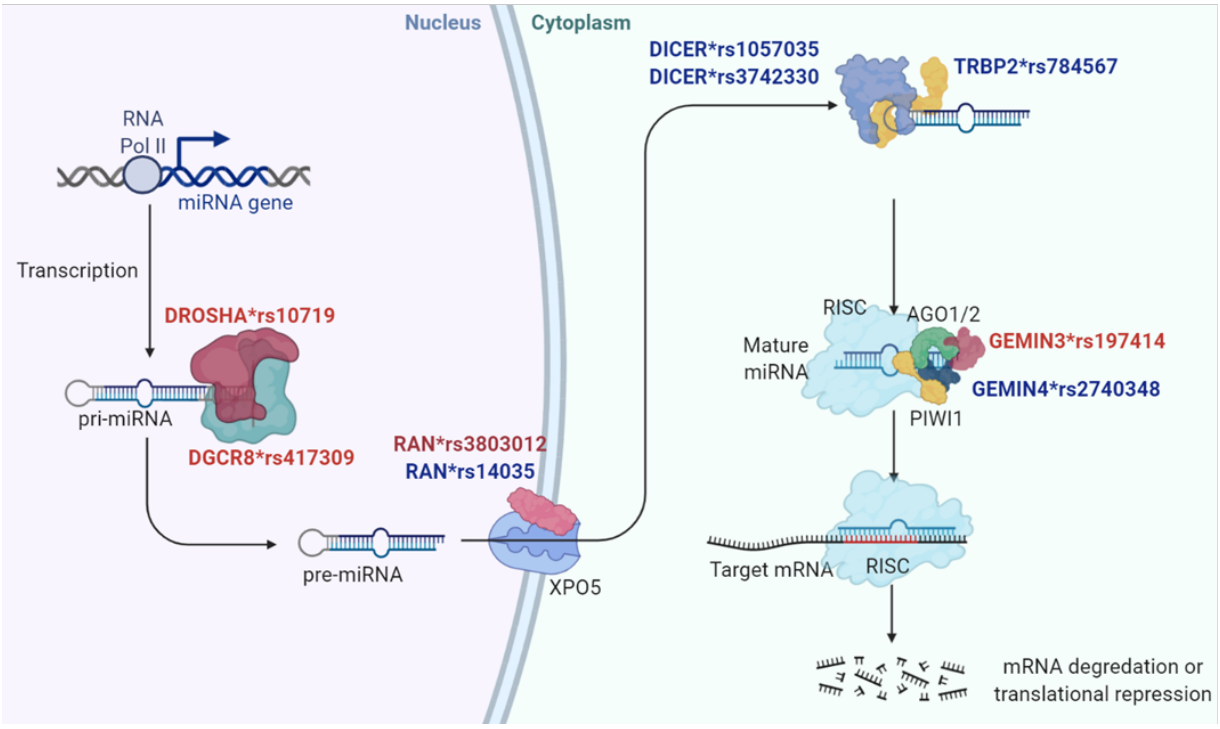
Methods: Mutation of 8176 pan-cancer samples were retrieved from 33 studies in The Cancer Genome Atlas (TCGA) database and cox regression model for survival was performed. Next, 22 computationally identified variants within 11 genes were selected based on the high citation rate and minor allele frequencies. Relevant articles through March 2020 were included. Pooled estimates under the five genetic association models were calculated. Heterogeneity between articles and publication bias were evaluated. Trial Sequential Analysis (TSA) was applied to assess the power and reliability of drawn conclusions.

Results: The TCGA patients with different cancer types revealed significant alterations in these miRNA machinery genes, with mutation frequency ranging from 0.6% to 13% of samples. RAN gene was associated with lymph node metastasis (OR=3.31, 95%CI=1.15-9.55, p=0.03), while TARBP2 (HR=0.42, 95%CI=0.21-0.85, p=0.015) and PIWIL1 (HR=0.71, 95%CI=0.54-0.93, p=0.014) gene mutations exhibited better overall survival. In the meta-analysis, 45 articles (74593 cases and 89198 controls) met the eligibility criteria. Pooled analysis revealed an increased cancer risk with DROSHA rs10719*G (OR=1.19, 95%CI=1.01-1.41, p=0.043), RAN rs3803012*G (OR=1.93, 95%CI=1.03-3.61, p=0.040), DGCR8 rs417309*A (OR=2.58, 95%CI=1.47-4.51, p=0.001), and GEMIN3 rs197414*A (OR=1.72, 95%CI=1.05-2.83, p=0.030). In contrast, both DICER1 rs1057035*T (OR=0.89, 95%CI=0.81-0.98, p=0.017) and GEMIN4 rs2743048*G (OR=0.91, 95%CI=0.84-0.98, p=0.021) conferred protection against developing cancer. TSA showed that the cumulative evidence is inadequate, and the addition of further primary studies are necessary to validate the outcomes.

Conclusion: In summary, this study suggests a potential role of the miRNA biogenesis genes in cancer forewarning and prognosis. Further functional studies might reveal biological explanation for the differential risk of these genetic variants in the context of different cancer types.


(A)
Overall
Bladder
Breast
Cervical
CLL
CRC
Gastric
HCC
H/N
Larynx
Lung
Oral
Prostate
RCC
Thyroid
AGO1 (A > G; rs595961)
AGO1 (G > A; rs636832)
AGO2 (C > A; rs4961280)
DGCR8 (G > A; rs417309)
DGCR8 (T > G; rs1640299)
DICER (A > G; rs3742330)
DICER (A > T; rs13078)
DICER (T > C; rs1057035)
DROSHA (A > G; rs10719)
DROSHA (G > C; rs6877842)
GEMIN3 (C > A; rs197414)
GEMIN3 (T > C; rs197412)
GEMIN4 (G > A; rs7813)
GEMIN4 (G > C; rs2740348)
PIWIL1 rs1106042 G > A
RAN (A > G; rs3803012)
RAN (C > T; rs14035)
TARBP2 (G > A; rs784567)
XPO5 (T > G; rs11077)

(B)


Nucleus
Cytoplasm
RNA
Pol II
miRNA gene
Transcription
DROSHA*rs10719
pri-miRNA
DGCR8*rs417309
pre-miRNA
RAN*rs3803012
RAN*rs14035
XPO5
DICER*rs1057035
DICER*rs3742330
TRBP2*rs784567
RISC
AGO1/2
Mature
miRNA
GEMIN3*rs197414
GEMIN4*rs2740348
PIWI1
Target mRNA
RISC
mRNA degredation or
translational repression

Mini-Talk I | Abstract | Education Science | General Surgery

START (SHOCK TREATMENT AND RESUSCITATION TEAM) ACTIVATIONS IN A UNIVERSITY GENERAL SURGERY PROGRAM

Beatriz Briones, MD, Kathryn Richardson,MD, LSU Health - Shreveport

Background: The activation rapid response team is a call for additional assistance at the floor patient's bedside. At our institution, this team is the Shock Treatment And Resuscitation Team (START). The START team consists of a medical critical care nurse, a respiratory therapist, the patient's floor nurse and Physician. At our institution, START criteria are Systolic blood pressure less than 90, heart rate less than 40 or greater than 130, respiratory rate less than 10 or greater than 30, Oxygen saturation less than 90% on supplemental oxygen or requirement for greater than 50% oxygen, urine output less than 50cc for 4 hours, acute significant bleeding, altered mental status, Dr Stroke. In addition, any nurse or physician can call START for concerns about a patient to summon help. The goal is early intervention to prevent clinical deterioration, stabilize the patient, or facilitate transfer to a higher level of care.. The ultimate goal is no cardiorespiratory arrests outside of the ICU, ER or OR. The purpose of this study was to see if START was effective in preventing Codes outside the ICU and secondarily to identify opportunities for improvement where a START might have been avoided.

Objective: Is there opportunity for improvement or areas where early intervention can prevent the need for START activation?

Methods: This is an IRB approved Quality improvement project to review patient charts admitted to Ochsner LSU Health. Inclusion criteria included all patients who were admitted to General Surgery and had a START activation during the 20 month interval of January 1, 2018 through August 30, 2020. Charts were reviewed for admitting service, day of week, and nursing shift when START activation occurred. Progress notes, labs, vital signs, nursing, physician, nurse practitioner notes, and respiratory therapist notes were reviewed to identify if there was opportunity for improvement, where intervention sooner might have prevented need for the START activation.

Results: During this interval, a total of 80 START activations were identified involving General Surgery patients. They were equally distributed among days of week and nursing shifts. Forty nine (61.25%) of these patients were admitted to the trauma service. Thirteen (16.25%) patients were admitted to vascular service. Seven (8.75%) patients were admitted to each general surgery and surgical oncology. Reasons for Start percentages listed: 37% respiratory distress/hypoxia, 32% abnormal vitals, 4% Dr Stroke, 27% nurse concern. There were 3 deaths: one immediate, one patient transitioned to comfort care and one died 5 days later. Twenty-two patients (27.5%) had opportunity for improvement (OFI). Eleven (13.75%) patients could have early intervention that might have prevented START activation. Only one START was for a surgical problem (hemorrhage). All others were medical interventions: abnormal labs or lab trends, restart home medications/dialysis/oxygen, over sedation requiring narcan administration, recognition of lethargy/altered mental status. The patient that died 5 days later had Opportunity for improvement and Start activation could have been done the day before for respiratory distress.

Conclusion: START activation was effective in preventing codes outside of the ICU. Care was escalated such that 42 patients were moved to ICU/SD and 38 patients were managed on the floor. There was no opportunity for improvement found in 58 patients. In twenty two patients, (27.5%), START activations there were recognized opportunities for improvement where providers could have intervened earlier by: recognizing abnormal labs, restarting home medications/dialysis/O2, better monitoring after narcan administration, or recognizing lethargy/altered mental status. The hospital program has instituted protocols for START nurse proactive chart reviews in an attempt to decrease all START activations.

OBSTETRIC TRAUMA: A PROPENSITY-SCORE MATCHED ANALYSIS

Ayman Ali, Danielle Tatum, Jessica Sedhom, Jacob Broome, Patrick McGrew, Juan Duchesne, Sharven Taghavi, Tulane School of Medicine

Background: Trauma represents the leading cause of non-obstetrical maternal death. How in-hospital outcomes of acutely injured pregnant patients (PP) compares to that of similarly aged non-pregnant controls has not been described. We hypothesized that PPs suffering acute traumatic injuries would have worsened outcomes when compared to a matched control group (CG).

Objective: To compare outcomes between pregnant vs. control patients after acute traumatic injuries.

Methods: The American College of Surgeons Trauma Quality Improvement Program (TQIP) was used to identify female patients of any age with traumatic injury in 2017. 1:1 Propensity score matching on age, race, injury severity score (ISS), and type of trauma (blunt, penetrating, or other) was used to compare PPs and the CG. Primary outcomes were mortality, disposition, length-of-stay, imaging use, and complications.

Results: A total of 397,701 women were identified, 322 of whom were identified as pregnant. Our matched sample included 294 patients in the PP and CG cohorts. After matching, PPs had longer length of stay (6 days versus 3, $p=0.005$), although days receiving mechanical ventilation or days in the ICU, if necessary, were not significantly different between groups. From the emergency room, PPs were more likely to proceed directly to the operating room (38.2% vs. 14.5%, $p<0.001$) and received significantly more ultrasound imaging (65.3% of patients vs. 39.1%, $p<0.001$)although CT scan, MRI, and plain film use was comparable between groups. PPs had comparable incidence of all complications, including intubation, acute respiratory distress syndrome (ARDS) sepsis, stroke, and pulmonary embolism or deep vein thrombosis.

Conclusion: After acute trauma, PPs did not have increased mortality or complications when compared to matched controls, although they were more likely to directly proceed to the OR and have longer length-of-stays.

A RETROSPECTIVE REVIEW OF MISSED BOWEL INJURIES IN BLUNT AND PENETRATING ABDOMINAL TRAUMA

Clement A, Gold L, Stuke L, Greiffenstein P, Schoen J, Hunt J, Marr A, Smith A., LSU Health - New Orleans

Background: The occurrence of a bowel injury following a blunt abdominal trauma is relatively rare; nevertheless, a missed diagnosis and delayed treatment is associated with high morbidity and mortality. As a result of this infrequency, clinical expertise and rapid diagnoses are limited. Bowel injuries require immediate operative intervention to avoid complications such as infection, enterocutaneous fistulas, sepsis, massive bleeding, prolonged intensive care, repeat surgery, and mortality. Traumatic bowel injuries can be diagnosed with computed tomography (CT) imaging, exploratory laparotomy, or diagnostic laparoscopy. Surgical decision making is based on a combination of clinical signs and imaging. In patients without an immediate need for surgical intervention, a combination of CT “hard signs” and “soft signs” of a bowel injury can be used within the context of the patient's clinical picture to decide if surgery is warranted or not.

Objective: Due to the wide variability in the literature of the management of patients with blunt and penetrating abdominal trauma and the lack of expertise in bowel injury diagnosis, we chose to refine a protocol for the management of these patients at UMCNO. This standardized approach to monitoring patients with a possible bowel injury is expected to decrease the time to diagnosis and reduce the morbidity and mortality associated with delayed diagnosis.

Methods: In this retrospective review, 124 adult patient charts from July 2012 through Feb 2022 at UMCNO presenting with blunt or penetrating abdominal trauma and a resulting bowel injury were evaluated to identify delayed and missed diagnoses. For this study, delayed diagnosis was defined as 4-24 hours after the patient was received in the care of the trauma team, and a missed diagnosis was defined as any delay in diagnosis greater than 24 hours.

Results: Of the 124 patients with a blunt or penetrating abdominal trauma and a resulting bowel injury, 16 patients were identified as having either a delayed or missed bowel injury. 9 of these patients experienced complications such as surgical site infections, sepsis, enterocutaneous fistulas, and increased hospital length of stays due to delayed onset of treatment.

Conclusion: Based on the patterns from this chart review and supporting literature, we refined a protocol for management of patients with blunt or penetrating abdominal trauma and a possible bowel injury. In future investigations, we plan to apply this decision making protocol into clinical practice in the UMCNO trauma surgery department and evaluate its efficacy in decreasing delayed and missed bowel injuries and decreasing morbidity and mortality associated with delayed diagnosis.

THE RACIAL AND SEXUAL DISPARITY IN EMERGENCY DEPARTMENT VISITS FOR SPINE FRACTURE INJURIES: A NEISS DATABASE STUDY

Mariam ElNaggar, Ali Hussein, Forat Koreish, Mohammad Hussein, Eman Toraih, School of Pharmacy

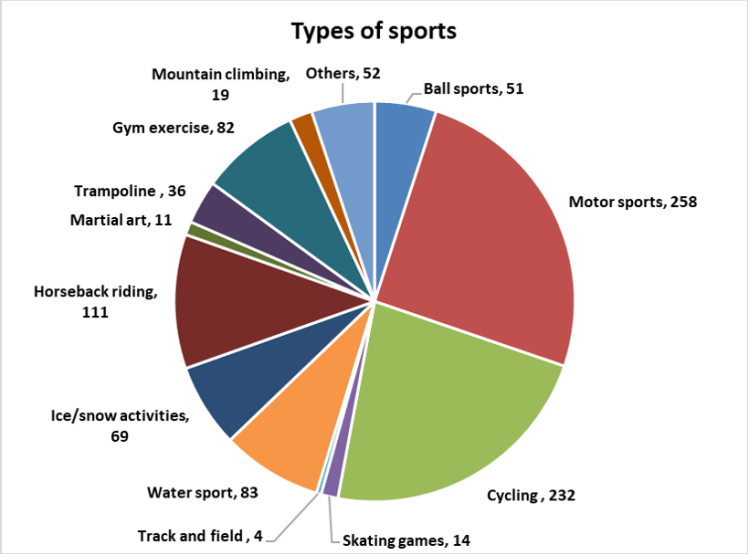
Background: As the frequency of sports-related injuries continues to climb in the United States, it is essential to identify populations at the highest risk for spine fracture injuries due to sports activities.

Objective: We aimed to identify the types of sports causing hospitalization for spine fracture injuries.

Methods: The National Electronic Injury Surveillance System (NEISS) database was examined for spine injuries from 2011-2020. NEISS is a nationally representative sample of hospitals in the U.S. Patients were categorized according to their gender and race. Regression models were employed to identify patients at high risk for injury.

Results: There was a total of 1,002 meeting inclusion criteria, with 366 (35.8%) at the sporting venue and 197 (19.3%) in the street. Fractures at the cervical spine (N=404, 39.5%) and lumbar spine (N=3, 35%) were the most common diagnoses, followed by thoracic (N=280, 27.4%) and sacral levels (N=80, 7.8%). Multiple level fracture accounted for 9%, and spinal cord injury was represented in 2.4%. Females were more likely to have neck fractures (44.7% vs. 28.1%, p<0.001), while males had more frequent lumbosacral injuries (58.6% vs. 34.8%, p<0.001). Motorsports (29.9% vs. 14.8%) and cycling (26.7% vs. 13.9%) were the most prevalent sports activities leading to spine fracture injury in females, whereas horseback riding was the most fracture cause in males (28.7% vs. 2.8%), p<0.001. Asian populations were more likely to have multiple level fractures (22.7% vs. 11% White and 7.4% African American, p=0.003). There were no fatalities reported in the injured patients. Regression analysis revealed females were more likely to have neck fracture (OR=1.72, 95%CI=1.12-2.64, p=0.013), while males had higher odds of having sacral fracture (OR=3.51, 95%CI=1.84-6.7, p<0.001). Multivariate analysis showed adolescents had three times more risk of spinal cord injury (OR=3.2, 95%CI=1.24-8.4, p=0.016).

Conclusion: Females had an increased risk of cervical fracture, while males had lower trunk injuries warranting hospitalization. Safety standards at different types of sports may help prevent spine fracture injuries in the U.S.



LAPAROSCOPIC COLECTOMY FOR ACUTE DIVERTICULITIS IN THE URGENT SETTING IS ASSOCIATED WITH SIMILAR OUTCOMES TO OPEN

Hajirawala, Luv; Moreci, Rebevva; Leonardi, Claudia; Bevier-Rawls Elyse; Orangio, Guy; Davis, Kurt; Barton, Jeffrey; Klinger, Aaron, LSU Health - New Orleans

Background: Diverticular disease is common and is associated with substantial morbidity as well as considerable medical costs. The role of minimally invasive surgery (MIS) for the surgical treatment of diverticular disease is evolving.

Objective: The aim of this study is to compare the outcomes of MIS colectomy to those of open surgery for patients with acute diverticulitis requiring urgent surgery.

Methods: The ACS NSQIP database was queried for all patients undergoing an urgent colectomy for acute diverticulitis between 2013 and 2018. The patients were then divided into two groups: MIS and Open. Baseline characteristics and short-term outcomes were compared using univariable and multivariable regression analyses.

Results: 3,487 patients were included in the analysis. Of these, 1,272 (36.5%) underwent MIS colectomy, and 2,215 (63.5%) underwent open colectomy. Patients undergoing MIS colectomy were younger (58.7 vs 61.9 years), and less likely to be ASA III (52.5 vs 57.9%) or IV (6.3 vs 10.5%). After adjusting for baseline differences, the odds of mortality for MIS and open groups were similar. While there was no difference in short-term complications between groups, the odds of developing an ileus were lower following MIS colectomy (OR 0.61, 95%CI: 0.49, 0.76). Both total length of stay (LOS) (12.3 vs 13.9 days) and post-operative LOS (7.6 days vs 9.5 days) were shorter for MIS colectomy. MIS colectomy added an additional 40 minutes of operative time (202.2 vs. 160.1 min).

Conclusion: MIS colectomy appears to be safe for patients requiring urgent surgical management for acute diverticulitis. Decreased incidence of ileus and shorter LOS may justify any additional operative time for MIS colectomy in suitable candidates.

Mini-Talk III | Video Submission | Clinical Science | Bariatric Surgery

ROBOTIC CONVERSION OF RETROCOLIC GASTRIC BYPASS TO SINGLE-ANASTOMOSIS DUODENO-ILEAL BYPASS

Mohamed A. Aboueisha ,Michael Z. Caposole, Meredith Freeman, Leah Evan, Shauna Levy, Carlos Galvani, John W. Baker, Tulane School of Medicine

Background: This is a video narrative of a 48-year-old female with lifelong obesity who had weight gain after previous roux-en-y gastric bypass surgery. She is taken to the operating room for a revision via a robot-assisted, modified, single-anastomosis duodeno-ileal (mSADI) bypass.

Objective: The technique is presented and described.

Methods: A Robotic-assisted Revisional Procedure

Results: A 48-year-old female with a history of lifelong obesity who underwent a roux en y gastric bypass in 2005, presented to our bariatric clinic with a chief complaint of weight gain. She weighed 350lbs at the time of her initial surgery and lost 100lbs in the post-operative period. She was able to maintain her weight loss for roughly 8 years. However, she stated that roughly 5 years before presenting to us, she started gaining weight back. On our initial exam, she weighed in at 315lbs with a BMI of 53. An EGD was performed which showed a 6cm pouch with a large amount of retained fundus as well as an enlarged gastrojejunal anastomosis up to 5cm. At this time, the author made the decision to proceed with a robotic-assisted modified single anastomosis duodeno-ileal bypass for the revision.

Conclusion: The patient Tolerated the Operation Well and was transported to the recovery room in a stable condition

A 5-YEAR PROPENSITY-MATCHED ANALYSIS OF PERIOPERATIVE OUTCOMES IN PATIENTS WITH CHRONIC KIDNEY DISEASE UNDERGOING BARIATRIC SURGERY

Leah M. Evans, Mohamed A. Aboueisha, Meredith Freeman, Michael Z. Caposole, John W. Baker, Carlos Galvani, Shauna Levy, Tulane School of Medicine

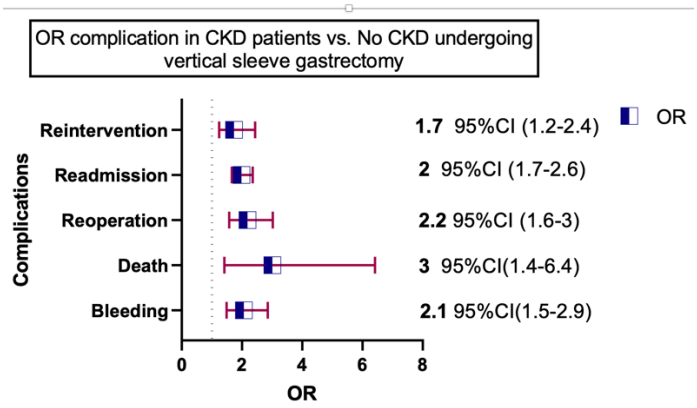
Background: Bariatric surgery can improve renal function in patients with comorbid chronic kidney disease (CKD) and obesity. Additionally, bariatric surgery can facilitate better outcomes following renal transplantation in patients with obesity. The safety of bariatric surgery in patients with CKD has been previously debated in the literature. This study evaluates the frequency of perioperative complications associated with CKD in patients undergoing primary bariatric surgery.

Objective: To determine perioperative outcomes in patients with CKD undergoing bariatric surgery.

Methods: The MBSAQIP database was queried from 2015-2019. Patients were included if they had Sleeve gastrectomy (VSG) or Roux-en-Y gastric bypass (RYGB) and were stratified based on CKD status. An unmatched and propensity-matched analysis was performed comparing perioperative outcomes between the groups.

Results: From 2015-2019, MBSAQIP showed that 61% of the patients underwent VSG and 25% underwent RYGB with a total of 717809 patients included in this study, 5817 (0.8%) had CKD, of whom 2266 (0.3%) were on chronic dialysis. 74.3% of patients with CKD underwent VSG while 25.7% underwent RYGB. In matched analysis comparing RYGB to VSG, patients who underwent RYGB had a higher rate of deep organ space infection (0.7%vs. 0.1%, OR, 5; 95%CI (1.1-22.9),p=0.021) and re-intervention (2.2%vs. 5.0%,OR,2.3; 95%CI(1.5-3.5),p<0.001). Within the VSG cohort, a matched analysis was performed for those with CKD and without CKD. The CKD cohort had higher risk of complications such as bleeding (2.1% vs. 0.9%,OR,2.1; 95%CI(1.5-2.9),p<0.001), readmission (9.3% vs. 4.9%,OR, 2; 95%CI(1.7-2.6),p<0.001), reoperation (2.7% vs. 1.3%,OR, 2.2; 95%CI(1.6-3),p<0.001) and need for reintervention (2.2% vs. 1.3%,OR,1.7; 95%CI(1.2-2.4),p<0.001). Notably, patients with CKD also had a higher mortality (0.6%vs. 0.2%, OR, 3; 95%CI (1.4-6.4), p=0.003). Furthermore, dialysis didn't show any significant effect on perioperative outcomes.

Conclusion: VSG has been the operation of choice in patients with CKD. Our results showed it is the safer option in patients with CKD when compared to RYGB. Although this patient population does have an increased risk of adverse perioperative events, dialysis didn't affect the outcome. Bariatric surgeons who choose to operate on patients with CKD should be well informed and remain vigilant given the increased perioperative risk. The risk is still considerably low and given the potential benefit on renal function and improvement in candidacy for renal transplant, they should be considered as surgical candidates.



PREDICTING THE RISK OF A SECOND PRIMARY THYROID CANCER AFTER SURVIVING A MALIGNANCY: A LATENCY TREND ANALYSIS OVER FOUR DECADES

Lauren Mueller, BA, Muhib Haidari, BS, Lily N. Trinh, MD, Eman Toraih, MD, PhD, MSc, Mohammad Hosny Hussein, PhD, Emad Kandil, MD, MBA, Tulane University School of Medicine

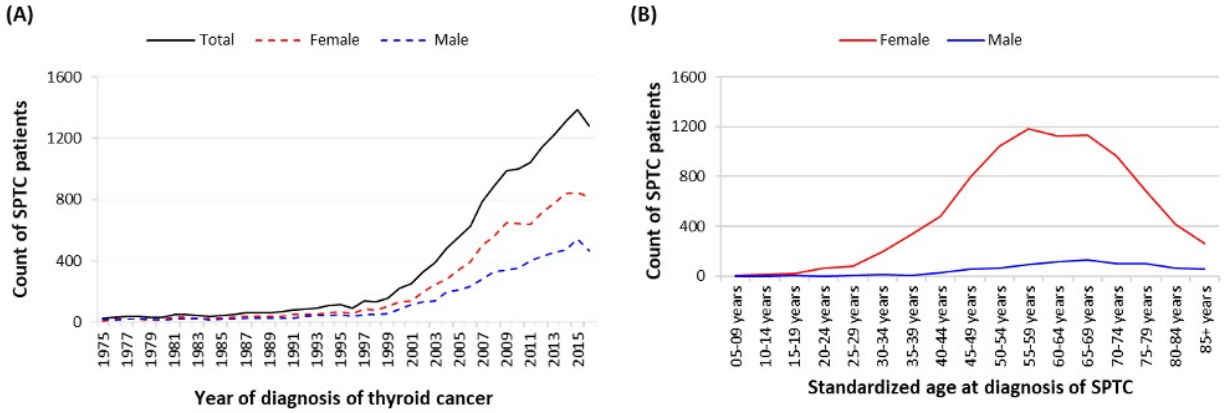
Background: Patients who survive primary cancer (PC) have a higher risk of developing second primary thyroid cancer (SPTC), but the differential effect on survival is understudied and poorly understood.

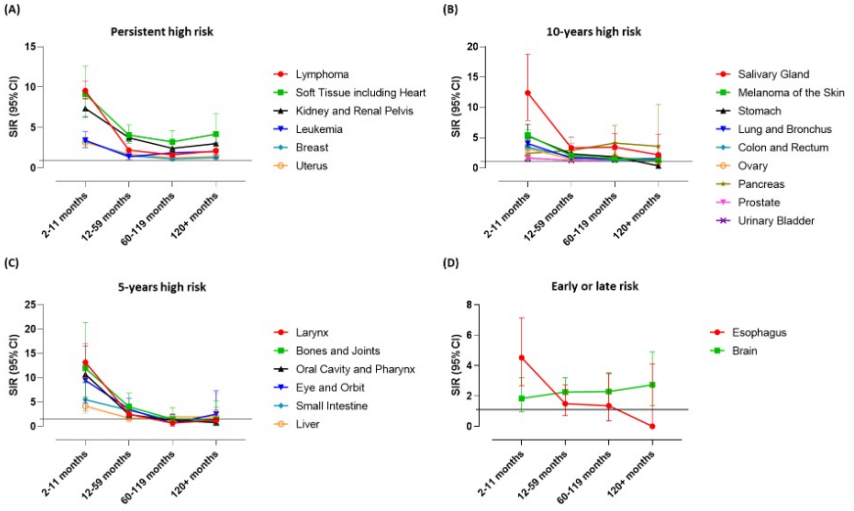
Objective: We aimed to (1) define the site-distributed patterns of primary cancer and their latency trends, (2) identify risk factors for developing subsequent SPTC, and (3) develop and evaluate a risk model that predicts survival for each malignancy before developing second primary thyroid cancer.

Methods: Patients with SPTC who survived primary malignancies, diagnosed from 1975 to 2016, were identified from the Surveillance, Epidemiology, and End Results (SEER) database (SEER 18 Registry). All primary cancer sites were selected using the multiple primary standardized incidence ratios (MP-SIR) session. Risk factors were identified by a multivariate Cox proportional regression hazard analysis and further evaluated by latent class analysis.

Results: A total of 7,586,281 records with cancer were reviewed: 33,551 cancer cases linked to 15,620 STPC individuals, 9,730 (62.3%) women and 5,833 (37.7%) men, were enrolled in the final analysis. Individuals with a primary malignancy were at a significant 90% increased risk of SPTC (SIR = 1.90, 95%CI = 1.86–1.93) compared with the general population. The risk and timeline of developing an SPTC varied among cancer sites, type of first malignancy, patient demographics, and exposure to chemotherapy. Elevated risks were observed after soft tissue sarcomas (SIR = 4.51, 95%CI = 3.79-5.33), head and neck tumors (SIR = 3.1, 95%CI = 2.77-3.46), and hematological malignancies such as extranodal Hodgkin lymphoma (SIR = 4.25, 95%CI = 1.16-10.88). Other indications for increased risk include male sex, Asian/Pacific Islander ethnicity, young age, and use of chemotherapy as treatment for the first malignancy. A model for the latency period of SPTC identified persistent high risk, 10-year risk, 5-year risk, and persistent low risk for the development of SPTC according to each type of first primary cancer.

Conclusion: Our analysis of survivors of solid and hematological malignancies suggests that these individuals have a higher risk of SPTC. Lifelong follow-up and a high index of suspicion for second primary cancers are warranted. Our latency period model identifying risk according to each type of primary cancer may aid clinicians in identifying patients at risk of developing SPTC and may guide them in developing a follow-up plan according to the latency period attributed to a patient's primary cancer.





Supplementary Table S2. Latency trend in different cancer sites.

Primary cancer site	2-11 months			12-59 months			60-119 months			120+ months		
	SIR	LL	UL	SIR	LL	UL	SIR	LL	UL	SIR	LL	UL
All Sites	4.06	3.91	4.22	1.75	1.7	1.81	1.36	1.30	1.42	1.39	1.29	1.49
Lymphoma	9.56	8.49	10.7	2.21	1.94	2.51	1.63	1.36	1.94	2.12	1.64	2.7
Soft Tissue including Heart	9.13	6.43	12.6	4.08	3.07	5.33	3.24	2.18	4.62	4.19	2.44	6.71
Kidney and Renal Pelvis	7.37	6.25	8.63	3.74	3.30	4.22	2.44	2.01	2.94	3.02	2.21	4.03
Leukemia	3.43	2.54	4.54	1.40	1.08	1.79	1.89	1.42	2.47	2.03	1.26	3.11
Breast	3.38	3.11	3.67	1.52	1.42	1.61	1.13	1.03	1.23	1.29	1.14	1.47
Uterus	3.18	2.61	3.83	1.71	1.49	1.96	1.26	1.03	1.52	1.43	1.05	1.90
Melanoma of the Skin	5.42	4.65	6.28	2.05	1.81	2.32	1.54	1.31	1.81	1.31	0.99	1.70
Salivary Gland	12.4	7.8	18.8	3.32	2.03	5.13	3.45	1.93	5.69	2.17	0.59	5.55
Stomach	5.31	3.81	7.21	2.33	1.66	3.19	1.87	1.07	3.04	0.37	0.01	2.05
Lung and Bronchus	4.04	3.54	4.6	1.66	1.42	1.93	1.5	1.16	1.92	1.54	0.91	2.43
Colon and Rectum	3.46	3.02	3.95	1.86	1.68	2.05	1.31	1.12	1.52	1.28	0.98	1.63
Pancreas	2.42	1.53	3.63	2.89	1.95	4.12	4.12	2.19	7.05	3.58	0.74	10.5
Prostate	1.65	1.39	1.94	1.25	1.14	1.37	1.34	1.21	1.48	1.11	0.92	1.32
Ovary	3.22	2.35	4.31	1.48	1.14	1.9	1.87	1.36	2.52	1.09	0.52	2.0
Urinary Bladder	1.62	1.16	2.21	1.26	1.03	1.53	1.32	1.03	1.66	1.40	0.93	2.02
Larynx	13.2	9.99	17.0	2.50	1.74	3.47	0.68	0.25	1.48	1.30	0.35	3.32
Bones and Joints	12	5.96	21.4	4.01	2.13	6.85	1.5	0.41	3.84	1.44	0.17	5.21
Oral Cavity and Pharynx	10.7	9.12	12.5	2.41	1.98	2.90	1.27	0.90	1.74	0.81	0.37	1.53
Eye and Orbit	9.47	4.89	16.5	3.56	2.04	5.79	0.67	0.08	2.43	2.51	0.52	7.34
Small Intestine	5.50	3.14	8.93	3.29	2.24	4.67	1.25	0.5	2.57	1.09	0.13	3.93
Liver	4.15	2.71	6.08	1.68	1.01	2.63	1.95	0.84	3.84	1.91	0.23	6.89
Esophagus	4.52	2.68	7.14	1.49	0.71	2.74	1.36	0.37	3.48	0	0	4.1
Brain	1.84	0.95	3.22	2.26	1.54	3.21	2.29	1.40	3.53	2.74	1.37	4.9

SIR: standardized incidence ratio, UL: upper limit confidence interval, LL: lower limit of confidence interval

Table 2. Risk of SPTC after another malignancy, stratified by patient characteristics at the diagnosis of primary cancer.

Characteristics	Levels	SIR	95% CI	AER	Z score
Gender	Male	2.01	1.94-2.08	1.42	*Reference*
	Female	1.83	1.79-1.88	2.30	**-4.24*** **
Age, years	<5	18.03	5.10-46.4	0.95	*Reference*
	5-24	4.90	4.08 -12.0	8.31	-1.22
	25-44	2.26	2.04-2.65	11.1	-1.50
	45-64	1.95	1.87-2.09	9.29	-1.53
	65-84	1.67	1.51-1.79	4.46	-1.55
	85+	1.22	0.97-1.53	0.23	-1.60
Race	White	1.84	1.80-1.88	1.80	*Reference*
	Black	1.87	1.73-2.02	1.22	0.39
	American Indian/Alaska Native	2.34	1.70-3.13	2.69	1.37
	Asian or Pacific Islander	2.67	2.49-2.86	3.46	**8.59*** **
Grade	Well differentiated	1.77	1.67-1.88	1.90	*Reference*
	Moderately differentiated	1.78	1.71-1.84	1.57	0.16
	Poorly differentiated	1.70	1.63-1.78	1.47	-1.06
	Undifferentiated	1.82	1.59-2.08	1.65	0.37
Laterality	Bilateral	2.07	1.62-2.61	2.76	*Reference*
	Right-sided	2.01	1.93-2.09	2.46	-0.23
	Left-sided	1.93	1.85-2.01	2.29	-0.55
	Not a paired organ	1.82	1.77-1.87	1.48	*Reference*
	Midline tumor	5.21	3.09-8.24	8.90	**2.58** **
Tumor stage	T0	3.72	1.60-7.32	6.42	*Reference*
	T1	2.34	1.58-4.92	5.05	-0.82
	T2	2.64	1.12-35.1	2.37	-0.12
	T3	3.09	1.56-77.9	2.66	-0.03
	T4	3.48	1.23-52.0	3.99	-0.02
LN infiltration	N0	2.34	1.63-6.25	6.36	*Reference*
	N1	2.92	1.90-4.23	4.61	0.44
	N2	3.21	2.10-5.22	5.30	0.61
	N3	3.45	1.46-8.39	7.80	0.52
Distal metastasis	M0	2.50	2.40-2.61	3.52	*Reference*
	M1	2.34	1.41-4.34	3.20	-0.21
LVI	No	5.89	3.22-9.88	4.04	*Reference*
	Yes	4.85	1.57-11.3	2.89	-0.35
Clinical stage	I	2.40	1.28-14.19	14.19	*Reference*
	II	2.36	1.64-14.24	14.24	-0.01
	III	3.49	1.62-15.76	15.76	0.22
	IV	2.98	1.84-5.44	5.44	0.17
Management	Primary site surgery	1.90	1.86-1.93	1.85	*Reference*
	Radiotherapy	1.78	1.55-2.73	2.15	-0.40
	Chemotherapy	2.10	2.03-2.18	2.58	**4.74*** **
	Surgery and radiation	1.86	1.08-5.70	2.23	-0.03

SIR: standardized incidence ratio, CI: confidence interval, AER: absolute excess risk. Excess risk is per 10,000. LVI: lympho-vascular invasion. P values for the z score: (*) <0.05, (**) <0.01, (***) <0.001.

EFFICACY AND SAFETY OF RADIOFREQUENCY ABLATION OF INDETERMINATE THYROID NODULES.

Ruhul Munshi, Mahmoud Omar, Abdallah S. Attia, Mohamed A. Aboueisha, Ruba F. Abu Alhuda, Meredith Meredith, Mohamed A. Shama, Emad Kandil, Eman Toraih, Tulane School of Medicine

Background: The 2015 American thyroid association (ATA) Guidelines adopted diagnostic lobectomy for treatment of cytologically indeterminate thyroid nodules, and the surgery is associated with multiple postoperative adverse events. However, Genetic testing have been reliably used to rule of malignancy. Since radiofrequency ablation (RFA) was approved by the Food and Drug Adminstration a year ago, it gained popularity as an alternative to traditional surgeries. Many studies have investigated the efficacy of RFA in cytologically benign thyroid nodules. However, no studies have investigated the efficacy of RFA in indeterminate thyroid nodules.

Objective: We sought to evaluate effectiveness, complications of RFA in patients with indeterminate thyroid nodules compared to benign thyroid nodules

Methods: We included thyroid nodules treated with RFA at Tulane medical center from July 2019 through October 2021. Nodule volume, thyroid function, US features, and complications were evaluated before treatment and two postoperative appointments. Fisher's exact test; Wilcoxon rank sum test; Pearson's Chi-squared test were used to compare between groups.

Results: A total of 101 nodules were cytologically benign, and 93 were indeterminate nodules that tested negative on genetic testing. The baseline largest diameter of the benign and indeterminate nodules was median 2.56 (IQR 1.46, 3.50), and 2.30 (1.42, 4.33), $p< 0.7$. The VRR at the 1 month follow up in benign and Indeterminate thyroid nodules was 54 (40, 76), 59 (36, 75), $P> 0.9$. The VRR at the 3 month follow up in benign and Indeterminate thyroid nodules was 77 (59, 90), 74 (55, 90), $P> 0.6$. The VRR at the 6 month follow up in benign and Indeterminate thyroid nodules was 2.3 (0.4, 4.5), 1.8 (0.6, 3.3), $P> 0.7$.

Conclusion: Our study showed that RFA is a safe alternative modality to treat benign as well s indeterminate thyroid nodules with no significant difference in VRR between both groups while preserving thyroid function and avoiding surgical complications associated with conventional surgeries.

EXTRACELLULAR MATRIX GRAFT FOR FULL THICKNESS RECONSTRUCTION OVER EXPOSED VITAL STRUCTURES: A CASE SERIES

Abigail Chaffin, Dylan Wolff, Tulane School of Medicine

Background: Soft tissue defects, especially those involving exposed vital structures present a reconstructive challenge as poor vascularity of such defects typically makes immediate skin grafting unviable. Where flap procedures are inappropriate or not possible, dermal matrices represent an alternative reconstructive option for defects with denuded vital structures. With dermal matrices becoming increasingly available and technologically advanced, we evaluated an ovine derived extracellular matrix graft (OFM) in the reconstruction of complex soft tissue defects involving exposed vital structures. In addition to the dermal grafts, morselized or powdered extracellular matrix (ECM) products have been used to increase surface area contact in irregular wound beds. When managing full thickness wounds, it is common to encounter an irregular wound bed facilitating the need for a combination of these two products.

Objective: To evaluate a layered OFM graft† and/ or a morselized OFM particulate^ as part of the surgical reconstruction of a full thickness soft tissue defects where there was exposed bone/tendon/vasculature/nerves or bowel present. The ECM graft serves as a bioscaffold for soft tissue repair and contains many proteins found in human soft tissue [1, 2], is anti-inflammatory [3, 4], stimulates angiogenesis [2], and undergoes complete remodelling [2, 5]. The idea behind adding a morselized ECM to a wound bed is to improve the surface area contact the material has with the wound bed and provide a catalyst to accelerate wound healing.

Methods: Six cases of soft tissue defects exhibiting denuded vital structures underwent reconstruction using an OFM graft as a dermal matrix where one case highlighted the combination of the sheet OFM matrix as well as the morselized OFM particulate. Grafts were fixed directly into defects for immediate coverage and subsequently temporized defects via granulation tissue formation for later skin graft or secondary closure. Defect granulation and epithelialization were monitored until closure and the final aesthetic and functional outcomes were evaluated.

Results: Complete healing was achieved in all cases, with defect granulation becoming observable within one to two weeks and complete granulation occurring within one to 13 weeks. Granulation tissue resulting from the graft was suitable for skin grafting, with 100% take of skin grafts after one week and complete reepithelialisation in two to three weeks in the three cases that received a skin graft. Good cosmetic, functional and patient satisfaction outcomes were achieved in all cases.

Conclusion: The present series demonstrates our initial use of an extracellular matrix based dermal matrix in reconstructing defects with exposed vital structures. While such dermal matrices do not supersede or replace flap procedures, they represent an alternative option on the reconstructive ladder in cases where flap procedures are not appropriate or possible. The combination of a sheet matrix graft and morselized ECM product proved to demonstrate a successful post-operative outcome in a complex lower extremity reconstruction.

DEVELOPMENT OF GUIDELINES FOR IDENTIFICATION AND TREATMENT OF INVASIVE FUNGAL INFECTIONS IN TRAUMA SURGERY PATIENTS

Nazary Nebeluk, PhD, Lyndsey N. Bruno, MD, Marquinn Duke, MD, Ryan Craig, MD, PhD, Gordon Love, MD; John P. Hunt, MD, MPH; Alan Marr, MD; Jonathan Schoen, MD; Lance Stuke, MD; Patrick Greiffenstein, MD; Alison A. Smith, MD, PhD, LSU Health - New Orleans

Background: Invasive fungal infections present both diagnostic and clinical management dilemmas for the trauma surgeon. Due to the rarity of these infections, universal guidelines for management are uncommon. Mucormycosis, a type of invasive fungal infection, is a significant complication due to extensive tissue injury and changes to the immune system in trauma patients. Treatment relies on medical management with amphotericin B and aggressive surgical debridement as the fungi are angioinvasive and cause ischemic necrosis. Despite the additional burden mucormycosis management can add to the management of trauma patients, no widespread guidelines are currently available for identification and optimal treatment of the condition.

Objective: The objective of our study was to gain insights into the nature of the patients that develop mucormycosis after a traumatic injury. We then planned to use these insights to develop guidelines for identification and management of mucormycotic infections in trauma patients going forward.

Methods: Confirmed cases of mucormycosis at an academic Level 1 and a community-based Level 2 trauma center were reviewed in order to identify practices contributing to successful infection resolution. Data reviewed were: 1) clinical suspicion of mucormycosis by the treating trauma surgeon; 2) involvement of a multi-disciplinary team including pathology for early identification of fungus with intraoperative frozen sections and infectious disease to help guide appropriate medical management; 3) local application of amphotericin B at the wound site via an instillation vacuum system.

Results: Four trauma patients who developed mucormycosis from two different hospitals are presented. One patient succumbed to their injuries while three were able to clear their infection with medical and surgical intervention. The surviving patients all had an infection of their lower extremity whereas the deceased patient had more extensive disease involving the thorax. Based off these experiences an algorithm outlining proposed treatment guidelines was created. In future trauma cases that present with suspicion of mucormycosis, outcomes after application of this algorithm-based treatment strategy will be measured.

Conclusion: Mucormycosis is a rare but significant post trauma complication with significant morbidity and mortality. Surgeons should be aware of this complication and maintain a high clinical suspicion as afflicted patients may not match the traditional clinical picture of a mucormycosis susceptible patient. Close coordination with a pathology service is required for confirmation of the diagnosis as timely intervention can prevent debilitating loss of tissue or death. Additionally, consideration should be given to newer treatment modalities for management such as local tissue irrigation with an antifungal agent. The treatment algorithm proposed in our project may facilitate screening patients presenting after a trauma in order to identify mucormycosis cases early and allow prompt and effective management.

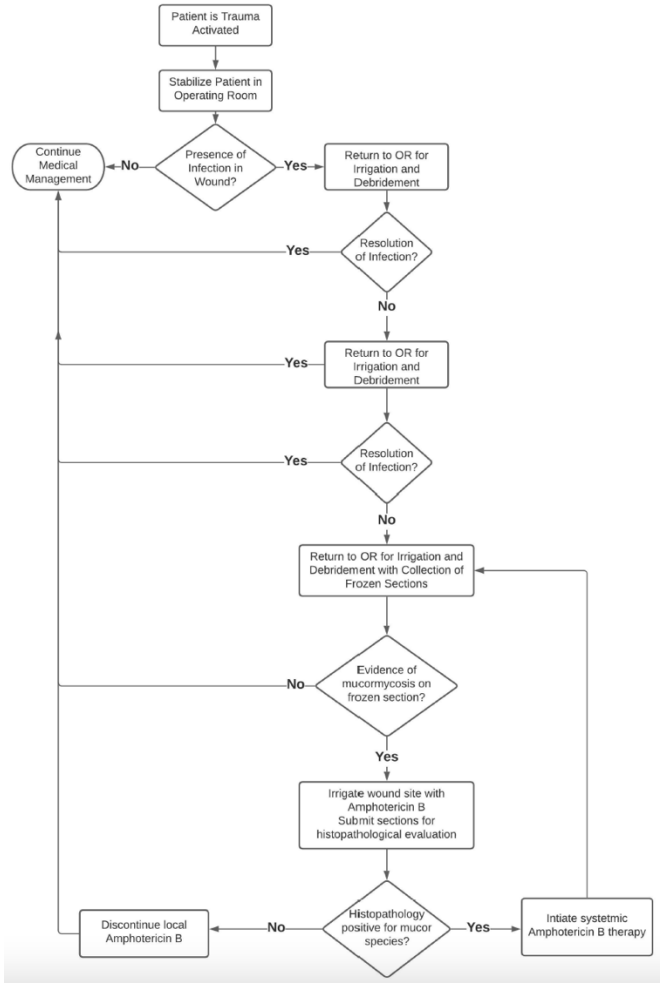


Table 1

Patient	Age	Gender	Presenting Trauma	Length of Hospital Stay	Site of mucormycosis	Complications during stay	Mucormycosis treatment	Outcome
1	17	M	GSW	58 days	Left lower extremity	Left sided AKA	22 days IV amphotericin B; 15 days local amphotericin B irrigation; discharged on isavuconazole	Clearance; closure of leg wound
2	42	F	MVC	19 days	Right lower extremity; possibly chest wall and right axilla	RUE forequarter amputation	7 days of amphotericin B	Deceased
3	60	F	MVC	76 days	Left lower extremity	Left sided AKA	6 days of local amphotericin B irrigation; discharged on isavuconazole	Clearance; closure of leg wound; LTAC placement
4	29	F	MVC	46 days	Left lower extremity	Left sided AKA	14 days IV amphotericin B; 14 days local amphotericin B irrigation; discharged on voriconazole	Clearance; closure of leg wound

Table 1 - Summary of cases presented. Summary of the trauma patients presented in the study including their age, gender, initial trauma, length of hospital stay, anatomical site of mucormycosis infection, additional complications during stay, treatment modalities for mucormycosis and outcome.