



ABSTRACTS

2019 Annual and Scientific Meeting

Resident Paper Competition

October 11, 2019
Trumbull Marriott Hotel

The Stamford Hospital is accredited by the Connecticut State Medical Society to sponsor continuing medical education for physicians. The Stamford Hospital designates this educational activity for a maximum of 8.0 AMA PRA Category I Credit(s)TM. Physicians should only claim credit commensurate with the extent of their participation in the activity.

The purpose of this meeting is to provide attendees with a forum for the latest information regarding clinical practice and research in the field of surgery. Surgical Residents have a continued need to improve the research skills and a forum to present their research. Rural surgeons have a need to learn about emerging technologies. There is an on-going need to enhance patient safety and quality of patient care.

All sessions are open to all meeting participants.

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Uniting Surgeons to Advance Patient Care in Connecticut

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Prizes awarded in the following categories:

	First Place	Second Place
Clinical Oncology	X	X
Clinical Oncology Case Report	X	X
General Surgery	X	X
General Surgery – Case Reports	X	X
Medical Students	X	X
Plastic Surgery and Quality/NSQIP & ERAS	X	X
Specialty Surgery	X	X
Trauma	X	X

Prizes to be Awarded

Papers

First: \$100 and trophy

Second: \$50 and trophy

Case Reports:

First: \$50 and trophy

Second: \$25 and trophy

Skills Competition

Intern: Loupes

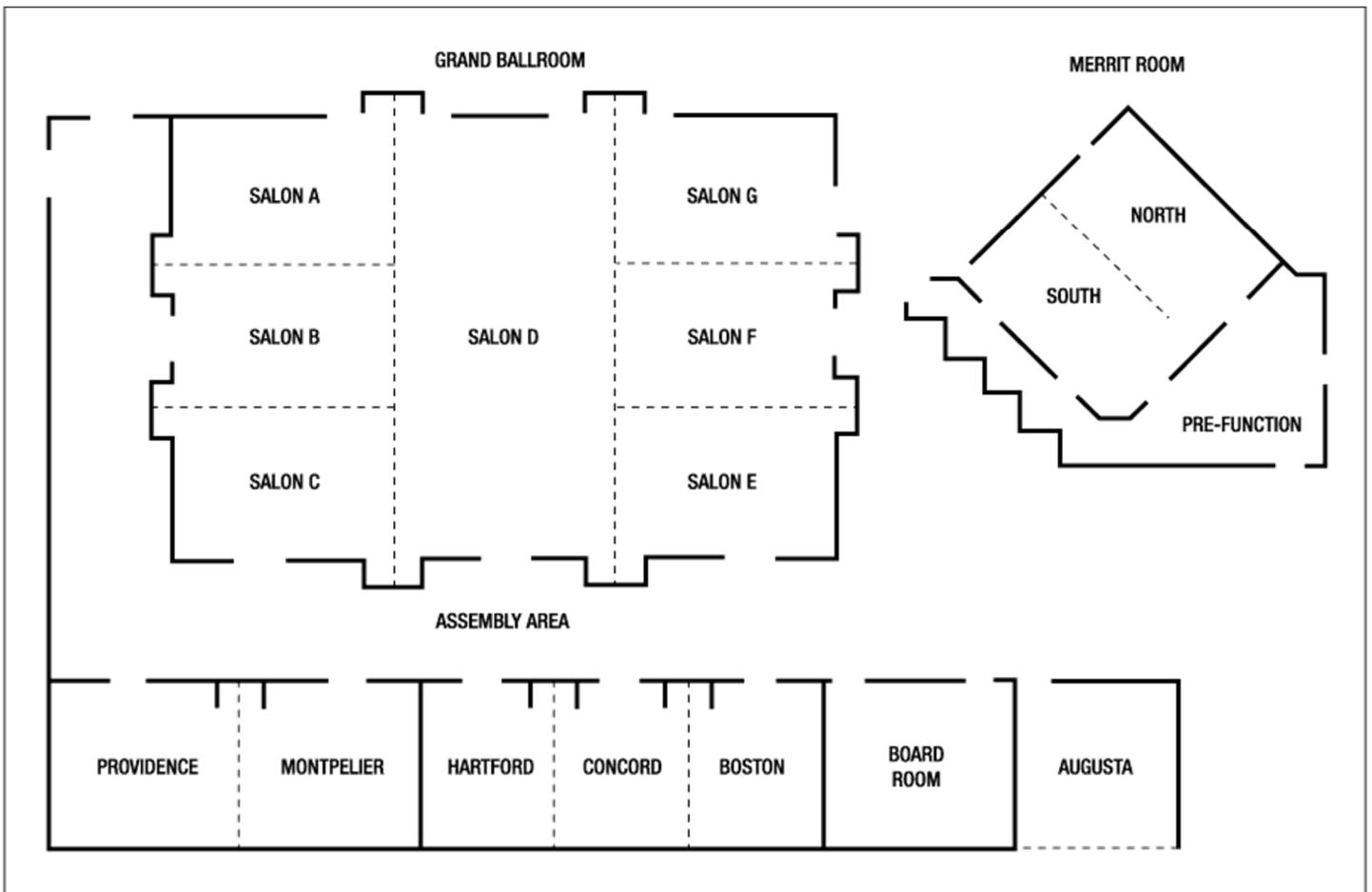
Mid-level and Chief: Medical textbook

Winning team: Fame and renown throughout the land, amazing trophies for each member and your program and your program will be submitted to the ACS to compete at 2020 Clinical Congress. Final selection decided by the ACS.

Map of the Trumbull Marriott

Competition Locations

Clinical Oncology Papers:.....**Augusta**
 Clinical Oncology Case Reports: ...**Augusta**
 General Surgery:**Concord**
 General Surgery – Case Reports: ..**Providence**
 Medical Students:**Merritt South**
 Plastic Surgery:**Montpelier**
 Quality, NSQIP & ERAS:**Montpelier**
 Specialty Surgery:**Boston**
 Trauma:**Hartford**



Continental Breakfast, AM Break and Lunch will be served in the Grand Ballroom



Disclosure Information

Connecticut Chapter of the ACS Professional Association, Inc Annual Meeting – October 11, 2019

In accordance with the ACCME Accreditation Criteria, the Connecticut Chapter American College of Surgeons Professional Association must ensure that anyone in a position to control the content of the educational activity has disclosed all relevant financial relationships with any commercial interest. Therefore, it is mandatory that both the program planning committee and speakers complete disclosure forms. Members of the program committee were required to disclose **all** financial relationships and speakers were required to disclose any financial relationship **as it pertains to the content of the presentations**. The ACCME defines a ‘commercial interest’ as “any entity producing, marketing, re-selling, or distributing health care goods or services consumed by, or used on, patients”. It does not consider providers of clinical service directly to patients to be commercial interests. The ACCME considers “relevant” financial relationships as financial transactions (in any amount) that may create a conflict of interest and occur within the 12 months preceding the time that the individual is being asked to assume a role controlling content of the educational activity.

The ACCME also requires that CTACSPA manage any reported conflict and eliminate the potential for bias during the session. The planning committee members and speakers were contacted and the conflicts listed below have been managed to our satisfaction. However, if you perceive a bias during a session, please advise us of the circumstances on the session evaluation form.

Please note we have advised the speakers that it is their responsibility to disclose at the start of their presentation if they will be describing the use of a device, product, or drug that is not FDA approved or the off-label use of an approved device, product, or drug or unapproved usage.

The requirement for disclosure is not intended to imply any impropriety of such relationships, but simply to identify such relationships through full disclosure, and to allow the audience to form its own judgments regarding the presentation.

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Vikram Bhatt, MD	No	
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Philip Corvo, MD, MA, FACS*	No	
Brittany Davis, MD	No	
Kimberly Davis, MD, MBA, FACS	No	
Ashley Dunbar, BA	No	
Alejandro Fajardo, MD	No	
Amanda Fazzalari, MD	No	
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Erika King, MD	No	
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Catherine Ly, MD	No	
Nathan Maassel, MD	No	
Brandon Madris, MD	No	
Emi Manuia, MD	No	
Adrian Maung, MD, FACS*	No	
Alan Meinke, MD, FACS*	No	
Kristin McCoy, MD	No	
John Morton, MD, MPH, FACS	No	
Nathaniel Novak, BS	No	
Alexander Ostapenko, MD	No	
Suraj Panjwani, MD	No	
Virginia Parker, MD	No	
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Breanna Robinson, BS, NRAEMT	No	
Nensi Melissa Ruzgar, BHSc	No	
Brienne Ryan, MD	No	
Thomas Schneider, BA	No	
Kevin Schuster, MD, FACS	No	
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Rachael Steinhauer, BS	No	
Santosh Swaminathan, MD	No	
Gianluca Tripodi, MD	No	
Christine Van Cott, MD, FACS*	No	
Heather Wanczyk, MS	No	
Erin White, MD	No	
Mary Ella Wood, DO	No	
PLANNING COMMITTEE NOT LISTED ABOVE	DISCLOSURE?	DISCLOSURE (All commercial relationships)
Kevin Dwyer, MD, FACS	No	
Christopher Tasik	No	

Order of Presentation

Augusta - Clinical Oncology - Supported by the CT Commission on Cancer

Santosh Swaminathan, MD	Saint Mary's Hospital	Impact of Malnutrition Markers on Outcomes following P
Brittany Davis, MD	Stamford Hospital	Metastatic Breast Cancer to the Subcutaneous Tissue of t
David Ianacone, MD	Stamford Hospital	Multiple Cranial Nerve Palsy: Metastatic Prostate Carcin
Raysa Cabrejo, MD	Yale University	Prognostic factors in determining the recurrence of desm
Raysa Cabrejo, MD	Yale University	The effects of immunotherapy on the overall survival of s

Augusta - Clinical Oncology Case Reports - Supported by the CT Commission on Cancer

John Tedesco, MD	Stamford Hospital	Collision Tumor with Ductal Carcinoma and Squamous Ca
Vikram Bhatt, MD	Saint Mary's Hospital	A Rare Pair: Adenosquamous Carcinoma of the Right Colc
Sue-Ting Lim, MD	Saint Mary's Hospital	Breast cancer in Transgender Patient with BRCA-2 mutati
Sue Ting Lim, MD	Saint Mary's Hospital	Colonic Metastasis from Primary Lung Adenocarcinoma P
Santosh Swaminathan, MD	Saint Mary's Hospital	Thymic neuroendocrine carcinoma: Case Report from a C

Concord - Sultan Ahamed, MD, MBA, FACS General Surgery

Priscilla Lam, MD	St. Mary's Hospital	Safe Approaches to Improving Efficiency at a High Volum
Kristin McCoy, MD	Stamford Hospital	Analysis of Transient Hyperbilirubinemia Following Routi
Mohammad Ali, MD	Waterbury Hospital	Early use of Small Bowel Follow Through Reduces Stay an
Amanda Fazzalari, MD	Saint Mary's Hospital	A Translational Model for Venous Thromboembolism: Va
Alpen Nacar, MD	Danbury Hospital	Non-Operative Treatment of Spontaneous Splenic Ruptur
Todd Jensen, MHS	University of CT School of Medicine	Comparison of Mesenchymal Stem Cells from Pediatric N
Rami Al-Aref, MD	Stamford Hospital	Management of Anterior Interosseous Nerve Syndrome i

Providence - Sultan Ahamed, MD, MBA, FACS General Surgery Case Report

Sepehr Karimi, MD	Quinnipiac University, Waterbury Hospital	Benefits of Natural Orifice specimen Extraction (NOSE) in
Brandon Madris, MD	Stamford Hospital	Revascularization of the Internal Iliac Artery as a Novel Tr
Emi Manuia, MD	Danbury Hospital	Bronchobiliary Fistula Secondary to Chronic-Pancreatitis-
Brienne Ryan, MD	Stamford Hospital	Complex restenosis after AV fistula creation
Ashley Dunbar, BA	Frank H Netter MD School of Medicine	Large cell neuroendocrine tumor of the gall bladder in a f
Shawn Liechty MD	Danbury Hospital	A Case of a Resectable Type V Biliary Cyst: A Call for Mod
Michael Geraghty, MD	Waterbury Hospital	Clostridium Paraputrificum Septecemia and Splenic Absc
Erika King MD	University of Connecticut	An Old Disease for a Young Person: A Case Study and Lite
Gaspar Barreto, MD	Waterbury Hospital	The Surgical Celiac Lymphoma
Nicolle Burgwardt, MD	Stamford Hospital	An Incidental Littoral Cell Angioma of the Spleen: A Case
Minje Ha, MD	Danbury Hospital	Incisional Hernia Causing Appendicitis
Anil Shah MD	Stamford Hospital	Stenting of Chronically Occluded IVC Filter: A Case Report
Rachael Steinhauer, BS	Frank H. Netter MD School of Medicine	Minimally Invasive Approach to Complex Liver Abscess Ai
Minha Kim, MD	Danbury Hospital	Case Report: Cystic Neutrophilic Granulomatous Mastitis

Merritt South - Medical Student Research - Supported by the CTACSPA

Zahra Qaiyumi, BS	Frank H. Netter MD School of Medicine	Reasons for a Delayed Diagnosis in a Well-known yet Less
Elisabeth Barrar, MD	Danbury Hospital	Operative Times for Lower Extremity Endovascular Revas
Alexandra Bourdillon, BS	Yale School of Medicine	Are Anesthesia Screens a Barrier to Communication Pract
Jacob Jones, BS	Frank H. Netter, MD School of Medicine	Postoperative Bracing on Pain, Disability, Complications a
Thomas Schneider, BA	Frank H. Netter MD School of Medicine	Adenocarcinoma of the Excluded Stomach 15 Years After
Breanna Robinson, BA	Frank H. Netter MD School of Medicine	Stop the Bleed: The Need for Hemorrhage-Control Educa
Nensi Ruzgar, BHSc	Yale School of Medicine	Pediatric Emergency Surgical Care: Evaluating Need and \
Alexa Lisevick, BS	Frank H. Netter MD School of Medicine	The Effect of Introducing a Mobility Technician Program c
Nensi Ruzgar, BHSc	Yale School of Medicine	Growth of a Local Global Surgery Symposium Over Three
Nathaniel Novak, BS	Yale School of Medicine	Evaluating the Utility of Intra-Osseous Vascular Access in
Emma Calcagno, BS	Yale School of Medicine	Risk Factors and Outcomes for Extended Post-Injury Opio

Order of Presentation – *continued*

Montpelier - Surgical Quality, NSQIP and ERAS - Supported by the CtSQC

Suraj Panjwani, MD	St. Mary's Hospital, Waterbury	Outcomes in Patients Undergoing Bariatric Surgery with R
Alexander Ostapenko, MD	Danbury Hospital	Surgical Research with National Databases: A guide to w
Beata Lobel, MD	Saint Francis Hospital	Variation in Surgeon Operative Reporting for Ventral Hern
Santosh Swaminathan, MD	Saint Mary's Hospital	Effect of Diabetes Mellitus on Postoperative Outcomes of

Montpelier - Plastic & Reconstructive Surgery - Supported by the CTACSPA

Austin Healy, MD	University of Connecticut	Reducing Opioid Use in Outpatient Surgery
Alejandro Fajardo, MD	University of Connecticut	Off the Shelf Technology Improves Efficiency in Global Sur
Catherine Ly, MD	Yale School of Medicine	Comparison of irradiated and non-irradiated free-flaps fo
Raysa Cabrejo, MD	Yale University	Functional Network Development in Sagittal Craniosynost

Boston - Surgical Subspecialties- Supported by the CTACSPA

Jennifer Hubbard, MD	Saint Mary's Hospital	Improved Cardiac Function after Myocardial Infarction wi
Nensi Ruzgar, BHSc	Yale School of Medicine	The Three Delays in Pediatric Surgical Care in Uganda: Ins
Nathan Maassel, MD	Yale School of Medicine	Admission to Surgery Expedites Care of Children with Cho
Heather Wanczyk, MS	University of Connecticut Health Center	The use of Human Induced Pluripotent Stem Cells to Trea
Aparna Kailasam, MD, MBA	St. Francis Hospital & Medical Center	Predicting the impact on women in a world without midu
Alexander Ostapenko, MD	Danbury Hospital	Challenges with database research: a comparison of two c

Hartford - Trauma/Critical Care - Supported by the CT Committee on Trauma

Erin White, MD	Yale New Haven Health	Primary Care Recommendations and Fall Risk Assessment
Brendan Gontarz, MD	Saint Francis Hospital	Using a Modified Trauma Quality Improvement Program t
Suraj Panjwani, MD	St. Mary's Hospital	Traumatic Cerebrospinal Fluid Leak after a Back Stab Injur
Jennifer Hubbard, MD	Saint Mary's Hospital	Need for CT Scanning of the Chest After Fall in the Elderly
Nathan Maassel, MD	Yale School of Medicine	Epidemiology of Pediatric Basketball-Related Injuries in th

Abstracts printed in order of presentation.

Clinical Oncology Competition Papers and Case Reports

Moderator:

Christine Van Cott, MD, FACS

St. Vincent's Medical Center
Surgical Clerkship Director and Assistant Professor of
Surgery, Frank H. Netter MD School of Medicine,
Quinnipiac University
Chair, Connecticut Commission on Cancer

Judge:

Scott H. Kurtzman, MD, FACS

Chairman, Waterbury Hospital Department of
Surgery
Director, Waterbury Hospital General Surgery
Residency Program.
Professor of Surgery, University of Connecticut Health
Center
Past President and Governor-at-Large, Connecticut
Chapter of the American College of Surgeons
Professional Association, Inc.

PAPER PRESENTATIONS

Impact of Malnutrition Markers on Outcomes following Pancreatectomy: A 10-year NSQIP Analysis

Santosh Swaminathan MD, Suraj Panjwani MD, Jahnvi
Kakuturu MD, Shohan Shetty MD, FACS
Saint Mary's Hospital

Introduction: The incidence of postoperative complications following pancreatectomy remains significant. Poor nutrition is often seen in patients with pancreatic malignancy. Our aim was to evaluate the impact of recent weight loss (WL) and hypoalbuminemia (HA) on postoperative outcomes following pancreatectomy for malignancy.

Method(s): Methods: Patients undergoing pancreatectomy for malignancy from 2007 to 2017 were identified using the American College of Surgeons National Surgical Quality Improvement Program database (ACS-NSQIP). Thirty day postoperative outcomes were assessed for patients with recent WL, HA (albumin < 3.5 g/dL), or a combination of both (HA+WL).

Results: The study population was classified into four groups (HA, WL, HA+WL, None). 363 (5%) of the 6889 patients included had HA+WL. 4713 (68%) patients had normal serum albumin with no history of recent weight loss. Pre-operative parameters such as age, gender, race, transfer (origin) status, BMI, diabetes, history of smoking, COPD, functional status, hypertensive treatment, bleeding disorder, history of transfusion, ASA status and

preoperative sepsis were significantly different among the four study groups and were thus included in the multivariate logistic regression analysis. On univariate analysis, patients with HA and combined HA+ WL were found to have a higher incidence of postoperative complications, namely, pneumonia, unplanned reintubation, ventilatory support > 48 hours, intraoperative or postoperative bleeding requiring transfusion, sepsis and septic shock. Multivariate analysis further reiterated the findings from the univariate analysis (Table 1.). Patients with HA + WL had a 60 % higher risk of any postoperative complication.

Conclusion: The presence of hypoalbuminemia with recent weight loss (HA + WL) is associated with worse postoperative outcomes in patients undergoing pancreatic resection for malignancy. Correction of these markers preoperatively may ameliorate postoperative complications.

Table 1. Multivariate analysis (controlling for significant preoperative variables), expressed as odds ratio (95% CI)

Variable	HA	WL	HA+WL
Pneumonia	1.1 (0.8-1.5)	0.8 (0.5-1.3)	1.6 (1.01-2.5)*
Unplanned intubation	1.4 (1.02-2.4)*	1.1 (0.7-1.8)	1.98 (1.2-3.2)*
Pulmonary embolism	0.8(0.4-1.4)	0.13(0.02-0.93)*	0.57(0.2-1.8)
Prolonged ventilator requirement	1.8(1.3-2.6)*	1.03(0.6-1.8)	2.1(1.22-3.54)*
Transfusion	1.8(1.6-2.2)*	1.2(0.96-1.5)	2.03(1.6-2.6)*
Sepsis	0.93(0.7-1.2)	0.81(0.6-1.2)	1.17(0.8-1.7)
Septic shock	1.03(0.7-1.5)	1.6(1.02-2.53)*	1.9(1.12-3.2)*
Any complication	1.4(1.23-1.6)*	1.06(0.89-1.3)	1.6(1.3-2.06)*

* indicates statistically significant variables (p<0.05)

Metastatic Breast Cancer to the Subcutaneous Tissue of the Hip in a 52 Year Old Female

Brittany Davis MD, Diane Durgan MD MPH, Kevin Miller MD, Valerie Brutus MD FACS, Helen Pass MD FACS
Stamford Hospital

Introduction: Approximately 10-15% of women diagnosed with early-stage breast cancer will develop metastatic disease within 3 years of the initial detection of the primary tumor. However, distant metastases may be found ten or more years after initial detection of disease. The most common sites for distant metastasis from invasive breast cancer are to the lung, liver and bone. Subcutaneous metastases are rare and most often found on the chest wall. An electronic literature search yielded no results for breast metastases to the subcutaneous tissues of the hip. Consequently, the following case report may represent the first documented case of distant breast cancer metastasis to the subcutaneous tissue over the contra-lateral flank.

Case Presentation: The patient is a 52 year old female with a past medical history of stage IA ER/PR positive invasive ductal carcinoma of the right breast treated with total mastectomy, adjuvant chemotherapy and endocrine therapy for a total of 5 years. Ten years later, she developed a locoregional recurrence of invasive carcinoma within the right breast axillary tail, and subsequently underwent surgical resection and a complete axillary lymph node dissection. She received an additional course of chemotherapy, post-mastectomy radiation, and was started on long-term Anastrozole. At that time, a metastatic workup consisting of an MRI of the brain, CT of chest, abdomen, and pelvis, as well as a bone scan, revealed no evidence of metastatic disease. Two years later, the patient was referred by her oncologist to a general surgeon after noting a subcutaneous left flank mass. On exam, there was an approximately 3cm non-tender, firm, mobile mass, without erythema or evidence of trauma. She reported no weight loss, fatigue or systemic symptoms. Excision of the mass revealed ER/PR positive moderately differentiated adenocarcinoma, consistent with a metastatic lesion. She again received adjuvant systemic therapy, which included Ibrance and Anastrozole and continues to follow monthly with oncology.

Discussion: Factors that increase the risk of metastasis include lymphovascular invasion, larger tumor size, and poor histopathological differentiation. Yet, despite this, one third of women without these factors will still develop distant metastases, and one third of women with a risk factor present will not develop distant disease. Few markers can predict the site of metastasis. Estrogen-receptor positive tumors tend to favor bone metastasis, whereas invasive lobular carcinoma has a predilection for gastrointestinal and ovarian locations. At present, predictors of metastasis in breast cancer are poor and lacking. However, there are some prognostic markers that are under investigation including ERBB2 (epidermal growth factor receptor 2), circulating tumor cells, and plasminogen activator uPA. We hypothesize that this patient's lymphatic drainage was aberrant secondary to her undergoing a complete axillary dissection and receipt of radiation therapy resulting in dissemination to her ipsilateral flank.

Conclusion: Metastasis of breast cancer to the subcutaneous ipsilateral flank is rare, but it is important to note this occurrence as surgeons can include it in the differential when evaluating a new mass outside of the breast/thorax on a patient with a history of breast cancer in order to facilitate proper work up and tissue handling.

Multiple Cranial Nerve Palsy: Metastatic Prostate Carcinoma Masquerading as Possible Ischemic, Hemorrhagic or Infectious Sinusitis

Ianacone, David MD; Norden, Samantha; MD Broderick, Meaghan MD, Tedesco, John MD; Klenoff, Jason MD; Volpicelli, Elgida MD
Stamford Hospital

Introduction: Prostate cancer is the most common cancer affecting men, accounting for 174,650 new cancer diagnoses in men in the United States in 2019. ¹ Adenocarcinoma of the prostate commonly metastasizes

via lymphatic and hematogenous spread, with the most commonly seen sites being the bone (84%), distant lymph nodes (10.6%), and liver (10.2%). ² Metastasis to the head and neck is rarely seen with prostate cancer, with very few cases being reported in the literature, where spread to the sphenoid, ethmoid and frontal sinuses has been noted. ³ Further, there have been very few reports of resultant cranial nerve palsies from these metastases. ⁴ We present the case of a 67 year old male presenting to our institution with new onset CN III and VI neuropathies and diffuse skull base and sinus inflammation, initially concerning for invasive fungal sinusitis, and subsequently found to have prostate cancer metastatic to the sphenoid, ethmoid and frontal sinuses.

Case Presentation: A 67 year old male with past medical history significant for metastatic prostate cancer on chemotherapy/XRT, BPH, prior TIA, chronic anemia presented to the hospital with right sided headache, diplopia, and perioral tingling and numbness. Patient was previously admitted two months prior for diplopia and perioral tingling and numbness. At the initial presentation it was thought that his symptoms were due to either an ischemic process given his history of cancer or hemorrhagic phenomenon. After a thorough neurological evaluation including CT and MRI, neurology diagnosed him with a right 6th cranial nerve mononeuropathy. During this medical workup, it was also discovered that he had a PFO which was subsequently managed with dual antiplatelet therapy per cardiology. His symptoms improved and eventually resolved but reappeared, resulting in the readmission. This time he also experienced garbled speech and a right sided facial droop. Patient had chronic pain in his back from his bone metastases to the spine, but these had improved since receiving XRT. On presentation patient was tachycardic, but otherwise stable and afebrile. Labs demonstrated an elevated WBC of 17.7 and a head CT showed diffuse inflammatory changes in the frontal, ethmoid, and sphenoid sinuses. An MRI with contrast revealed diffuse abnormal intracranial dural thickening and enhancement as well as diffuse infiltration of right central skull base, right sphenoid sinus, right posterior ethmoid sinus, right cavernous sinus, and right Meckel's cave. Given the MRI results, there was still a need to distinguish between an infectious process, such as Aspergillus galactomannan or Cryptococcus, and leptomenigeal carcinomatosis. The MRI of his spine revealed diffuse bony metastasis in the cervical, thoracic, and lumbar spine without cord compression. A sinus CT was later obtained which showed loss of fat in the paranasal sinuses on the right side with extensive right sided sinus opacification. Patient was taken to the operating room with ENT and underwent endoscopic image guided functional endoscopic sinus surgery with sphenoid sinusotomy and removal of soft tissue biopsies. Frozen section was consistent with high grade carcinoma and the pathology confirmed high grade cancer with necrosis.

Conclusion: Metastatic Prostate to the bone is a known phenomenon, however distant metastasis to cranial bone structures such as the ethmoid, frontal and sphenoid as with this patient is extremely rare and complicated from a surgical perspective. Rather than be subjected to the complex surgical approach and associated morbidities this patient decided to forego further treatment and made it

clear he did not want any further surgical therapy. This case was ultimately interesting due to the uncommon location of the metastatic disease and the complex surgical planning that accompanies a patient such as this.

Sources:

1. American Cancer Society. Key Statistics for Prostate Cancer | Prostate Cancer Facts. *January 4, 2018.*
2. Gandaglia G, Karakiewicz PI, Briganti A, et al. Impact of the Site of Metastases on Survival in Patients with Metastatic Prostate Cancer. *Eur Urol.* 2015;68(2):325-334. doi:10.1016/j.eururo.2014.07.020
3. Akdemir F, Aldemir M, Çakar H, Güler G. Metastasis of prostate adenocarcinoma to the frontal and ethmoid sinus. *Turk Urol Derg.* 2016;42(4):299-302. doi:10.5152/tud.2016.21957
4. Mugundhan K, Arasi K V, Balamurugan N, Chandrasekaran P, Thiruvartuchelvan K, Sivakumar S. Carcinoma Prostate Presenting as Multiple Cranial Nerve Palsy. *J Assoc Physicians India.* 2017;65(2):92-93.

Prognostic Factors in Determining the Recurrence of Desmoplastic Melanoma

Raysa Cabrejo MD, Sarah Persing MD, Wael Ibrahim MD, Anjela Galan MD, Stephen Ariyan MD, Kelly Olino, James Clune MD
Yale University

Introduction: Desmoplastic melanoma is a rare subclass of melanoma with unique clinical implications. Staging in melanoma relies heavily on sentinel lymph node biopsies. However, the predictive value of sentinel node biopsies in desmoplastic melanoma has been difficult to determine due to small studies with short follow-up. Therefore, staging desmoplastic melanoma and predicting those that may benefit from upfront check point inhibitor therapy is difficult. The purpose of this study is to identify patients that are likely to have recurrence utilizing pathological characteristics, mutation analysis and sentinel lymph node biopsies and clinical/demographic characteristics.

Methods: From 1998 to 2018, 147 patients with desmoplastic melanoma underwent treatment at Yale New Haven Health System. Of these, 94 patients had sentinel lymph node biopsies. The patients were divided into pure and mixed desmoplastic melanoma, 66% and 34%, respectively. All dermatopathology reports, sentinel lymph node biopsy results, demographics, and clinical outcomes were recorded for all patients. A binomial logistic regression was performed with the coefficients of depth of the initial pathology, age, and the number of positive nodes from the sentinel lymph node biopsy. All statistics were done utilizing STATA 10.

Results: Desmoplastic melanoma had a recurrence rate of 17% in our cohort. The average age of diagnosis was 69.9 (± 14.2) years. The average depth of the desmoplastic melanoma was 4.4 (± 4.2) mm. Only 6% of the patients had a positive sentinel lymph node biopsy; 78% of them had complete lymphadenectomies subsequently. For pure desmoplastic melanoma, the binomial logistic regression calculated an odds ratio of recurrence for depth of 1.3 ($p=0.04$, CI: 1.02-1.61), for age of 1.07 ($p=0.04$, CI: 1.01-1.15). For mixed desmoplastic melanoma, the binomial logistic regression calculated an odds ratio of recurrence for a positive lymph node of 43.7 ($p=0.02$, CI: 1.78-65.93).

Conclusions: In this study, we study pathological characteristics, sentinel lymph node biopsies, and overall clinical outcomes. For desmoplastic melanoma, the division

of pure and mixed demonstrated different characteristics important in determining recurrence. For mixed desmoplastic melanoma, a positive sentinel lymph biopsy was a significant factor in determining recurrence, similarly to cutaneous melanoma. For pure desmoplastic melanoma, age and depth were the most important factors in determining recurrence, unlike cutaneous melanoma. Therefore, it is probably beneficial to provide patients with higher risks of recurrence upfront check point inhibitor therapy as a preventative treatment for recurrence.

The Effects of Immunotherapy on the Overall Survival of Subungual Melanoma Patients

Raysa Cabrejo, MD, Sarah Persing, MD, Wael Ibrahim, MD, Kelly Olino, MD, James Clune, MD
Yale University

Introduction: Subungual melanoma represents a rare subtype of acral melanoma that typically presents as a dark pigmented stripe or irregular lesion under the nail plate. This subtype carries a poorer prognosis, as it is frequently misdiagnosed, leading to a delay in diagnosis. Subungual melanoma is traditionally treated with amputation of the involved digit or wide local excision. Advances in immunotherapy have been shown to be effective in increasing overall survival in patients with metastatic cutaneous melanoma. It has also been hypothesized that the efficacy of checkpoint inhibitors is linked to the high mutation burden of cutaneous melanoma. To date, the effect of immunotherapy on overall survival in patients with subungual melanoma has not been studied. We hypothesize that patients treated with immunotherapy would have increased overall survival compared to those patients not treated with immunotherapy and therefore would have a high mutation burden.

Methods: From 1991 to 2018, 65 patients with subungual melanoma who underwent treatment at Yale New Haven Health System were retrospectively identified. Dermatopathology reports, sentinel lymph node biopsy (SLNB) results, demographics clinical outcomes, and overall survival were recorded for all patients. Of the total with stage 3 or 4 melanoma, 19 were not treated with a checkpoint inhibitor and 10 treated with a checkpoint inhibitor after surgical management. These subsets of patients were analyzed using a Kaplan-Meier survival estimates comparing survival of patients treated with immunotherapy to those without. All statistics were performed using STATA 15.0. Tumor and blood samples were also whole genome sequenced and compared to determine somatic mutations.

Results: Subungual melanoma had a recurrence rate of 46% in our cohort. The average age at diagnosis was 62.6 (± 15.9) years. The average depth of the subungual melanoma was 4.0 (± 2.6) mm. The Cox Regression calculated for age at diagnosis the hazard ratio (HR) is age has a hazard ratio of 1.04 ($p=0.20$, CI=0.98-1.09), depth has a hazard ratio of 0.79 ($p=0.07$, CI=0.61-1.01), and checkpoint inhibitors have a hazard ratio of 2.91 ($p=0.19$, CI=0.58-14.42, $\beta=0.91$). The tumor mutation burden was 63.0 (± 31.6).

Conclusions: Immunotherapy is a promising option for management of melanoma, however there are few studies examining its effect in subungual melanoma. Our results suggest that checkpoint inhibitors do not affect survival with an adequate calculated power of 0.85. Subungual

melanoma has a low mutation burden of 63.0 (± 31.6) compared to cutaneous melanoma, which ranges about 10⁴. Therefore, it may be possible that low efficacy of checkpoint inhibitors in increasing the survival of subungual melanoma may be due to a low mutation burden. Larger randomized controlled trials are needed to help elucidate the effect of immunotherapy on overall survival in subungual melanoma patients.

CASE REPORTS

Collision Tumor with Ductal Carcinoma and Squamous Cancer: A Case Report and Literature Review

Gianluca Tripodi MD, John Tedesco MD, Marissa Novack MD, Helen Pass MD, Robert Babkowski MD
Stamford Hospital

Introduction: Breast cancer is the second most commonly diagnosed cancer globally and the leading cause of cancer related death in women. In the United States, breast cancer accounts for over 260,000 cases each year and is responsible for over 40,000 deaths. Collision tumors, can represent a subtype of breast cancer phenotypes, and are rare clinical entities in which two distinct histological tumor types show involvement in the same anatomic site. Diagnosis is complex and depends upon summarization of histopathology, morphology, staining with immunohistochemistry, and specific cytogenetics. They can manifest in various organs and combinations of cell lines. Typically, the breast type collision tumor typically present with ductal carcinoma along with a lymphoma or leukemia. To our knowledge there are only a handful of breast collision tumors manifesting squamous cell and ductal carcinoma.

Case Presentation: This is a 94 year old female, with a past history of right breast ductal carcinoma in situ approximately 20 years ago, at which time she was treated breast conserving therapy. She then recently represented with multifocal right breast invasive ductal carcinoma with no evidence of metastatic disease. She declined a mastectomy or any adjuvant therapy and opted for right wire localized partial mastectomy. She then went onto develop a symptomatic axillary recurrence and underwent right axillary lymph node dissection. Final pathology revealed poorly differentiated adenocarcinoma with deposits of squamous cell differentiation. After being presented at multidisciplinary tumor board, she was deemed not to be a candidate for radiation therapy, and the patient denied chemotherapy.

Conclusion: Collision tumors are extremely rare pathologies that involve two different tissue types found alongside one another histologically. Our case involving ductal carcinoma with squamous cell cancer of the overlying skin is extremely rare given the already low incidence of collision tumor of the breast with unique pathological findings. Additionally, diagnosis of a collision tumor with metastases containing both poorly differentiated adenocarcinoma and squamous carcinoma has not been frequently reported in the literature.

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A Rare Pair: Adenosquamous Carcinoma of the Right Colon, a case report and review

Virginia Parker, MD; Vikram Bhatt, MD; Aaron Brown, MS; Iyare Esemuede, MD
Saint Mary's Hospital

Introduction: Colorectal cancer (CRC), mainly adenocarcinoma, still remains the 3rd most common cause of death in women and the second leading cause of death in men even with the implementation of screening colonoscopies and awareness. One subtype, Adenosquamous Carcinoma (ASC) is a rare tumor chiefly arising in the distal colon or rectum and accounts for between 0.05 and 0.2 percent of all colorectal malignancies. We report here on an even rarer occurrence, a case of ASC of the ascending colon which has only been reported three times in the literature.

Method: Our case is of a 79-year-old male with a history of recent embolic cerebrovascular accident (CVA) who was placed on clopidogrel and rivaroxaban and returned shortly after discharged with a lower gastrointestinal (GI) bleed. The patient reported that the bleeding began two days prior and he has never had a screening colonoscopy. Lab work revealed that his hemoglobin had fallen from 12 g/dL to 8.7 g/dL in the two weeks since he was discharged. The patient underwent a colonoscopy that revealed a large polypoid villoglandular soft mass in the proximal ascending colon; upper endoscopy was negative. This mass obstructed the advancement of the colonoscope and appeared to involve the cecum and proximal ascending colon. A second 2.5 cm sessile polyp was also seen in the distal ascending colon. Carcinoembryonic Antigen was found to be 4.6 ng/mL. The patient underwent a metastatic workup that did not reveal any distant disease therefore the patient underwent a laparoscopic right colectomy with lymphadenectomy.

Results: Pathological examination of the specimen revealed a poorly differentiated ASC that invaded through the muscularis propria into subserosal soft tissue, staging it

a T3. Nine of the 16 nodes had metastatic disease, N2b. Histopathological examination showed an invasive carcinoma exhibiting mixed glandular and squamous features that stained positive for p40 and CK20, but negative for CK7. Lymphovascular invasion was also present. The tumor was negative for the BRAF mutation, but positive for a KRAS mutation. The pathological stage of the patient is Stage IIIC.

Adenosquamous carcinoma is a rare colorectal tumor that has been associated with a poor prognosis compared to adenocarcinoma. In one series of case report of 145 cases, 53% of colorectal ASC were found in the sigmoid colon, 28% in the right colon, and 19% in the transverse and descending colon [3]. The increased aggressive nature of ASC is thought to be due to the increased metastatic potential of the squamous cell component compared to the glandular component of the malignancy [1]. The 5-year survival rate for patients with Stage II is 86% and decreases to only 24% for Stage III patients [3, 7].

Conclusion: The histogenesis of ASC has not fully been discovered but general theories do exist [2,4]: 1) the presence of embryologic nests of ectoderm cells; 2) ectopic squamous cells that are converted into malignant cells; [3] pluripotent stem cells capable of multidirectional differentiation; [4] normal glandular cells may be transformed into malignant squamous neoplasm by metaplasia by a stimulus such as ulcerative colitis [5]; radiation [6] or HPV [6].

In comparing our case to others in the literature, all had at least a N2 disease and in all of the cases the tumor invades into the muscularis propria into the pericolorectal tissue. Although rare, adenosquamous carcinomas pose a serious clinical concern due to its aggressiveness and further analysis is needed to determine the carcinogenesis and if it requires alternative treatment pathways given its squamous component.

Breast cancer in Transgender Patient with BRCA-2 mutation on Gender-Affirming Hormone Therapy

Virginia Parker, MD; Vikram Bhatt, MD; Aaron Brown, MS; Sue Ting Lim, MD, Deanna Locurto PA-C, Nicole Sookhan MD
Saint Mary's Hospital

Introduction: Transgender patients comprise a group of individuals whose gender identity and expression differ from their sex at birth. Gender-affirmation hormonal therapy in a subset of these patients is a unique risk factor for cancers that is yet being defined. There is a paucity of literature and guidelines pertaining to screening of gender-related diseases and diseases related to gender-affirming therapy in this population. These challenges are compounded by barriers of health care including lack of provider knowledge, inconsistent insurance coverage and social stigma.

Case Presentation: We herein report a case of a 62-year-old transgender woman with family history of breast cancer in her mother diagnosed at the age of 60, as well as lung cancer and skin cancer in her first-degree relatives. She initially received leuprolide injections as part of gender

affirming therapy, however she started using transdermal estrogen due to changes in insurance coverage since the past 3 years. She has yet to undergo sex reassignment surgery. On her most recent screening mammogram, she was found to have an area of spiculation and developing density in the retro areolar right breast. Ultrasound showed a BIRADS 5 lesion, and biopsy of the lesion confirmed invasive ductal carcinoma, ER+/PR+/HER-2+. She underwent bilateral mastectomy with tissue expander reconstruction and right sentinel lymph node biopsy. Final pathology showed T2N0 tumor with no evidence of metastasis on imaging studies. She underwent genetic testing and was found to have BRCA-2 mutation.

Discussion: This is a unique case of a transgender woman on hormone replacement therapy, subsequently diagnosed with right breast triple positive invasive ductal carcinoma. Genetic testing revealed BRCA-2 mutation, predisposing her to prostate cancer, skin cancer as well as pancreatic cancer. Management of this patient highlights the uniqueness of transgender healthcare, and its challenges especially given the lack of well-designed epidemiologic studies in existing literature.



Colonic Metastasis from Primary Lung Adenocarcinoma Presenting as Sigmoid Diverticulitis

Virginia Parker, MD; Vikram Bhatt, MD; Aaron Brown, MS; Sue Ting Lim, MD, Deanna Locurto PA-C, Nicole Sookhan MD
Saint Mary's Hospital

Introduction: According to American Cancer Society, lung cancer presents with metastasis in 26 percent of patients at the time of diagnosis. Common site of metastasis includes brain, liver, adrenal glands and bones. The reported incidence of symptomatic gastrointestinal metastases ranges from 0.2-0.5%.

Case Presentation: We herein report a case of a 72 year-old Caucasian female who presented with a three day history of left lower quadrant pain, fever and chills. She had one similar episode two months prior which resolved following a course of IV and oral antibiotics. CT Abdomen/Pelvis on this presentation showed mural thickening of the sigmoid colon. Laboratory work up was unremarkable except leukocytosis and elevated CEA 17.1.

This patient was previously diagnosed with stage IV lung adenocarcinoma (cT4, cN1, cM1a) and was undergoing chemotherapy at the time of presentation. She had a 46 pack year smoking history and quit 36 years ago. Her primary lesion was a right apical suprahilar adenocarcinoma (PDL-1 -ve/EGFR -/ BRAF -) with FDG avid

Clinical Oncology Competition

Santosh Swaminathan MD, Sue Ting Lim MD, Paraag Chowdhary MD, Abdel A. Richi MD FACS FCCP

Saint Mary's Hospital

Introduction: The incidence of thymic neuroendocrine carcinoma is low and was recently determined to be four percent in a report of over a thousand cases. We, as a part of being a community cancer program describe a surgical case of locally invasive thymic neuroendocrine carcinoma.

Methods: Fifty eight year old male active smoker who underwent workup for shortness of breath and paroxysmal atrial fibrillation associated with a significant weight loss in the preceding four months.

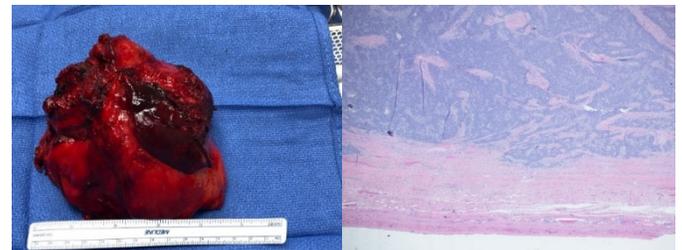
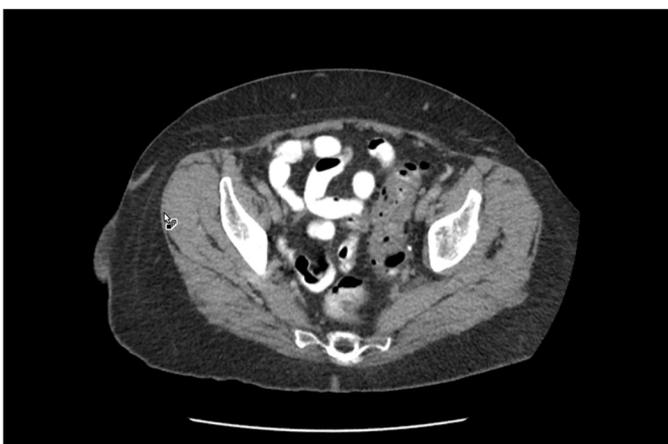
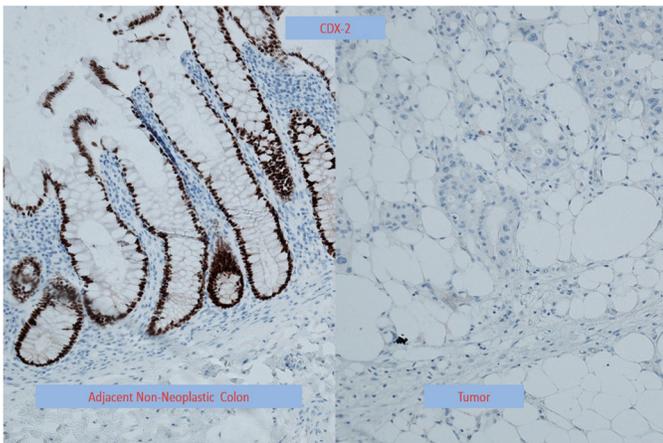
Results: Evaluation with CT scan of the chest performed showed a large heterogeneous left anterior mediastinal mass with an enlarged lymph node. CT-guided biopsy revealed thymic neuroendocrine carcinoma with uptake on PET scan. He thus underwent a surgical resection of the mass with the adjacent area of lung and pericardium via a median sternotomy. Final pathology revealed a large cell high grade neuroendocrine carcinoma (LCNEC). Postoperatively the atrial fibrillation resolved, the patient started to gain weight and further management included initiation of chemo-radiation.

Discussion: In the present case report we identify cardiac dysrhythmia as a possible manifestation of thymic carcinoma. Management of large cell neuroendocrine tumors of the thymus involves review of multiple case series and comprises of complete surgical resection and adjuvant chemoradiation.

uptake in right hemidiaphragm and right 12th rib. She showed minimal response to first line chemotherapy and was started on Alimta and Avastin.

She underwent laparoscopic Hartmann's procedure. Final pathology revealed sigmoid diverticulitis with focal perforation and an area of invasive adenocarcinoma involving the perforated diverticulum. Eleven mesenteric lymph nodes were harvested and negative for malignancy. The tumor showed immunoreactivity for CK 7 and lack of immunoreactivity for CDX2 and CK 20 which argued strongly against a primary gastrointestinal tumor, and favored a non- colonic primary site. Immunohistologic features favored metastatic adenocarcinoma and given the lack of other primary sites, this was thought to likely originate from lung adenocarcinoma.

Discussion: This is an unusual case demonstrating colon metastasis from primary lung adenocarcinoma masquerading as acute sigmoid diverticulitis. A literature search revealed a series of 366 cases of gastrointestinal metastasis from lung primary spanning across three continents over a 20-year period. Majority of these gastrointestinal metastases occurred at end stage lung cancer, and missed diagnosis occurred frequently. This clinical vignette emphasized the importance of clinical suspicion for metastatic process in a patient with end stage lung cancer presenting with gastrointestinal symptoms.



Thymic Neuroendocrine Carcinoma: Case Report from a Community Cancer Program

Sultan Ahamed, MD, MBA, FACS General Surgery Competition



Sultan Ahamed, MD, MBA, FACS, was graduated from the University of Madras, India in 1966. He completed his residency training at the Hospital of Saint Raphael, Yale University in New Haven, CT. Dr. Ahamed served as President and Chairman of medical professional liability insurance provider CMIC Group from 1993-2017. He is also

the past President of the New London County Medical Association and Connecticut State Medical Society. Dr. Ahamed also served as Chairman of the Board of the Physicians Insurance Association of America.

Moderator:

Kathleen LaVorgna, MD, FACS
Chair of Surgery, Nuvance Health, Norwalk Hospital
ACS Governor-at-Large for Connecticut
Past President, CTACSPA, Inc.

Judge:

Denise Barajas, MD FACS
Medical Director - Hewitt Center for Breast Wellness
Griffin Hospital, Derby CT

Safe Approaches to Improving Efficiency at a High Volume Bariatric Center

Priscilla Lam MD, Natalie Pozzi MD, Soroush Shakibakho MSc, Kanika Aggarwal PharmD, Philip Corvo MD, FACS, Shohan Shetty MD, FACS
Saint Mary's Hospital

Introduction: Bariatric surgery has come to the forefront of medical strategies for weight loss and improving obesity-associated comorbidities. As a bariatric surgery center for our region, we have developed strategies to safely improve efficiency at our center with appropriate control of postoperative pain and nausea along with appropriate patient scheduling.

Method(s): A retrospective review was performed of all adult patients undergoing laparoscopic or robotic sleeve gastrectomy between the time period July 2017 to January 2019. The incidence of postoperative nausea and vomiting was recorded as well as procedure start times, procedure end times, time of postoperative swallow studies, use of intraoperative esophagogastroduodenoscopy (EGD) and time until discharge. Student t-tests were used to calculate differences in length of stay based on procedure duration time and time of postoperative upper GI series.

Results: A total of 193 patients were included in the study. The average age, BMI, and male to female ratio in our study group was 42 years, BMI 45.62 and 31:162. The results showed that patients with procedure times less than or

equal to one hour were more likely to be discharged with a shorter length of stay compared to those with procedure durations greater than one hour. Similarly, patients who underwent an upper GI swallow study within the first 20 hours after their surgery were also more likely to have a shorter length of stay. While it was expected that total procedure time would reduce incidence of postoperative nausea/vomiting due to decreased anesthesia exposure, this was not found to be statistically significant ($p = 0.26$).

Conclusion(s): At a high-volume bariatric surgery center, streamlining the approach to surgery along with postoperative pain and nausea control strategies can safely and effectively reduce hospital length of stay and improve cost effectiveness in a surgical field that continues to grow. Future studies should evaluate the role of intraoperative EGD alone for leak testing versus postoperative imaging.

Procedure Time	Length of Stay (hrs)	95% CI	P value
≤ 1 hour	43.97	1.96	0.01
> 1 hour	48.10	2.77	0.01

Table 1. Comparison of length of stay based on total procedure time

Time of Swallow Study	Length of Stay (hrs)	95% CI	P value
< 20 Hours	42.54	2.43	0.01
≥ 20 Hours	47.09	1.72	0.01

Table 2. Comparison of length of stay based on time of swallow study postoperatively

Analysis of Transient Hyperbilirubinemia Following Routine Laparoscopic Cholecystectomy

Kristin McCoy, MD, Thomas Tritt MD, and Mohamad Zambakji MD
Stamford Hospital

Introduction: T During routine testing for patients following a laparoscopic cholecystectomy, hyperbilirubinemia and elevated liver enzymes often cause concern, and therefore, may result in an extensive workup. Hyperbilirubinemia is indicative of the obstruction of bile due to gallstones or injury to the bile ducts. In recent practice it has been noted that many patients following a laparoscopic cholecystectomy will have a transient increase in their bilirubin levels, but remain asymptomatic. The question is whether these patients should undergo further workup when the suspicion is low. Patients with an injury to a bile duct or an obstruction in the biliary tree will usually present with poor clinical signs, so our goal of this study is to identify the predictive factors versus clinically insignificant transient transaminases.

Methods: We retrospectively studied patients who underwent laparoscopic cholecystectomy at Stamford Hospital. We analyzed the post-operative serum levels of bilirubin, alanine transaminase (ALT), aspartate transaminase (AST), and alkaline phosphatase (ALP) in these patients. We identified those patients who warranted

additional work up for the abnormal lab values and stratified them.

Results: Sub group analysis of patients was divided into those with a clinically insignificant increase in liver enzymes and those with clinically significant post-operative rise in liver enzymes. Predictive risk factors were collected within the two subsets. An algorithm was created to help determine which patients benefit from early imaging versus observation.

Conclusion: Transient elevation of serum bilirubin, AST and ALT seem to occur frequently. We hypothesized that the cause for the transient transaminitis can be attributed to several factors including surgical manipulation, patient positioning, etc.

Our future goals of this study will be to prospectively evaluate the post-operative serum levels of bilirubin and liver enzymes to determine the clinical significance in patients undergoing elective laparoscopic cholecystectomy and highlight predictive and prognostic factors.

Early Use of Small Bowel Follow Through Reduces Stay and Cost in Small Bowel Obstructions

Mohammad S. Ali MD, Daniel Slack MD, Richard Feinn PhD, Zhongqiu Zhang MD PhD
Waterbury Hospital

Introduction: According to the Nationwide Inpatient Sample in 2011, nearly 1,500,000 admissions with over 300,000 laparotomies were performed for adhesion related small bowel obstructions (SBO). Small Bowel Follow Through (SBFT) consists of serial X-rays with oral Gastrografin contrast that can help confirm the diagnosis of obstructions that will require operative intervention. This study can also be therapeutic because the osmotic effect of the contrast may promote transit and result in resolution of a SBO. Aim of the study is to determine if early SBFT administration to patients with SBO decreases length of stay (LOS), hospital costs, and can identify patients that will fail non-operative management.

Methods: Single institution retrospective study from 2010 to 2019 that included a total of 476 patients. These patients were organized into groups of those who received the SBFT ≤ 24 hrs after admission (n=40), those who received the SBFT >24 hrs (n=198), and the third group of randomly selected patients that did not receive the SBFT (n=238). Overall LOS, hospital costs, and time from SBFT to the operating room was compared was using an analysis of variance

Results: LOS significantly differed between groups with SBFT ≤ 24 hrs patients having an average LOS of 6.95 days, compared to 10.65 days in the SBFT >24 hrs and 11.75 days in the no SBFT group (p=.005). Median time to the operating room in <24 hrs SBFT and >24 hrs SBFT was 1 day, which was significantly shorter than median time of 4 days for no SBFT group (p= <0.05). The average daily cost for a SBO patient is \$1,803.50. The shorter LOS by 4.8 days equated to a saving of \$8,657 per patient.

Conclusion: SBFT administered within 24 hrs decreases LOS, overall hospital costs, and decreasing time to operating room in patients that are likely to fail non-operative management.

Table 1: Mean \pm SD for Outcomes by SBFT Status

Outcome	SBFT ≤ 24 hrs	SBFT > 24 hrs	No SBFT	P-Value
Length of Stay	6.95 \pm 9.95	10.65 \pm 10.06	11.75 \pm 3.06	.005
Surgery (%)	14.0%	26.3%	15.6%	.008

A Translational Model for Venous Thromboembolism: Variable Expression of microRNAs in Hibernating and Active Black Bears

Amanda Fazzalari MD^{ab}, Giacomo Basadonna MD PhD^a, Alper Kucukural PhD^{cd}, Kahraman Tanriverdi PhD^e, Milka Koupenova PhD^e, Natalie Pozzi MD^b, Jahnvi Kakuturu MD^b, Ann-Kristin U. Friedrich MD^b, Ron Korstanje PhD^f, Nicholas Fowler MS^g, Jerrold L. Belant PhD^g, Dean E. Beyer Jr. PhD^{h,i}, Marjory B. Brooks DVM^j, Eric W. Dickson MD MHCM^k, J. Alexander Palesty MD^e, Jane E. Freedman MD^d, Mitchell A. Cahan MD MBA^{a*}

- a. Department of Surgery, University of Massachusetts Medical School, 55 Lake Ave N, Worcester, MA 01655
- b. The Stanley J. Dudrick Department of Surgery, Saint Mary's Hospital, 56 Franklin Street, Waterbury, CT 06706
- c. Bioinformatics Core, University of Massachusetts Medical School, 368 Plantation St, Worcester, MA 01605
- d. Program in Molecular Medicine, University of Massachusetts Medical School, 368 Plantation St, Worcester, MA 01605
- e. Department of Medicine, Division of Cardiovascular Medicine, University of Massachusetts Medical School, 368 Plantation St, Worcester, MA 01605
- f. The Korstanje Lab, The Jackson Laboratory, 600 Main St, Bar Harbor, ME 04609
- g. Camp Fire Program in Wildlife Conservation, State University of New York College of Environmental Science and Forestry, 1 Forestry Dr, Syracuse, NY 13210
- h. Department of Fisheries and Wildlife, Michigan State University, College of Agriculture & Natural Resources, 480 Wilson Rd, East Lansing, MI 48824
- i. Michigan Department of Natural Resources, 1990 Highway 41 S, Marquette, MI 49855
- j. Cornell University Animal Health Diagnostic Center, 240 Farrier Rd, Ithaca, NY 14850
- k. Department of Emergency Medicine, University of Massachusetts Medical School, 55 Lake Ave N, Worcester, MA 01655

Introduction: Hibernating American black bears have significantly different clotting parameters than their summer-active counterparts, affording them protection against venous thromboembolism (VTE) during prolonged periods of immobility. The identification of microRNA (miRNA) signatures that allow bears to maintain hemostasis during hibernation may lead to the development of novel therapies targeting regulators of these pathways, that can ultimately be used for the prevention or treatment of VTE in humans. We compared the microRNA expression in the plasma of hibernating black bears with their summer active counterparts to evaluate potential differences in hemostasis during hibernation.

Methods: MiRNA sequencing was assessed in plasma from 21 American black bears in summer active (n=11) and hibernating states (n=10) and miRNA signatures during each state were established using both the bear and human genomes. MiRNA targets were predicted using messenger RNA (mRNA) transcripts from black bear kidney cells.

Results: We identified 15 miRNAs that are differentially expressed in the plasma of hibernating black bears. Of these miRNAs, three were significantly downregulated

(miR-141-3p, miR-200a-3p, and miR-200c-3p) during hibernation. These three miRNAs were predicted to target *SERPINC1*, the gene for coding for antithrombin (AT), a protein we have previously shown is altered in hibernating bears.

Conclusion: To our knowledge this is the first study that explores the role of miRNAs in the genetic modulation of hemostasis in hibernating bears. Our findings suggest that the hibernating black bears' ability to maintain hemostasis and achieve protection from VTE during prolonged periods of immobility may be explained by decreased expression of three miRNAs (miR-141-3p, miR-200a-3p, and miR-200c-3p), ultimately resulting in unopposed expression of *SERPINC1*, and increased AT production. Together, these findings provide information that can be applied to the development of miRNA mimics or anti-miRNAs that target AT and can be used in as prophylaxis and treatment of VTE.

Non-Operative Treatment of Spontaneous Splenic Rupture as a Complication of Babesiosis. A Case Report

Alpen Nacar MD, Zachary Phillips MD, Patrick Zimmerman DO, Juan Flores-Gonzales MD, Rio Nomoto MD, Mary Ella Wood MD, Inam Shaikh, MD
Danbury Hospital

Babesiosis, a tickborne parasitic infection of erythrocytes caused by the protozoan *Babesia microti*, is an emerging zoonotic disease primarily affecting the northeastern and upper midwestern United States. The severity of infection can range from subclinical infection to mild febrile illness to more severe presentations including hemolytic anemia, disseminated intravascular coagulation, acute respiratory distress syndrome, renal/hepatic failure and splenic rupture. While splenic rupture is an uncommon complication of Babesiosis, it is even more rare in cases with no history of trauma.

Here we present a 72 year-old male admitted with a one month history of generalized weakness, waxing and waning fevers, and malaise with interval development of a one day history of acute onset lower abdominal pain with no inciting traumatic events who was found to have spontaneous splenic rupture secondary to Babesiosis infection. The patient remained hemodynamically stable throughout his hospital course and repeat imaging showed decreasing size of the associated perisplenic hematoma, therefore the patient was observed in the Intensive Care Unit and ultimately discharged with outpatient continuation of antibiotic therapy.

Comparison of Mesenchymal Stem Cells from Pediatric Normal and Esophageal Atresia Patients for Use in Regenerative Medicine

Todd Jensen, MHS, Heather Wanczyk, MS, Shefali Thaker, MPH, Christine Finck, MD
CT Children's Medical Center & Department of Pediatrics at UConn School of Medicine

Introduction: Esophageal Atresia (EA) is a congenital defect in which the esophagus is not fully connected. Current treatments to bring together long gaps between the esophagus have very high complication rates and the

replacement tissue does not possess the correct structure or physiologic properties. Tissue engineering and regenerative medicine has been suggested as a new patient-specific treatment for EA utilizing the patient's own cells and a tubular scaffold. Our group recently published on the successful regeneration of an esophagus using a retrievable scaffold seeded with adipose derived mesenchymal stem cells (AD-MSC) in a porcine model of esophageal loss. The goal of this study was to evaluate phenotypic differences between AD-MSCs from normal (N-AD-MSC) and EA patients (EA-AD-MSC) to determine if EA-AD-MSC could be used for autologous tissue engineering approaches.

Methods: Subcutaneous fat was obtained from pediatric patients undergoing surgery after informed consent was obtained from the parents (IRB#). Cells were expanded for 2 passages and characterized by flow cytometry and qRT-PCR. Once the cells were expanded approximately 16 million cells were seeded onto a commercially manufactured nanofiber tubular scaffold by Biostage and incubated for 6 days with rotation. Seeded scaffolds were harvested at Day 6 and Live/Dead staining on the seeded scaffolding was performed. In addition, medium was analyzed for key growth factors using precoated sandwich ELISAs and gene expression was evaluated and compared to cells in culture.

Results: The cells from all patients expressed mesenchymal stem cell markers CD90, CD105, CD73, CD44 and did not express hematopoietic markers CD45, CD34 and HLA-DR by flow cytometry. Relative gene expression was similar between Normal (N) and Esophageal Atresia (EA) patients for CD105, CD44, CD73 and CD90. Integrin profiles for the cells also was similar across the two groups. Growth kinetics were different between Normal and Esophageal Atresia patients, which could have been a product of age difference. Live/Dead staining at the time of harvest demonstrated that the majority of the cells were viable on the scaffold. Glucose and lactate measurements over the course of the incubation also demonstrated cell viability and metabolism. Relative gene expression at the time of harvest demonstrated increased expression of IL6, IL8 and VEGFA. Similarly, ELISA results demonstrated a large production of VEGFA, IL6 and IL8 across all patient samples.

Conclusions: In conclusion, in vitro, the EA-AD-MSCs were similar to N-AD-MSCs in mesenchymal phenotype, cytokine production but had different growth rates. The large age difference between the normal and esophageal atresia patient cells is a likely explanation for the differences in growth kinetics and younger patients are being recruited as they become available. This study demonstrates no major differences in phenotype between normal and Esophageal atresia AD-MSCs. Furthermore, this study demonstrated the ability of EA-AD-MSCs to be seeded onto electrospun scaffolds as a potentially new surgical option for these patients.

Management of Anterior Interosseous Nerve Syndrome in a Community Hospital: A Case Report

Rami Al-Aref, MD; Yuen-Jong Liu, MD
Stamford Hospital

• **Introduction: Background:** AIN syndrome is a rare nerve entrapment syndrome presenting as roughly 1% of all

upper extremity palsies; patients classically present with pure motor symptoms with difficulty opposing the thumb to the index and long fingers.

- **Case:** 61 year-old RHD male carpenter who presented with two week history of motor palsy of FPL and FDP(I), severely limiting his ability to work; negative EMG/NCS, no spontaneous improvement after two months, and required surgical decompression.
- **Discussion:** While management of AIN entrapment remains controversial; operative therapy continues to be a successful cornerstone. Given our patient's lack of spontaneous improvement, we pursued operative decompression.

Background: Anterior interosseous nerve entrapment is a rare nerve compression syndrome that affects less than 1% of all upper extremity palsies. The AIN is a pure motor branch that derives from the median nerve about 5 - 8 cm distal to the lateral epicondyle and 4 cm distal to the medial epicondyle. It innervates three muscles in the forearm: flexor pollicis longus (FPL); pronator quadratus (PQ); and the radial half of the flexor digitorum profundus (FDP(I) and FDP(II)). Clinically then, It is a pure motor palsy with patients presenting with an inability to oppose the thumb to the index and long fingers. Classically, this is described an inability to make the "a-OK" sign.

Case Presentation: 61 year-old right-hand dominant (RHD) male presented with a two week inability to flex his left thumb interphalangeal joint (IPJ) and index finger distal interphalangeal joint (DIPJ). He worked as a carpenter and he used his left thumb and index fingers to pinch nails. He noted significant weakness in his ability to pinch but denied any paresthesias or trauma. On initial evaluation he had 0/5 strength in both thumb IPJ flexion and index DIPJ flexion and a failed fine pinch test. He had 5/5 strength in flexion at the long DIPJ. Imaging of his hand showed mild osteoarthritic changes of his left thumb IPJ. Electrodiagnostic studies showed mild bilateral median neuropathy at the wrist with no other sensory or motor deficits. He showed no improvement over two months, so we recommended surgical decompression. About 6 cm distal to the medial epicondyle we identified the AIN arising from the posteromedial aspect of the median nerve (Figure 2). The nerve was followed into the pronator muscle and was found to be entrapped by tendinous edge of the deep head of the pronator teres muscle (Figures 3, 4). The tendinous edge was excised and the nerve was followed distally with no other sharp step-offs noted. At six months post-operatively, he has had no regain of function. We elected to wait another six months for nerve recovery and discussed arthrodesis or tendon transfers as salvage treatment options.

Discussion: Anterior interosseous nerve syndrome is a pure motor neuropathy that can be extremely debilitating. Patients with AIN syndrome are unable to form an "O" with their index finger and thumb due to paralysis of the FPL and radial FDP. These patients tend to have a positive Pinch Grip test (Berger et al). Moreover on a day to day basis, these patients will struggle with tasks such as buttoning their shirt or turning their car on. Lack of any sensory deficits in these patients serves as a key factor in differentiating it from other entrapments of the median

nerve, such as pronator syndrome. AIN compression tends to occur at the head of the pronator teres muscle, the proximal edge of the flexor digitorum superficialis arch, a thrombosed radial/ulnar artery, or even a space occupying lesion (Spinner et al).

Electrodiagnostic studies can be helpful to rule out other neuropathies and may help reveal abnormalities in FPL, FDP, and PQ. MRI can be useful as in some cases it can show increased signal intensity in the muscles innervated by the AIN (Dunn et al).

Differential diagnosis may include trauma to the region, brachial plexus neuritis, other compressive neuropathies, or even viral neuritis. Differentiation between these is dependant on history, physical exam, and other diagnostic studies.

Management of AIN syndrome remains controversial with many patients improving without surgical decompression. Conservative therapy with rest, NSAIDs, and physical therapy remain mainstays of treatment (Seki et al). In some patients, splinting with flexion of 90 degrees at the elbow is advocated for 8 - 12 weeks if patients are not improving (Miller-breslow et al). Schantz et al argues that early surgical decompression has demonstrated promising results and should be a mainstay of treatment. While there is no consensus on the management of AIN syndrome, the majority of patients will undergo a period of conservative management prior to surgical decompression.

In the case of our patient, his job and livelihood depended on his ability to activate his FDP and FPL for stable fine pinch. He failed initial conservative therapy and opted for surgical decompression. Intraoperatively we noted the nerve to be impinged at the deep head of the pronator teres. Post-operatively he still awaits return of function.

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Sultan Ahamed, MD, FACS General Surgery Case Reports Competition



Sultan Ahamed, MD, MBA, FACS, was graduated from the University of Madras, India in 1966. He completed his residency training at the Hospital of Saint Raphael, Yale University in New Haven, CT. Dr. Ahamed served as President and Chairman of medical professional liability insurance provider CMIC Group from 1993-2017. He is also

the past President of the New London County Medical Association and Connecticut State Medical Society. Dr. Ahamed also served as Chairman of the Board of the Physicians Insurance Association of America.

Moderator:

Adrian Maung, MD, FACS, FCCM

Associate Professor of Surgery, Section of General Surgery, Trauma and Surgical Critical Care, Department of Surgery, Yale School of Medicine Adult Trauma Medical Director, Yale New Haven Hospital

Judge:

Royd Fukumoto, MD, FACS

Department of General Surgery, Program Director, General Surgery Residency Program, Nuvance Health, Danbury Hospital Medical Arts Center

Benefits of Natural Orifice Specimen Extraction (NOSE) in Colorectal Surgery

Sepehr Karimi MD, David Aughton MD, John Kaczmarek MD, Zhongqiu Zhang MD PhD
Waterbury Hospital

Introduction: Over the past three decades minimally invasive surgery has resulted in reduced post-operative pain, wound infections, rates of hernia, earlier return of bowel function, and shorter length of hospital stay. The need for a "mini laparotomy" to extract the specimen in colorectal surgery negates many of the benefits of minimally invasive surgery. Natural orifice specimen extraction (NOSE) was first performed in 1991 and is described as removal of a specimen through the opening of a hollow viscus that already communicates with the outside world, such as the vagina or GI tract. Over the past 30 years multiple studies have revealed reduction in postoperative analgesic use, quicker return of bowel function, shorter length of stay, and reduced hernia rates with NOSE compared to conventional specimen extraction. This method has been utilized for endometriosis, IBD, diverticulitis, and malignancy. Extraction through a posterior colpotomy is the most widely adopted method for multiple reasons. The vagina has redundant vascular supply leading to excellent healing, is clean in nature, and has

adequate elasticity. There are no reports of dyspareunia or sexual dysfunction from this method. In this paper we will describe a series of 2 cases of Natural Orifice Specimen Extraction performed at Waterbury Hospital.

Methods and Results: Our first patient is a 45 year old female with persistent pain after diagnostic laparoscopy with incidental appendectomy. On imaging, she was found to have uterine fibroids and therefore was taken to the operating room for robotic assisted laparoscopic hysterectomy and bilateral salpingo-oophorectomy. Intraoperatively, significant adhesions were noted between the posterior wall of uterus and superior rectum consistent with endometriosis. Due to significant inflammatory changes in her upper rectum, she underwent a low anterior resection (LAR) with colorectal anastomosis (CRA), and natural orifice extraction (NOSE). Once the uterus was removed, a robotic stapler was fired to transect the bowel in mid-rectum. The transected bowel was exteriorized through the open vaginal cuff. The proximal bowel transection was performed and the purse-string suture and anvil were placed extracorporeally. The anvil within the bowel was delivered back through the vagina into the pelvis. Colorectal anastomosis was performed and vaginal cuff opening was closed robotically. Patient was discharged on Post-operative day 2 with no complications.

The next patient is a 43 year old female who presented with recurrent abdominal pain secondary to progressive endometriosis. She was taken to the operating room for CO₂ colonoscopy, Robotic assisted appendectomy, sigmoid resection with colorectal anastomosis, lysis of adhesions, salpingo-oophorectomy, hysterectomy, and excision of pelvic endometriomas. Intraoperative findings were extensive adhesions in the pelvis, diffuse endometriosis involving the appendix and sigmoid colon with endometriomas in the sigmoid colon. Following the hysterectomy and salpingo-oophorectomy, both the appendix and sigmoid colon were exteriorized through the vaginal cuff. Following sigmoid resection and colorectal anastomosis, the vaginal cuff was closed robotically. Patient was discharge on Post-operative day 1 with no complications.

Conclusion: Natural Orifice Specimen Extraction (NOSE) for colorectal surgery is a safe alternative to the mini laparotomy. This method results in less post-operative analgesic use, earlier return of bowel function, shorter hospital stay, lower incisional hernia rate, and decreased wound complications.

Revascularization of the Internal Iliac Artery as a Novel Treatment of Chronic Mesenteric Ischemia

Brandon Madris, MD
Stamford Hospital

Nonocclusive mesenteric ischemia is bowel hypoperfusion in the absence of mesenteric thrombus which most often occurs secondary to acute myocardial infarction, congestive heart failure or hemodialysis (1). We present a 70-year-old female admitted to the hospital with severe abdominal pain during hemodialysis. Her pain was recalcitrant to SMA stenting, but resolved with stenting of her common iliac artery (CIA). In chronic mesenteric occlusive disease the

bowel remains viable through a network of anastomoses between the peripheral and intestinal vasculature (2). There is significant morbidity associated with open revascularization (3). In our case, increasing flow through hemorrhoidal collaterals brought symptomatic relief.

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Bronchobiliary Fistula Secondary to Chronic-Pancreatitis-Induced Biliary Obstruction

Emi Manuia MD, Shawn Liechty MD, Alexander Ostapenko MD, Daniel Kleiner MD
Danbury Hospital

Introduction: S Bronchobiliary fistula (BBF) are benign in nature and present as fulminant acute respiratory distress syndrome (ARDS). Rarely do they occur due to biliary obstruction caused by chronic pancreatitis. BBF carry an unacceptable mortality risk up to 10.3% in some cases, mainly due to surgical complications. Here we present a patient who presented to the emergency room with cachexia and ARDS, which masked the prompt diagnosis of BBF. The fistula was diverted with ERCP and stenting. Definitive therapy with hepaticojejunostomy is planned after optimal nutritional recovery.

Case Report: A 43-year-old malnourished female with hepatic mass and chronic pancreatitis treated with Puestow procedure presented from a nursing facility with productive cough with yellow sputum and chronic abdominal pain. She was admitted to the ICU for ARDS and promptly underwent bronchoscopy, where 1 L of tan-colored, foul smelling thin liquid was evacuated and ultimately grew *E. Coli*. She required prone ventilation with paralysis to maintain adequate ventilation. A decompressive tube was placed into the abdominal portion of the fistula which resulted in improved ventilation. Later, a HIDA scan demonstrated BBF. Initial attempt to take down the fistula surgically was thwarted by malignant hyperthermia, so she underwent ERCP with sphincterotomy and stent placement across a distal bile duct stricture. This test established her diagnosis which was a ruptured biloma from a distal biliary obstruction. Post-ERCP HIDA demonstrated appropriate biliary decompression. She is currently receiving supplemental enteral nutrition by gastrostomy tube in anticipation of future fistula takedown.

Conclusions: BBF is a rare and morbid condition. BBF secondary to biliary obstruction from chronic pancreatitis is rarer. If suspicion for BBF is high, bronchoscopy, HIDA, and urine dipstick to assess for bilious sputum are useful adjunctive tests. Establishing a diagnosis early may reduce morbidity and associated costs of care.



Complex Restenosis after AV Fistula Creation

Brienne Ryan MD, Anil Shah MD, Stephen Bauer MD FACS
Stamford Hospital

Introduction: Common arteriovenous access complications include stenosis formation, thrombosis and failure to mature. Some studies have shown as high as 64% to 77% stenosis of new AV grafts within the first year. These complications can have significant impact on patient quality of life as well as leading to patient mortality. According to the Kidney Disease Outcomes Quality Initiative (K/DOQI) guidelines, a clinically significant stenosis in an AV graft is defined as a greater than 50 percent diameter. We encountered a case that demonstrated multiple areas of high grade stenosis related to both an AV fistula and stenosis of a vascular prosthetic device leading to severe arm swelling. Balloon angioplasty was used to open up the stenotic regions and return flow.

Method(s): An 86 year old male with past medical history significant for end-stage renal disease presented with severe arm swelling ipsilateral to a fistula. A venogram with intent to treat was indicated for presumptive central venous stenosis. A fistulogram was performed which demonstrated multiple areas of high grade stenosis including 70% stenosis in the cephalic arch and distal cephalic fistula and 80% to 90% long segment stenosis from the left subclavian through the innominate vein into the superior vena cava. Most of the stenosis was in-stent stenosis in the wall stent placed several months prior. The patient had developed significant collaterals through the azygos system to supplement filling. A stent was noted in the location of a previously positioned pace-maker wires.

Results: The patient was found to have greater than 80% stenosis in the superior vena cava and left innominate vein. There was between 80-90% stenosis from the left subclavian vein into the cephalic arch. A stiff angled 035 Glidewire was used to cross the lesion. The wire was

exchanged for a 018 guidewire. A 018 intravascular ultrasound probe was placed into the superior vena cava. The intravascular ultrasound interrogated the superior vena cava, left innominate vein, left subclavian vein and left innominate vein. A 8mmx80mm Boston Scientific gladiator balloon was chosen. An 8 mm balloon angioplasty was performed in the superior vena cava and innominate vein and left subclavian. Two to four minutes of insufflation was performed at 25-30 atmospheres. A 7mmx80mm Boston Scientific balloon was used in the cephalic arch and distal cephalic fistula. A repeat venogram was performed which showed good luminal gain and strong palpable thrill with no evidence of extravasation.

Conclusions: Restenosis is a common complication of arteriovenous access procedures. As high as 77% stenosis of new AV graft has been reported. Significant stenosis is defined by greater than 50% diameter. We encountered a patient with chronic graft stenosis which resulted in greater than 90% long segment stenosis, with additional in-stent stenosis and resultant development of collaterals through the azygos system. Balloon angioplasty was performed which achieved improved luminal gain at the sites of stenosis.

Large Cell Neuroendocrine Tumor of The Gall Bladder in a Down Syndrome Patient

Ashley Dunbar BA¹, Rachael Steinhauer BS¹, Christine Van Cott MD^{1,2}, Imran Siddiqui MD²

¹Frank H Netter MD School of Medicine at Quinnipiac University

²St. Vincent's Medical Center, Department of Surgical Oncology

Introduction: Large cell neuroendocrine carcinoma (LCNEC) of the gall bladder is exceptionally rare. Only 10 cases have been published. We present the first case in an individual with Down Syndrome found to have locally advanced LCNEC of the gall bladder extending into the liver and small bowel.

Case Discussion: A 49-year-old individual with Down Syndrome and congenital duodenal strictures who had undergone surgery as a neonate presented with nausea, abdominal pain and diarrhea. CT abdomen demonstrated a 5 X 4.2 cm exophytic, heterogeneously enhancing mass at the inferior aspect of segment 6 of the liver (Fig 1-2), along with multiple small hypodense foci in both hepatic lobes consistent with biliary hamartomas. Differential diagnosis included gall bladder carcinoma, cholangiocarcinoma of the liver or locally advanced small bowel malignancy. Workup included tumor markers, staging CT chest, MRI of the abdomen and EGD, which revealed gastritis and ulceration at anastomosis but no luminal cancer.

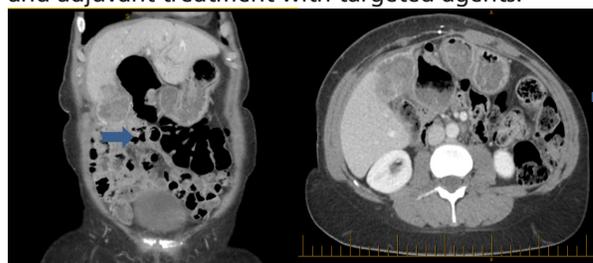
The patient underwent diagnostic laparoscopy followed by robotic converted to open extensive LOA with en bloc resection of the liver involving the gallbladder mass and multiple loops of small bowel. She was also found to have a stricture at the ampulla which was stented. A transduodenal biopsy, sphincterotomy and common bile duct exploration cholangiogram was performed. She then underwent reconstruction with a gastrojejunostomy and

Roux-en-Y/small bowel enteroenterostomy and closure of duodenotomy.

Pathology findings included poorly differentiated large cell neuroendocrine carcinoma (G3), 6 cm in greatest dimension, with invasion of liver, duodenum and stomach, negative liver and gastric/small bowel margins (Fig 3-4). The tumor was composed of large cells with nucleomegaly, prominent nucleoli, numerous mitotic figures as well as geographic necrosis (Fig 5-6). LVI was present, PNI not identified, and 3/15 lymph nodes involved. Staging was determined to be pT4pN1. Molecular/genetic testing of the tumor showed no evidence of MMR and CPS was 10. Postoperatively, she had a bile leak and underwent PTC placement. She was treated for cholangitis and was found to have *Citrobacter* bacteremia. CT at 8 weeks post-op showed enlarging liver lesions in both lobes of liver, measuring up to 2cm in size.

The patient was seen for a second opinion regarding adjuvant therapy. Initially, the idea was to treat the entity like small cell carcinoma with platinum/etoposide. CPS immunotherapy was considered, although no data on previous usage was present given rarity of disease. However, repeat imaging was suggestive of hepatic metastases that had since further progressed. CT guided biopsy of liver frozen section was consistent with poorly differentiated cancer, indicative of metastatic disease. Given the diagnosis of LCNEC of the gallbladder, the patient was not a candidate for chemotherapy at which time palliative therapy and hospice support was considered.

Conclusion: LCNEC is an extremely rare cancer and its association with Down Syndrome is unique and has not previously been reported. LCNEC is an aggressive cancer with poor prognosis and there are currently no clear guidelines for treatment. Given its aggressive nature, it is currently treated with surgery and chemotherapy. Recent advances in neoadjuvant treatment may suggest future approaches including identification of molecular profiling and adjuvant treatment with targeted agents.



Figures 1 & 2: CT of the abdomen and pelvis. Arrows indicate tumor.



Figure 3 & 4: Resected gross specimen. Arrows indicate tumor.

Clostridium Paraputrificum Septicemia and Splenic Abscess – The First Documented Case Report

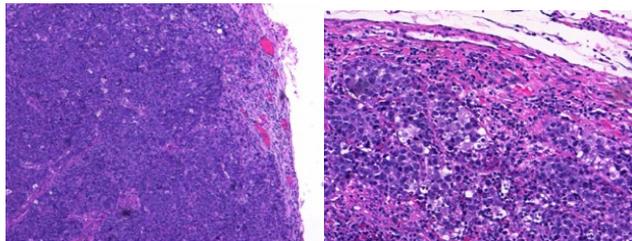
Robert Kimmel, Alexandra Sanowski-Bell, Daniel Ricuarte, Peter Zdankiewicz
Waterbury Hospital

Introduction: *C. paraputrificum* is an anaerobic, motile, endo-spore forming, chitinolytic, gram-positive bacterium, which is rarely isolated. This particular bacteria has been described in individuals with predisposing risk factors such as immunosuppressed state or malignancy, particularly colon cancer, diabetes, trauma, hematologic disease or infective endocarditis. It has also been isolated from healthy individuals and has been thought to contribute to colonic epithelium maturation and development, however, its role in infectious diseases is limited and unclear.

Case Report: The patient is a 71-year-old obese female with a past medical history significant for diabetes, hypertension, atrial fibrillation, hypothyroidism, GERD, and left total knee replacement. She was brought to the emergency room due to altered mental status, lethargy, chills, and generalized malaise. On presentation, the patient was hemodynamically stable, afebrile, with a benign physical exam, but had mild leukocytosis to 11.5, elevated creatinine 1.57 (baseline 0.85), and hyperglycemic to 442. Blood cultures demonstrated *Clostridium paraputrificum* bacteremia. CT scan of the abdomen revealed a large, complex gas forming splenic abscess measuring 12 x 10 x 8 cm with extension into the splenic vein at the hilum. She was taken for an exploratory laparotomy and open splenectomy. Post-operatively the patient remained on a total of 14 days of antibiotics, and ultimately was discharged to a rehabilitation facility on post-operative day seven. She returned the day following discharge with fevers, tachypnea, leukocytosis and CT revealing a large left sided pleural effusion, bilateral pneumonia, and sputum cultures growing *K. Pneumonia*. Her clinical course deteriorated quickly, and she was subsequently made comfort measures by her family and passed away on post-operative day twenty.

Discussion: Based on our literature review, this is the first documented case of *C. paraputrificum* causing bacteremia and splenic abscess. The species' clinical significance is not well described, and few case reports exist on this organism being isolated in liver and GI tract pathology, but never splenic abscesses. The source of our patient's splenic abscess was never able to be determined. Our patient was not immunocompromised prior to her admission and did not have any history of colon cancer, which are predisposing factors to *C. paraputrificum*. Though there is report of *C. paraputrificum* in a liver abscess, it is still very rare as the only "known" case was published in 2017. Furthermore, splenic abscess is even more rare than liver abscess with approximately .15-.20% incidence. *E. coli*, *S. aureus*, *S. pneumonia* are the most common isolated organisms from splenic abscess, with an anaerobe like *Clostridium paraputrificum* only first reported with our patient's case.

Conclusions: The primary etiology of this patient's splenic abscess is unknown, as she did not exhibit any other infectious source. It is likely that they patient may have had



Figures 5 & 6: Low-power and high-power light microscopy H&E staining of the LCNEC tumor

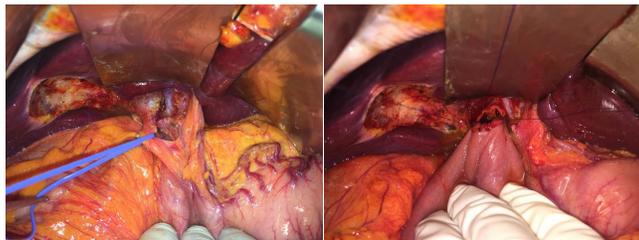
A Case of a Resectable Type V Biliary Cyst: A Call for Modification to the Todani Classification

Shawn Liechty MD, Alexander Ostapenko MD, Daniel Kleiner MD
Danbury Hospital

Introduction: Choledochal cysts are a rare entity, occurring in approximately 1:100,000 to 1:150,000 live births, with a female to male preponderance of approximately 3-4:1. Choledochal cysts are classified into 6 types, with some variations in subtype. Type V cysts (Caroli disease) account for approximately 20% of all cysts. Treatment historically consists of orthotopic liver transplantation or hepatectomy. In one series, post-operative complications occurred in 37.5% of patients receiving surgical treatment for Caroli disease and included cholangitis, hepatic insufficiency, T-tube leakage, bleeding, biloma, wound infection, cholestasis, and pancreatitis. Typically, Caroli disease is characterized by multiple intrahepatic biliary cysts, but case reports have described cases with isolated intrahepatic cysts. Here, we present a case of an isolated type V choledochal cyst that was resected without the need for hepatectomy or liver transplantation.

Case Presentation: A 33-year-old male with constipation was found to have a choledochal cyst on CT scan. ERCP and MRI confirmed a type V choledochal cyst. Imaging showed the cyst to be isolated and located near the liver edge, so the patient was deemed a candidate for cyst resection. He underwent successful cyst resection with hepaticojejunostomy reconstruction and continues to do well without postoperative complication 9 months later.

Conclusion(s): Type V biliary cysts are a rare entity that are typically treated with hepatectomy or orthotopic liver transplantation, resulting in significant perioperative morbidity. Some type V cysts are isolated and amenable to local resection without hepatectomy or transplant. We suggest a modification to the Todani classification to reflect the subgroup of type V cysts that are amenable to local resection. These patients may benefit from reduced perioperative morbidity if they are treated with local resection.



an undiagnosed previous infection that led to the development of this splenic abscess. She may have overcome the primary infection, but due to her significant comorbidities may have led to an immunocompromised-like state that made her susceptible to the development of her splenic abscess. Unfortunately, the family did not wish to proceed with autopsy and the cause will never be known.

An Old Disease for a Young Person: A Case Study and Literature Review of Acute Diverticulitis in the Young Patient

Erika King MD, Saumitra Banerjee MD, FACS
University of Connecticut & St. Francis Hospital

Introduction: Once thought to be a rarity or misdiagnosis, the number of cases of acute diverticulitis amongst the younger population is growing. This is a case study of a 25-year-old male with 2 bouts of acute diverticulitis with an accompanying literature review of the dogma for the cause of acute diverticulitis. It will also delve into the management of acute diverticulitis in young patients, and further explore those reports that have subjects less than 30 years of age.

Method(s): A retrospective chart review was performed for this case study. A literature review was subsequently performed using Pubmed from years 1980-to current date.

Results: The patient is a 25-year-old male with two documented cases of diverticulitis to date. At the first diagnosis, the patient was treated with medical management, including IV antibiotics, seemingly resolving the infection. Several months later returned to the emergency room with CT guided diagnosis of acute diverticulitis at ileum, far from his prior diverticulitis.

Conclusion(s): The management of patients who are younger than 30 has been a debate amongst physicians. This patient exemplifies the cause for debate over the management of this population. The patient was first treated with medical management and had seemingly improved, however, he then subsequently had a recurrence. At this time, the decision for more aggressive surgical management is still being discussed. The literature review should help to illuminate the possibilities of management and outcomes for young patients with acute diverticulitis. The cause of diverticulitis has been understood in the medical community as multifactorial, but a large portion of patients' understanding is that the disease progression and prognostic determination can be broken down to age and diet. If we eliminate old age as a factor and focus on the cohort of patients younger than 30, for diverticulitis, the current dogma in the surgical community is that the cause of diverticulitis is high fat and low fiber diets. This, in turn, leads to physicians instructing their patients to make lifestyle adjustments. However, the diet may not be the source for acute diverticulitis among a younger population. Furthermore, physicians are not in agreement with the medical management of these individuals. Some physicians state that younger patients have more severe cases while others are not as severe and can be managed non-surgically. The purpose of this case study and literature review is to explore other treatment

options for younger patients with acute diverticulitis as well as discuss the etiology of this disease process in an increasing patient population.

The Surgical Celiac Lymphoma

Gaspar Barreto MD, David Aughton MD, Jayakara Shetty MD
Waterbury Hospital

Introduction: Enteropathy Associated T-cell Lymphoma (EATL) is a rare pathology associated with Celiac Sprue with an abysmal prognosis. The association with this enteropathy makes it challenging to make an early diagnosis because of the symptoms typically associated with it. This makes an effective treatment strategy more challenging because of the typically later timeline to diagnosis. We present a case of biopsy confirmed advanced EATL eluding modern imaging techniques suggesting an ill-defined approach to differentiating the patient with a Celiac flare to the one with a more sinister pathology warranting invasive surgical intervention.

Case: A 60 year old female presented to the ED complaining of chronic left upper quadrant abdominal pain in light of a past medical history notable for serologically and biopsy proven Celiac Disease with no associated malabsorptive or B-symptoms, hepatosplenomegaly, or infectious signs. CT abdomen concerning for a 4 cm soft tissue abnormality with associated dilated Jejunal loops, mesenteric edema, and adjacent nodal enlargement. She was subsequently sent for a CT-Enterography to characterize any intraluminal lesion, however the imaging was discordant with the original CT scan and did not identify the same lesion. The patient was taken for an elective diagnostic laparoscopy showing ulcerative jejunitis. We converted to an exploratory laparotomy to perform a small bowel resection with side to side anastomosis at an area where the small bowel was kinked and felt like there might be a mass. The pathology resulted as Large CD30 positive T-Cells consistent with Enteropathy-Associated T-cell Lymphoma. Staging PET/CT scan was negative for metastatic disease.

Conclusions: Enteropathy Associated T-cell Lymphoma (EATL) is a challenging and unfortunate disease process at the end of the Celiac spectrum heralding an abysmal prognosis with most patients having a life expectancy of only a few months following diagnosis. Albeit a rare complication of the most common genetic diseases in the US, the nuanced clinical presentation and inherent late stage at time of diagnosis may suggest a higher prevalence than previously hypothesized warranting a high index of clinical suspicion in non-responders to dietary modification.

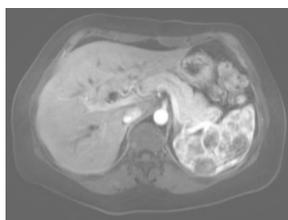
An Incidental Littoral Cell Angioma of the Spleen: A Case Report

Nicolle Burgwardt MD, Kristin McCoy MD, Kevin Miller MD
FACS, Helen Pass MD FACS
Stamford Hospital

Introduction: Littoral cell angioma of the spleen is a rare vascular tumor named for its cell of origin, the splenic sinus

lining cells, known as littoral cells. It was first described by Falk et al in 1991, followed by only a handful of case reports in the last 30 years. This report will review the presentation, evaluation, and management of this rare tumor.

Case Presentation: The patient is a 53-year-old female who presented to the ED with 3 days of nausea, vomiting and epigastric/RUQ pain. Initial workup revealed leukocytosis, cholelithiasis, and pericholecystic fluid suggestive of cholecystitis on CT and RUQ US. She was admitted for IV antibiotics, underwent an uneventful laparoscopic cholecystectomy and was discharged POD1. Her CT of abdomen/pelvis incidentally revealed innumerable low-attenuation non-specific, thin walled lesions within the spleen. She was referred to hematology-oncology for additional evaluation. Laboratory workup was unremarkable. Cytometry and bone marrow biopsy were negative. Additional imaging was obtained.



MRI: Spleen 14.3cm x 8.6cm with complete infiltration by solid masses best appreciated on arterial phase post contrast. Largest 40mm x 26mm.

PET CT: No abnormal uptake by lesions on spleen. Chest,

mediastinum, breasts, abdomen, pelvis, bones appear normal



Follow up CT: Stable hypodense splenic masses without any other abdominal, pelvic, or retroperitoneal abnormalities. Histologic sampling recommended for definitive diagnosis.

She underwent an uneventful open splenectomy. Pathology revealed an enlarged spleen, measuring 14x8.5x1.5cm and 240gm, extensively involved by numerous nodules of anastomosing vascular channels with dilated cavernous vascular spaces lined by plump cells consistent with a littoral cell angioma.

Discussion: Littoral cell angioma is a rare benign vascular tumor named for its cell of origin, the splenic sinus lining cells, known as littoral cells. First described by Falk et al in a review of 17 cases, this novel lesion was described as variable sized nodules replacing splenic tissue, comprised of anastomosing vascular channels resembling splenic sinus with an irregular lumina, with papillary projections and cyst like spaces. The cells do not display atypia and have low mitotic activity. IHC testing reveals the expression of CD68, confirming its endothelial origin, and differentiating it from other neoplasms, such as angiosarcoma. On CT scan, littoral cell angioma appears as hypoattenuating nodules demonstrating contrast enhancement on delayed phase. It

is nearly impossible to diagnosis littoral cell angioma by imaging alone. Pathological evaluation is required to differentiate this benign entity from a malignancy. A splenectomy, as performed in our case, is the appropriate treatment. Postoperative surveillance is recommended, however no guidelines exist.

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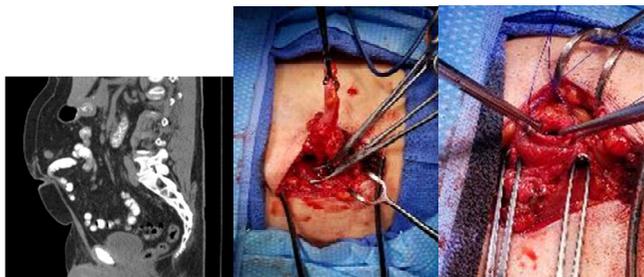
Incisional Hernia Causing Appendicitis

Minje Ha MD, Shawn Liechty MD, Cynthia McKinney MD, Kathleen Knapp, Margaret Spinella, Adam Welber MD, John Borruso MD
Danbury Hospital

Introduction: Incisional hernia containing the appendix is very rare, and the overall incidence is not known. Case reports of Amyand hernia, or inguinal hernia containing the appendix, sometimes include incisional hernia containing the appendix, but there is no consistent classification. As such, the true incidence, pathology, and preferred treatment of incisional hernia containing the appendix is not known. Recent case series provide some evidence to support performing appendectomy in all cases of Amyand hernia, but recommendations regarding incisional hernia containing the appendix are lacking. Here we present a case of incisional hernia containing an enlarged but otherwise grossly normal appearing appendix that demonstrated acute appendicitis on pathology.

Case Report: A 67-year-old male presented to the general surgery office for evaluation of painful abdominal wall mass 6 months after robotic assisted radical prostatectomy. Examination demonstrated a palpable bulge at robotic trocar site. CT scan demonstrated incisional hernia that contained the appendix. There were no systemic signs of infection. The patient went to the operating room for incisional herniorrhaphy. An enlarged but otherwise normal appearing appendix was identified and standard appendectomy performed. The fascial defect was small so it was closed primarily. Pathology demonstrated focal acute appendicitis. The patient has recovered and remains without complication 2 months later.

Conclusions: Incisional hernias containing the appendix are rare, and the incidence of appendicitis associated with incisional hernia is unknown. Recent case series have recommended prophylactic appendectomy when the appendix appears grossly normal in cases of Amyand herniorrhaphy. Here, we present a case of incisional hernia containing an enlarged but grossly normal appearing appendix with discordant pathology demonstrating acute appendicitis. We recommend appendectomy in cases of incisional hernia that contain the appendix.



Stenting of Chronically Occluded IVC Filter: A Case Report and Literature Review

Anil Shah MD, Stephen Bauer MD, Brienne Ryan MD
Stamford Hospital

Introduction: Venous thromboembolism (VTE) is a common disease that are associated with two common presentations, deep vein thrombosis of the lower extremity and pulmonary embolism. The pathogenesis of VTE, Virchow's Triad, hypothesizes that VTE is a result of alterations in blood flow, vascular endothelial injury, and alterations in the proteins involved in coagulation. Mainstays of treatment are anticoagulation. Alternatively, in patients with contraindications to anticoagulation, IVC filters are often used. One of the well known complications that can occur after IVC filter placement is IVC thrombosis, with an incidence reported in the literature as high as 30% (Partovi, 2017). Endovascular therapies have become a useful adjunct in the treatment of occluded IVC filters. Endovascular recanalization is already an accepted method to restore flow in cases of chronic total occlusion of the IVC and iliac veins. In a recent single center experience at an outside institution 71 patients underwent recanalization, 54% of which were due to occlusion of IVC filters, further suggesting that occlusion of IVC filters is common (Murphy, 2017). In this case report we present a case where stenting of an occluded IVC filter was done to relieve proximal occlusion and relieve lower extremity edema in a patient.

Case Presentation: We present a case of a 72 year old male that came in to be evaluated for bilateral leg swelling, hyper pigmentation, and ulcerations of his right anterior ankle. The patient did admit that 30 years ago he developed a DVT with a pulmonary embolism, which the patient believed to be in the right leg. At that time he had an IVC filter placed however I was complicated by embolization so a second filter had to be placed. His venous ultrasounds showed that he had bilaterally venous reflux with chronic scarring. The patient then underwent an ascending venogram via the right popliteal artery with interrogation of both iliac and femoral system, where it was seen that the IVC filter was occluded. The IVC filters was then balloon dilated and stented to restore flow distally.

Conclusion: The patient whose case we present has yet to follow up status post balloon angioplasty and stenting of his IVC filter however we conclude that the presented endovascular technique is viable in cases of occluded IVC filters.

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Minimally Invasive Approach to Complex Liver Abscess Arising from Foreign Body Perforation

¹Rachael Steinhauer BS, ¹Ashley Dunbar BA, ²Imran Siddiqui MBBS, MD

Frank H. Netter MD School of Medicine, Hamden, CT, ²St. Vincent's Medical Center, Bridgeport, CT

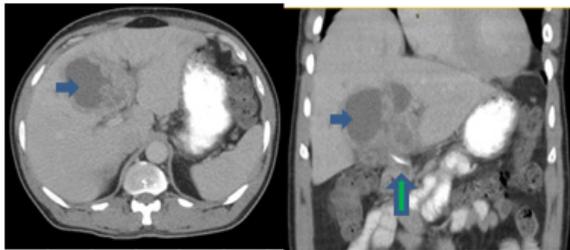
Introduction: Pyogenic liver abscess caused by a migratory foreign body presents a therapeutic challenge as correct diagnosis is often not made prior to surgical intervention. Surgery plays a role in liver abscesses which are large and appear complex on imaging. We present a unique case of large complex liver abscess involving ingested foreign body secondary to perforation of a hollow viscus.

Case: A 54-year-old man with a history of poorly controlled hypertension with prior CVA presented to the Emergency Department with four days of fever and new onset right upper quadrant abdominal pain. He was previously seen in the emergency department several times for fever and nonspecific complaints. Physical exam was unrevealing, and labs were significant for leukocytosis with a left shift, elevated liver function tests, and coagulopathy. An abdominal CT demonstrated a complex abscess involving segments III and IVb with evidence of cholecystitis and a hyperdense structure within the common bile duct with adjacent wall thickening of the duodenum. Based on these findings the patient was diagnosed with sepsis secondary to liver abscess and cholecystitis, with possible foreign body causing biliary obstruction. Operative management included diagnostic laparoscopy, laparoscopic intraoperative ultrasound, removal of foreign body after careful dissection and ligation of the cholecystogastric fistula, cholecystectomy, intraoperative cholangiogram, and marsupialization of a complex liver abscess with partial hepatectomy and drain placement, all performed laparoscopically. Subsequent imaging revealed a separate, enlarging abscess anterior to the site of drain placement which required percutaneous drainage. The patient had an uneventful recovery.

Results: Culture of the abscess demonstrated *Streptococcus anginosus* and *Streptococcus constellatus* and antibiotics were tailored. Pathology of the foreign body revealed that it was a 4.5 x 0.6 x 0.1 centimeter focally hyperemic fragment consistent with bone.

Conclusion: This case highlights the challenges associated with management of a liver abscess secondary to migrating foreign body. Increasing incidence of liver abscesses heightens concern for the risks of surgical intervention and its complications. Advances in laparoscopic and robotic techniques as well as use of intra-operative ultrasound allow us to perform these cases through a keyhole approach. This offers the advantages of a faster recovery,

early mobility, faster return to work, and definitive surgical debridement and source control. Other treatment options including percutaneous drainage do not offer these advantages. This approach needs to be performed in centers of excellence with surgeons trained in hepatobiliary surgery.



Cystic Neutrophilic Granulomatous Mastitis During Pregnancy

Minha Kim MD, Zandra Cheng MD, FACS
Danbury Hospital

Introduction: Cystic neutrophilic granulomatous mastitis (CNGM) is a rare inflammatory breast disease that is difficult to diagnosis as its clinical presentation is often mistaken as infectious mastitis or inflammatory breast cancer. Patients most commonly complain of a unilateral painful mass that may or may not be associated with erythema and swelling. Patients may also present with signs and symptoms of an abscess, lymphadenopathy, and nipple retraction. Diagnosis of CNGM is usually by histopathology; therefore a core or excisional biopsy is usually performed. Histopathologic findings are characterized by neutrophilic and granulomatous inflammation surrounding clear cystic spaces and may include presence of gram positive bacilli. Once the diagnosis of CNGM is established, medical therapy is preferred. Although rare, there have been few reported cases of CNGM during pregnancy. CNGM during pregnancy presents as an additional challenge when diagnosing and treating CNGM.

Method: Literature review of reported cases of cystic neutrophilic granulomatous mastitis

Case Presentation: A 36 year old Chinese female, G2P1, with a past history of biopsy proven CNGM of the right breast, presented in her 11th week of pregnancy with symptoms consistent with infectious mastitis of the left breast. An initial ultrasound of the left breast was concerning for mastitis. She reported her symptoms were unlike the symptoms she had when she presented with CNGM of the right breast. She was started on ceftriaxone, which improved her symptoms, then transitioned to oral Keflex on discharge. She had followed up in the clinic and presented with clinical signs and symptoms and imaging

evidence of abscess in the left breast. In spite of multiple attempts of conservative management her condition worsened. She was therefore taken to the operating room for an incision and drainage and tissue biopsy. Her pre-operative and intra-operative cultures demonstrated *Cornebacterium* species and therefore the patient was started on clindamycin. Her tissue pathology demonstrated CNGM. Patient continued clindamycin for two weeks and was healing appropriately until post-operative day thirty two. Patient had developed areas of induration and tenderness, which was concerning for reoccurrence of CNGM. She was restarted on antibiotics and the area of induration was treated with an ultrasound guided intralesional Kenalog injection. With continuous wound care and management, patient's wound improved and had completely closed.

Discussion: CNGM presents as a diagnostic and therapeutic challenge due to its presentation as infectious mastitis, abscess, or inflammatory carcinoma. Typically, CNGM presents as a unilateral mass in women of reproductive age. Rarely does this condition present in pregnancy or as bilateral disease. Patients who have presented with bilateral disease often complained of hard mass with associated erythema or pain. In our patient, when the patient was initially diagnosed of CNGM of the right breast, she presented with a hard painful mass without fevers or leukocytosis. However, when the disease occurred in the left breast, patient complained of fever, malaise, and pain, which was associated with erythema and leukocytosis. In reported cases of CNGM in pregnancy, patients presented with a tender, erythematous breast and were initially diagnosed and treated for infectious mastitis. Patients who initially present with signs and symptoms suggestive of mastitis or abscess are started on antibiotics and often subjected to extended use of antibiotics due to lack of response to therapy. Imaging have limited role in diagnosing CNGM. In order to accurately diagnosis CNGM, biopsy is needed. Diagnostic histopathological features of CNGM include lobulocentric granulomas with mixed inflammation and clear vacuoles lined by neutrophils within the granulomas. Medical therapy is the mainstay for treating CNGM and consists mainly of antibiotics and immunosuppressive therapy such as methotrexate. More recently, localized therapy such as topical steroids or intralesional injections have been reported with high success. If medical management fails, surgery would be the next step. Many patients, including gravid patients, have responded well to steroid therapy. During pregnancy, treatment is limited, especially if the patient is unresponsive to steroid therapy, since the treatments for CNGM can be teratogenic to the fetus.

Medical Student Research Competition

Moderator:

Richard S. Stahl, MD, MBA, FACS, FACHE

Senior Associate Dean for Strategic Relationships
Frank H. Netter MD School of Medicine
Quinnipiac University

Judge:

James Clark, MD

Chief Resident, Stamford Hospital Surgical Residency

Reasons for a Delayed Diagnosis in a Well-known yet Less Common Cause of Foot Drop: Nerve entrapment at the fibular head, double crush syndrome at the knee and proximal tibiofibular instability.

Zahra Qaiyumi M.S., Alan M. Reznik MD MBA FAAOS
Frank H. Netter MD School of Medicine at Quinnipiac University

Introduction: Foot drop, resulting from an inability to dorsiflex the foot, has many known causes. These include lumbar radiculopathy, multiple sclerosis, and compartment syndrome. One cause of foot drop, Fibular nerve entrapment at the knee, is less common and thus often overlooked by healthcare practitioners when making a diagnosis. Here we present 6 cases where a diagnosis of fibular nerve entrapment at the knee was made after a delay in diagnosis. A detailed explanation of surgical decompression of the nerve, as well as recommendations for accurate clinical diagnosis are also presented. The purpose of presenting these cases is to shed light on the clinical presentation of fibular nerve entrapment at the knee, and aid in a more accurate and timely diagnosis of this pathology.

Presentation of Cases: Six cases with a diagnosis of fibular nerve entrapment at the knee that initially went undiagnosed by clinicians were chosen and each case was reviewed. The symptoms of each patient were tracked over time, before and after they underwent surgical decompression to treat the nerve entrapment. The clinical presentation and surgical outcomes of each case are presented in the paper. The cause of fibular nerve entrapment varied among the cases, and included scar tissue formation secondary to injury, recurrent ganglion cyst formation, and scar tissue formation secondary to previous surgical intervention. In each of the six cases, surgical decompression of the fibular nerve where it crosses over the fibular head proved to be therapeutic. It was also noted that a delay in diagnosis often occurred due to concomitant lumbar spine symptoms.

Conclusions: In order to decrease the likelihood of a delayed diagnosis when a patient is suffering from fibular nerve entrapment at the knee, additional steps must be taken during clinical workup. When a patient presents with sensory loss in the first web space of the foot, extensor hallucis longus weakness or a foot drop, entrapment at the knee should be suspected. This is especially true when there is local trauma to the knee as part of the history. In such

cases, additional examination should be performed to include added palpation of the nerve at the knee and testing for a Tinel's sign at the area where the nerve crosses the fibular neck. The examiner should also test for proximal tibiofibular movement or instability, look for swelling that may indicate a ganglion cyst near the fibular neck, and test for a lateral meniscus tear that could be associated with a meniscal cyst causing local compression. These are findings that are less commonly thought of and hence may lower the chances of a timely diagnosis in the less common, well known, but often delayed diagnosis of fibular nerve entrapment at the knee.

Operative Times for Lower Extremity Endovascular Revascularization Procedures Affects Patient Outcomes

Alexander Ostapenko MD, Ian Schlieder DO, Elisabeth Barrar MD, Shiquan He MS, Joann Petrini PhD, MPH, Alan M Dietzek MD
Danbury Hospital

Introduction: Longer operative times for open infrainguinal revascularization have been associated with higher perioperative complication rates particularly with respect to surgical site infections and extended lengths of stay. We sought to determine if morbidity or mortality after lower extremity endovascular interventions was associated with prolonged procedure times.

Methods: The NSQIP 2011-2017 Lower Extremity Target database was utilized. Patients were excluded if no diagnosis was given or if operative time was not recorded. Patients were stratified by diagnosis of either claudication or critical limb ischemia (CLI). Comparison of median operative time with our primary outcome variable of mortality was tested using Wilcoxon rank-sum test. Secondary outcome variables including MI, stroke, return to OR, wound infection or amputation were also compared similarly. Statistical significance was set at $p < 0.05$.

Results: A total of 11,529 patients met inclusion criteria. There were 3,668 patients with claudication and 7,062 with CLI. 730 patients were not given a diagnosis and were excluded. The median operative time for those with claudication was 85 mins whereas those with CLI was 96 mins ($p < 0.001$). The majority of interventions were performed in the femoropopliteal region versus below the knee. Among claudicants, those with mortality ($p = 0.039$), MI ($p = 0.001$), return to OR ($p < 0.001$) or amputation ($p < 0.001$) had significantly longer operative times than those without each according outcome. CLI patients with mortality ($p = 0.044$), MI ($p < 0.001$), return to OR ($p < 0.001$) or amputation ($p < 0.001$) also had significantly longer operative times compared with those without each according outcome.

Conclusion: Prolonged operative times for endovascular procedures are associated with morbidity and mortality regardless of indication (claudication vs CLI). Median operative times are longer for CLI patients likely indicating more complex procedures. Nevertheless, surgeons should bear in mind the greater risks for complications associated with lengthy endovascular procedures specifically NSQIP

outcome variables such as MI, return to OR, amputation and overall mortality.

Are Anesthesia Screens a Barrier to Communication Practices in the OR?

Alexandra Bourdillon BS¹, Heather Osborn MD¹
¹Department of Surgery (Section of Otolaryngology), Yale University School of Medicine, New Haven, Connecticut

Introduction: Breakdowns in communication are the most common cause of adverse surgical events, and teamwork-related practices are central aspects of many surgical safety tools and evaluations including the WHO Surgical Safety Checklist and the Observational Teamwork Assessment for Surgery. An ether screen is a (typically opaque) drape hung between the sterile surgical field and the non-sterile anesthesia area. Because of its variable use in the context of Otolaryngology, the goal of our preliminary study was to evaluate the association between use of the ether screen and frequencies in verbal interactions in the operating room, to inform future investigation.

Method(s): 15* Otolaryngologic procedures (ranging from 15 to 215 minutes) were observed in full by a trained Medical Student who took note of ether screen practices, procedure length and verbal exchanges between anesthesia and scrubbed surgical staff. The procedures were selected indiscriminately to capture a spectrum of operating teams and procedures under 4 hours. All verbal exchanges were included regardless of relation to patient management and interactions were individualized at the discretion of the reporter.

Results: Altogether 3* procedures with and 12* without ether screens were included in this preliminary study. 74* encounters were recorded among the procedures without ether screens and 9* among procedures with ether screens. Communication was more frequent among procedures without ether screens (0.124 exchanges per minute) compared to those with ether screens (0.057 exchanges per minute).

Conclusions: While the trend in these data suggest an association between anesthesia screen usage and reduce communication practices, interpretation should be made with caution because of the limited sample size.

Ether Screen	Number of Procedures (n)	All Exchanges (n)	Exchanges Initiated by Anesthesia (n)	Exchanges Initiated by Surgery (n)	Average Rate of Exchanges (per minute)
Absent	12	74	30	44	0.12427126
Present	3	9	5	4	0.0566457

*Preliminary data shown; data collection is ongoing and additional data will be included in the presented results. The number of observed procedures is expected to exceed 20.x

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Postoperative Bracing on Pain, Disability, Complications and Fusion Rate following a Lumbar Fusion: A Meta-Analysis

Jacob Jones, BS*, Samuel Oduwole, BS*, Richard Feinn, PhD*, James J. Yue, MD**

*Frank H. Netter MD, School of Medicine at Quinnipiac University, North Haven, CT.

*Connecticut Orthopedic Specialists, Hamden, CT.

Introduction: Intussusception of the bowel can be defined as a proximal segment of bowel telescoping into an adjacent segment of bowel. Children tend to present more commonly with intussusception and will classically present with intermittent cramping abdominal pain and "Currant-jelly" diarrhea. In adults, intussusception however, is considered a rare condition consisting of only roughly 5% of all intussusceptions and accounts for only 1-5% of all bowel obstructions. Generally for an intussusception to occur there needs to be a lead point which can be benign or malignant.

Method(s): Case Report

Results: This case was unique in that it had two bouts of bowel intussusception both resulting in operative repair. Our patient is a 63 year-old female with a past medical history significant for hypothyroidism and hypertension who presented complaining of roughly 1 month of intermittent and colicky abdominal pain that acutely worsened on the morning of presentation. Her pain was associated with nausea, vomiting, and obstipation. Interestingly her surgical history was significant for a prior episode of intussusception years prior that required a small bowel resection; the lead point at the time was identified to be a benign intestinal lipoma. Imaging during this presentation suggested an ileocolic intussusception along with mesenteric lymphadenopathy. She was taken to the OR; we noted a large ileocolic intussusceptum along with significantly enlarged lymph nodes. We manually reduced the intussusception and performed a Right hemi-colectomy due to bowel ischemia and palpation of a hard mass within the ileum. The patient was then admitted to the floor and had a standard post-operative course. Pathology subsequently showed mantle cell lymphoma and the patient began to undergo treatment with our oncology colleagues.

Conclusions: Intussusception in adults in general is a rare disease process and is generally associated with a pathologic mass that acts as a lead point. More commonly, benign lesions acting as lead points within the small bowel while adenocarcinoma tends to cause ~50% intussusception of the colon. Malignant lymphoma is a rather uncommon cause of intussusception and is the etiology in < 1% of all intussusceptions. The most common presenting type of lymphoma in these patients is diffuse large B-Cell lymphoma; while mantle cell lymphoma can be diffusely involved within the GI tract, to our knowledge only a handful of cases have been described as a cause of intussusception. Moreover, our patient has had two distinct episodes of intussusception which begs the question if the two are related or if these occurrences were coincidental.

Community Identification and Referral of Surgical Congenital Anomalies: A Pilot Assessment in Uganda

Cosmas Sibindi, Seong Hong, Nasser Kakembo, MBChB, John Sekabira, MBChB and Doruk Ozgediz, M.D. Yale School of Medicine

Introduction: Delayed access to care for surgically correctable congenital anomalies (CAs) is a major challenge for childrens surgery in low income countries. Nonetheless, few studies have assessed the perspective of birth personnel and community health workers. We reviewed existing CA screening tools for front-line health workers and assessed their feasibility for use in Uganda.

Methods: Two tools were identified: one developed by Christian Blind Mission (CBM) International, and the other by the Indian government (the RBSK program). 29 semi-structured interviews with health cadres and stakeholders in urban, peri-urban and rural areas (Table 1) were conducted. Knowledge, attitudes, beliefs and behaviours associated with identification of CAs were assessed and with feedback on the two tools.

Type of Cadre	Interviews
Village Health Team (VHTs)/Community Health Workers members	4
Midwives	9
Clinicians (Surgeons, Physicians, Residents/Nurses/Rehabilitative Officers)	10
Others (social workers, local leaders, parents, ministry of health officials)	6
Total	29

Table 1: Breakdown of interviews conducted

Results: VHTs(4/4) expressed a baseline biological understanding of CAs but identified cost to families as a major challenge. VHTs and Clinicians requested a more simplified tool than the sample[OD1]s, stressing the need for a revised pictograms and handbooks. Midwives endorsed strong knowledge of CAs but identified high workload (6/7) and lack of refreshers (5/7) as barriers to implementation. Clinicians expressed concern at the capacity of Ugandan hospitals to handle increased pediatric cases(7/10). All cadres recommended training a newly developed health cadre, the Community Health Extension Workers (CHEWs) in CA identification.

Conclusions: To improve access to care for surgical CAs, frontline health workers and birth personnel have requested 1) a revised pictogram and handbook with refresher courses; 2) extending training to CHEWs; and 3) improved referral networks for free/subsidized surgical care.

Adenocarcinoma of the Excluded Stomach 15 Years After Roux-en-Y Gastric Bypass

Thomas R. Schneider, BA¹, Aziz L. Benbrahim, MD, FACS, FASMBS^{1,2}

¹Quinnipiac University Frank H. Netter MD School of Medicine, North Haven, CT

²MidState Medical Center, Meriden, CT

Introduction: Roux-en-Y gastric bypass is a safe and effective surgical weight loss option for patients with severe obesity disease, and it remains the gold standard of bariatric procedures. The operation bypasses the duodenum and excludes the fundus and body of the stomach to produce mechanical and hormonal alterations that decrease hunger, increase satiety, and promote sustained weight loss. One consequence of the procedure, however, is that anatomical changes may pose a unique diagnostic challenge to physicians if subsequent pathology such as cancer arises in the excluded stomach. Gastric cancer is typically diagnosed by direct visualization and biopsy of the lesion via upper endoscopy, but these traditional methods are ineffective for inspecting the excluded stomach. Here we present the case of a patient who developed adenocarcinoma of the excluded stomach 15 years after Roux-en-Y gastric bypass.

Case Presentation: A 64-year-old male initially presented as an outpatient with two months of non-specific symptoms including nausea, vomiting, eructation, intermittent regurgitation, and productive cough with globus sensation. He also noted worsening reflux symptoms that were refractory to lifestyle changes and pharmacotherapy including twice daily omeprazole. Past medical history was notable for severe obesity disease for which the patient underwent Roux-en-Y gastric bypass surgery in 2003 with subsequent 278 lb weight loss.

As part of the initial diagnostic workup, an upper endoscopy revealed stenosis of the gastrojejunostomy (GJ) site and a small gastrogastic fistula. Following two months of failed non-operative management with endoscopic dilation, the patient underwent revision of the GJ anastomosis and takedown of the gastrogastic fistula. A post-operative esophagram suggested persistent communication between the gastric pouch and remnant. During a second attempt at fistula takedown two days later, the surgeon was notified intraoperatively that tissue specimens obtained from the previous GJ anastomosis revision were positive for malignancy. After discussion with the family, it was decided to proceed with gastrectomy of the excluded stomach, leaving behind the gastric bypass pouch. Initial post-operative recovery was uneventful.

Medical oncology assessed the patient to be at high risk of recurrence and therefore recommended an adjuvant chemotherapy regimen of folinic acid, fluorouracil, and oxaliplatin. The patient completed several cycles of this regimen but was ultimately unable to complete the full duration of treatment due to recurrent infections and other complications. Interval CT scans did not show evidence of recurrence. Fifteen months from the time of diagnosis, the patient underwent laparoscopy for persistent pouch leak with abscess that necessitated conversion to an open procedure for partial colectomy and transverse colostomy due to devascularization of the mid-transverse colon. Pathology for the resected colon, stomach, and small bowel was positive for signet ring carcinoma.

Conclusion: Gastric cancer of the excluded stomach is a rare but reported finding following Roux-en-Y gastric bypass surgery. The precise mechanism of tumorigenesis in these

patients is unknown, but it may be related to chronic irritation from bile reflux or gastric stasis. Gastric cancer generally presents late due to vague and nonspecific symptoms, and diagnosis is particularly challenging in patients status-post gastric bypass due to the difficulty of visualizing the excluded stomach with traditional endoscopic techniques. Advanced endoscopic and minimally invasive techniques such as double balloon enteroscopy and laparoscopic transgastric endoscopy should be considered in the diagnostic workup of patients with suspected cancer of the excluded stomach. Physicians must have a high index of suspicion in this patient population to avoid delays in diagnosis and treatment.

Stop the Bleed: The Need for Hemorrhage-Control Education and Equipment

Jeremy Fridling BA, NREMT-P, Aziz Benbrahim MD, FACS, FASMBS, and Christine Van Cott, MD, FACS
Frank H. Netter MD School of Medicine at Quinnipiac University

Introduction: The Hartford Consensus recommended that hemorrhage-control training and equipment be made increasingly available for first responders and members of the public, and bystander intervention during recent mass-casualty events has prevented exsanguination and saved lives. The Stop the Bleed Campaign was created by the Department of Homeland Security in 2015 with the goal of providing members of the public with access to hemorrhage-control equipment and free training, via the Bleeding Control Basic (BCON) course. Medical institutions across Connecticut, including St. Vincent's Medical Center in Bridgeport and the Frank H. Netter MD School of Medicine at Quinnipiac University in North Haven, are actively teaching public BCON courses.

Methods: A 75-year-old female with a non-contributory medical history was shopping at a home improvement store in suburban Connecticut when she stumbled and fell into a steel shopping cart, suffering a 10 cm laceration to the anterolateral portion of her right lower extremity. Bystanders in the store promptly called 9-1-1 and, without access to Hartford Consensus-recommended hemorrhage-control equipment, unsuccessfully attempted to stop the bleeding using direct pressure with paper towels. The arriving Emergency Medical Technicians (EMTs) removed the bystanders' makeshift bandage, placed two hemostatic gauze dressings on the patient's leg, and applied direct pressure, resulting in control of the hemorrhage without the use of a tourniquet.

Results: The EMTs transported the patient to the nearest community hospital, which the patient preferred over a more-distant trauma center, without incident. Upon arrival at the hospital, the patient was observed in no acute distress and with no signs of shock. Her wound was assessed, cleaned, and closed with one internal and eleven external sutures, which were well-tolerated. She was instructed to follow up for suture removal and take acetaminophen and ibuprofen for the pain.

Conclusions: The Hartford Consensus emphasized utilizing members of the public to act as immediate responders and

initiate hemorrhage control before first responders reach the patient. Many traumatic deaths are due to potentially controllable hemorrhage, and prompt intervention by bystanders combined with appropriate continuation or escalation of care by first responders can prevent death by exsanguination in these patients. While the bystanders acted laudably by applying direct pressure to the injury before EMS arrival, they did not have access to appropriate equipment and did not apply effective pressure, inhibiting them from stopping the bleeding. The patient in this case achieved a successful outcome despite sub-optimal bystander care but a patient with a more significant injury or a history or medications predisposing to coagulopathy may not have experienced the same result. BCON training has been proven effective in teaching members of the public to control life-threatening hemorrhage, so the bystanders' attempts may have been more successful if they had participated in training and if hemorrhage-control equipment had been made available, as recommended by the Hartford Consensus. The care provided for this patient demonstrates the value of educating first responders and the need to educate members of the public in hemorrhage-control techniques.

Growth of a Local Global Surgery Symposium Over Three Years: Lessons Learned about Trainee Engagement at an Academic Surgical Program

Nensi M. Ruzgar, Sarah Ullrich MD, Maija Cheung MD, Doruk Ozgediz MD MSc
Yale University School of Medicine

Introduction: Growing trainee interest in global surgery has yielded various initiatives, but many even within the same campus remain isolated and may appear less accessible to trainees without prior experience. To help design more inclusive global surgery opportunities, we evaluated the trainee-outreach of the first three implementations of a local global surgery symposium at our institution.

Methods: Since 2017, the global surgery symposium was run three times as free single-day gatherings targeted at local trainees. Each program included over twenty local and outside speakers from multiple surgical specialties, anesthesia, nursing, and public health, spanning academic, non-profit, and public initiatives. Attendees were recruited through posters, social media, and mailing lists. Participants' responses to registration and feedback surveys were analyzed.

Results: 195 individuals registered for the symposium in 2017, 135 in 2018, and 147 in 2019; 377 unique individuals were captured in the registrations. Over three years, registrants were predominantly health professional students (41% in 2017, 50% in 2018, 44% in 2019) and residents (15%, 10%, 24%); with increasing proportions of undergraduates (4%, 12%, 13%) and decreasing proportions of physicians or practitioners (32%, 24%, and 22%). Compared to its initial year, 2018 and 2019 symposia showed increased registration by non-local participants by 23% and 21%, respectively. 45% of 2017 attendees reported 1+-year global surgical experience whereas 9% reported no prior experience. In 2018, those without GS experience increased (38%), while those reporting 1+-year experience

decreased (38%, $p < 0.0001$). 43% of those without prior experience were medical students, with another 43% being residents. 100% of the three symposia's attendees noted that this symposium helped guide their future plans. Most (62% in 2017, 80% in 2018, 72% in 2019) appreciated the diversity of topics, while suggested improvements included lengthening the gathering (64%, 57%, 56%) and incorporating interactive sessions (21%, 29%, 35%).

Conclusions: As the symposium's outreach grew to include more junior audiences with less global surgical experience, the consistency of feedback suggests the role of local programs in exposing trainees to global surgical outreach and research even if they lack prior experience. The topical breadth of the program was rated highly, underscoring the need to emphasize to trainees the diverse routes to global surgical engagement.

The Effect of Introducing a Mobility Technician Program on Early Mobilization of Patients Following Total Hip and Knee Replacement

Alexa Lisevick, BS, Smitha Vellanky, MSc, John Grady-Benson, MD, Michael Cremins, PhD, PA-C
Saint Francis Hospital

Introduction: Early ambulation of total joint replacement (TJR) patients has been shown to improve patients' outcomes, such as reducing patient length of stay (LOS) and rates of postoperative complications. Limited physical therapy (PT) resources and late operative cases may challenge day-of-surgery (PODo) mobilization. Specifically, in our institution, a high percentage of patients were not mobilized on PODO if they reached the inpatient floor after 2:00 pm. A Mobility Technician (MT) program composed of nurse's aides that received additional training from PT to properly mobilize patients was implemented in January 2015. The purpose of this study is to compare the effectiveness of the MT model to a traditional PT model in the early ambulation of TJR patients.

Methods: Patients undergoing unilateral, primary total hip replacement (THR) or total knee replacement (TKR) at one institution between June 2014 and July 2015 were included. Various measures of early mobilization were retrospectively assessed between case-matched pre- and post- MT program implementation groups, including: total and PODO mobilizations; time-to-first mobilization; ambulation distances; and, length of stay (LOS). Patients were case matched for age, gender, and BMI. Wilcoxon Signed-Rank test was used to test significance of any differences in outcomes between paired cases.

Results: 902 TJR case-matched pairs (THR, $n = 473$; TKR, $n = 429$) were included in these analyses. Following MT program implementation: (1) The mean numbers of total and PODO mobilizations both increased significantly ($p < 0.001$); (2) The mean total distance ambulated by patients prior to discharge significantly increased ($p < 0.001$); (3) The mean time-to-first mobilization significantly decreased ($p < 0.001$); (4) Mean LOS of non-Medicare patients decreased marginally.

Conclusions: Following MT program implementation, patients mobilized significantly earlier, more frequently, and greater distances prior to hospital discharge. Preliminary analyses indicate that the MT program is successful in the early mobilization of THR and TKR patients. Future analyses will compare the cost-effectiveness of the MT model in comparison to a traditional PT model.

Total Hip Replacement Patients: (n = 473)

	Pre-MT	Post-MT	p
Total mobilizations per day (mean ± S.D.)	3.6 ± 1.15	5.0 ± 1.54	<0.001
Time to 1st mobilization (hrs.) (mean ± S.D.)	6.3 ± 6.32	2.8 ± 4.47	<0.001
# of PODO mobilizations (mean ± S.D.)	1.2 ± 1.10	2.3 ± 1.53	<0.001
Total ambulation distance (ft) (mean ± S.D.)	1252.5 ± 764.73	1578.4 ± 940.26	<0.001

Total Knee Replacement Patients: (n = 429)

	Pre-MT	Post-MT	p
Total mobilizations per day (mean ± S.D.)	3.1 ± 1.01	4.6 ± 1.51	<0.001
Time to 1st mobilization (hrs.) (mean ± S.D.)	9.0 ± 6.94	3.8 ± 5.51	<0.001
# of PODO mobilizations (mean ± S.D.)	0.8 ± 0.93	1.8 ± 1.47	<0.001
Total ambulation distance (ft) (mean ± S.D.)	1020.4 ± 816.83	1422.5 ± 897.07	<0.001

Pediatric Emergency Surgical Care: Evaluating Need and Value of a Rural Provider Course in Uganda

Nensi M. Ruzgar¹, Maija Cheung MD¹, Phyllis Kisa MD², Doruk Ozgediz MD MSc¹

¹Yale University School of Medicine and ²Mulago Hospital, Kampala, Uganda

Introduction: Challenges faced by global pediatric surgery (PS) are especially prevalent in Uganda, where only four pediatric surgeons and three pediatric anesthesiologists care for over 20 million children, with limited low-cost and setting-appropriate PS training opportunities available to enhance capacity. In 2018, a Pediatric Emergency Surgical Care course was developed for providers at rural Ugandan hospitals. This study assesses the value of the course and the needs expressed by the participants to guide the design of future PS training opportunities.

Methods: Providers from rural Ugandan hospitals were recruited through the National Surgical Association to attend a pilot course in Kampala. Participants completed a pre-course survey, a post-course knowledge test, and a post-course feedback survey. The pre-course survey covered the participants' training; common conditions seen, treated at primary hospital, or referred to higher levels of care; and capacity-related priorities.

Results: 11 providers attended the course, including 7 medical officers, 3 surgeons, and 1 senior house officer. 10 (91%) responded to the pre-course survey; all completed the post-course knowledge test and survey. Of the pre-course survey responders, 60% completed their training within the last year and only 40% had any PS exposure during their training, with an average 7.5 weeks of exposure. The most common PS procedures performed or referred correlated with the providers' confidence in managing those conditions (Table). The providers rated the most needed interventions to improve PS as more frequent CME-courses (35%), hands-on training (27%), and improved anesthesia delivery (21%). The post-course test had a median correct score of 86% and the post-course feedback highlighted the need for similar training opportunities,

hands-on demonstrations, and extensions of similar courses to more senior providers, nurses, and anesthesia providers.

Conclusions: The pediatric surgical gaps and priorities identified by providers from rural Ugandan hospitals suggest the need for more frequent, hands-on, multidisciplinary training opportunities to enhance PS capacity.

Table. Most commonly performed and referred pediatric surgical procedures compared to providers' confidence in management

Rank	Most common PS procedures (%)	Rank	Confidence in management (mean Likert score on a 5-point scale, standard deviation)
<i>Performed at home hospital</i>		<i>Highest Likert scores</i>	
1	Hernia or hydrocele repairs in children >1yo (36%)	1	Hydrocele (4.3, 1.1)
2	Laparotomy for intussusception (19%)	2	Burns in children (4.2, 1.1)
3	Burn care (18%)	3	Umbilical hernias (3.9, 1.1)
<i>Referred to higher levels of care</i>		<i>Lowest Likert scores</i>	
1	Cleft lip repair (33%)	1	Cleft lip (1.0, 0)
2	Anoplasty (15%)	2	Anorectal malformations (1.6, 1.0)
3	Atresia reversal (11%)	3	Hirschsprung disease (2.0, 1.1)
			Gastroschisis (2.0, 1.2)

Evaluating the Utility of Intra-Osseous Vascular Access in Patients Being Treated for In-Hospital Cardiac Arrest

Nathaniel Novak BS, Kevin M. Schuster MD, MPH, FACS, FCCM
 Yale School of Medicine

Introduction: The resuscitation of in-hospital cardiac arrest patients depends heavily on adequate vascular access for the administration of life saving medications. Intra-osseous (IO) access involves inserting a needle into a bone, typically the anterior tibia, to directly access the highly vascularized marrow cavity. IO can be used when no other accesses are in place, or as an adjunct if access is sub-optimal. Recently the use of IOs has expanded from the pre-hospital setting to in-hospital use for emergent vascular access. One of two hospital campuses have IO placed by surgical residents per protocol and on the other campus they are placed by the code team. We hypothesized that IO use for in-hospital cardiac arrest may be associated with improved outcomes.

Methods: Medical records were reviewed for patients 18 years old and older treated for in-hospital cardiac arrest at Yale New Haven Hospital between 2013 and 2019. Cardiac arrest flowsheets were reviewed to determine the types of vascular access already present or placed during the resuscitations, what medications were administered, as well as other patient variables. Outcomes of interest were return of spontaneous circulation (ROSC) and survival to discharge.

Results: Ninety-seven patients were treated for in-hospital cardiac arrest. Sixty-one of the patients were male. Mean age was 69 with the most common types of arrest being PEA (65), asystole (18), ventricular tachycardia (8), and ventricular fibrillation (6). Thirty-four of these patients had IO accesses placed during the resuscitation. Seventy patients achieved ROSC, and twenty-four of them survived to discharge. Patients with no venous access prior to the start of resuscitation less commonly achieved ROSC than those with IV access in place (OR 8.63 95% CI 0.86-86.92), however survival to hospital discharge was not affected by having IV access at the time of the resuscitation (OR 0.99 95% CI 0.10 – 9.95). Having CVC access compared to

peripheral IV access prior to the code did not make a difference for ROSC (OR 1.50 95% CI 0.52-4.29) or survival to discharge (OR 1.61 95% CI 0.60-4.30). There were no differences between patients who required a new access and those that did not (OR 0.49 95% CI 0.16 – 1.49) for ROSC and (OR 0.75 95% CI 0.22 – 2.48) for survival to discharge. Additionally, there were no differences in ROSC or survival to hospital discharge between CVC and IO when placed during the resuscitation. The use of IOs for in-hospital cardiac arrest increased over time (p=0.003) however both ROSC (p=0.503) and survival to discharge (p=0.268) remained constant.

Conclusions: Having an established IV access prior to the start of resuscitation for in-hospital cardiac arrest patients may increase the probability of ROSC without improving long-term survival. IO placement during resuscitation from in-hospital cardiac arrest has increased significantly with time but without improved outcomes. Although IOs offer a rapid alternative to other forms of access to the vascular system they may not provide clinical benefit. Further investigation is warranted with larger sample sizes and assessment of the impact of particular treatments delivered by IO.

Risk Factors and Outcomes for Extended Post-Injury Opioid Dependency in Trauma Patients with Significant Injury

Emma C. Calcagno, BS, Kevin M. Schuster, MD, MPH, FACS, FCCM
 Yale School of Medicine

Introduction: Patients with traumatic injuries require complex medical and surgical care, often having significant pain management needs, traditionally treated with high opioid analgesics for prolonged time periods. Recent reports have identified risk factors for prolonged opioid utilization in elective surgical patients, but these studies do not address the unique circumstances of trauma patients. We aimed to evaluate predictors for long-term opioid use, as well as identify patterns of opioid use post-hospitalization, in patients with traumatic injuries.

Methods: Patients were admitted to a Level I trauma center in the years 2014 (period 1) and 2019 (period 2). All patients had an injury severity score of 5 or higher and a duration of hospitalization of 3 days or longer. Demographic information was collected, including: age, race, sex, BMI, type of health insurance, injury, existing opioid use, opioid dose prior to injury, and injury severity score (ISS). Information regarding in-hospital and post-hospital opioid administration was collected in morphine equivalents (ME). Information was extracted from the electronic medical record and the Connecticut Prescription Monitoring Program. Bivariate and multivariable analysis were conducted including correlations, t-test, and linear regression with p<0.05 considered significant.

Results: Two hundred and two patients were included (101 in each period). Of those, only the patients in period 2 had post-discharge data available. Half (50.5%) of the patients were female with a mean (SD) age of 68.3 ± 21.1. The median [IQR] ISS and length of stay (LOS) were 10 [9, 19] and 6 [4, 9] respectively. White patients made up 79.7%,

with 13.4% black patients. Of all patients, 18% were on pre-injury opioids with a median ME daily dose of 27 [20, 45]. The median [IQR] ME dose averaged over the last three hospital days was 10 [2, 32.5]. Median ME daily dose at discharge was 45 [10-45]. The dose during the last 3 days and the last day did correlate with the discharge daily dose (corr coeff. = 0.411, $p < 0.001$) and (corr coeff. = 0.479, $p < 0.001$) respectively, despite the difference in absolute dose. Race did not impact in-hospital or discharge doses. The ISS did not correlate with the dose during the last three days (corr coeff. = -0.020, $p = 0.779$) or dose at discharge (corr coeff. = 0.107, $p = 0.581$). The discharge dose did not correlate with the post-discharge duration of use (corr coeff. = -0.022, $p = 0.908$) with only 31.1% renewing their opioids after their initial prescription. Opioid dose during the last 3 hospital days and on discharge were lower in period 2, both $p < 0.001$. On regression analysis, predictors of more opioids were a lower ISS ($p = 0.049$) and being in period 1 ($p = 0.004$).

Conclusions: Taken together, our findings suggest the use of opioids in trauma patients has decreased in recent years. There appears to be opportunity to improve discharge practices, however, given that, although correlated, the absolute dose on discharge was much higher than the in-hospital dose. Discrepancies between injury severity and dose suggest that patient factors may be more important than injury severity in determining patient needs.

Surgical Quality, NSQIP and ERAS



Moderator:
Alan Meinke, MD, FACS
 Private Practice, Surgeons of
 Westport, Westport, CT
 Vice Chairman, Department of
 Surgery and Director of
 Surgical Quality, Nuvance Health,
 Norwalk Hospital
 President, CT Surgical Quality
 Collaborative & CTACSPA

Quality Judge: Hon. Daniel Benishek, MD, FACS
Retired, US House of Representatives, (MI-1)
Retired, General Surgeon, Dickinson County
Healthcare System

Plastic and Reconstructive Judge: Jillian Fortier, MD
 UCONN Health Center

Surgical Quality, NSQIP and ERAS

Outcomes in Patients Undergoing Bariatric Surgery with Respiratory Risk Factors - MBSAQIP analysis

Suraj Panjwani MD, Santosh Swaminathan MD, Jahnvi Kakuturu MD, Shohan Shetty MD, FACS
 St. Mary's Hospital, Waterbury, Connecticut

Introduction: Bariatric surgery has proven to be a safe and effective measure for combating obesity. Excessive weight has a punitive effect on the pulmonary system. We sought to evaluate the impact of preoperative respiratory risk factors on outcomes of patients undergoing laparoscopic sleeve gastrectomies (SG) and laparoscopic Roux-en-Y gastric bypasses (RYGB) using the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP) database.

Methods: We identified all patients who underwent SG and RYGB between 2015-2017. Patients with a history of prior bariatric/foregut surgery were excluded. Preoperative and intraoperative data was evaluated. Patients with history of smoking within the last one-year, COPD and sleep apnea requiring CPAP/BiPAP were grouped as those with preoperative respiratory risk factors. Post-operative adverse pulmonary outcomes analyzed were pneumonia, need for unplanned intubation, and mechanical ventilation > 48 hours. Other post-operative outcomes investigated included cardiac arrest, 30-day mortality, morbidity, reoperation, and readmission rates.

Results: There were 116,757 patients who underwent a RYGB and 312,522 patients who underwent SG during 2015-2017. Amongst these, 187,960 (44%) patients had at least one preoperative respiratory risk factor. Presence of at least one preoperative respiratory factors independently increased the risk of post-operative pneumonia, unplanned intubation, mechanical ventilation > 48 hours, cardiac arrest, morbidity, reoperation, and readmission, when

Surgical Quality, NSQIP and ERAS Plastic and Reconstructive Surgery

adjusted for other significant co-variables such as age, sex, ASA status, BMI, race, and operative time. The risk of having adverse postoperative outcomes increased with increasing number of preoperative respiratory factors. COPD had the most impact on post-operative adverse outcomes amongst the three respiratory factors (Odds Ratios for COPD 1.75-2.46, Smoking 1.05-1.53, and Sleep Apnea 1.08-1.53) (Table.1).

Conclusions: Bariatric surgery patients with preoperative history of smoking, COPD or sleep apnea have worse post-operative outcomes. Risk of adverse outcomes increases with number of respiratory factors.

Table 1. Impact of Pre-Operative Respiratory Factors on Post-Operative Outcomes (Multivariate)

Outcome	At least one Respiratory Factor	Respiratory Risk Factors		
		Smoker	COPD	Sleep Apnea
Pneumonia	1.60 (1.38-1.86)*	1.43 (1.16-1.79)*	2.40 (1.80-3.21)*	1.49 (1.29-1.73)*
Unplanned Intubation	1.45 (1.21-1.74)*	1.44 (1.10-1.87)*	2.46 (1.82-3.32)*	1.38 (1.15-1.65)*
Mech. Vent. > 48 hours	1.55 (1.21-1.99)*	1.53 (1.08-2.18)*	2.32 (1.53-3.50)*	1.53 (1.20-1.96)*
Cardiac Arrest	1.47 (1.03-2.08)*	1.05 (0.59-1.87)	2.32 (1.29-4.19)*	1.45 (1.02-2.04)*
30 day Mortality	1.22 (0.97-1.53)	1.31 (0.93-1.86)	2.16 (1.46-3.18)*	1.08 (0.871.35)
Morbidity	1.27 (1.22-1.32)*	1.15 (1.08-1.23)*	1.80 (1.63-1.99)*	1.24 (1.19-1.30)*
Readmission	1.14 (1.04-1.18)*	1.11 (1.06-1.18)*	1.75 (1.59-1.93)*	1.10 (1.06-1.14)*
Reoperation	1.11 (1.05-1.18)*	1.88 (1.08-1.31)*	1.65 (1.40-1.94)*	1.06 (0.99-1.12)

Reported as Odds Ratio (95% Confidence Intervals). * Indicates P < 0.05

Surgical Research with National Databases: A guide to working with NSQIP

Alexander Ostapenko, MD
 Danbury Hospital

Introduction: The implementation of electronic medical records in the healthcare field has lead to a rise in the development of national databases for use in research, pre-operative risk assessment, and quality improvement. Despite the availability of these databases, they remain an underutilized resource, likely secondary to barriers to their accessibility and efficient use. The National Surgical Quality Improvement Program (NSQIP) is an example of such a database; it is a peer-collected and peer-controlled database that collects data on various elective and non-elective surgical procedures. The aim of this study is to explore the basic elements of NSQIP, demonstrate the steps needed to acquire and manipulate data utilizing the colectomy-targeted data as an example, and to critically evaluate the strengths and weaknesses of this database.

Methods: General and colectomy-specific NSQIP data was acquired for 2012 to 2017. Participant user files (PUFs) from each individual year were merged. Using Python computer programming language, a database was created for data extraction and analysis. The colectomy data was concatenated with the general NSQIP data using patient specific identifiers.

Results: The basic steps to efficiently and effectively utilize the NSQIP database were determined to be as follows. We acquired general and colectomy-targeted NSQIP files for the last 5 years. For the overall NSQIP database, PUFs were provided for each individual year and contained around 1-million patient-procedures, with an average size around 1GB. Since manipulation, storage, and sorting of files of this size is challenging with most statistical

software; we used the Python pandas library to merge multiple years of data into a single database. Next, we concatenated the targeted-colectomy PUFs, which contained 23 additional valuable variables, to the general NSQIP PUF with unique patient identifiers. The result was a unique database from which variables of interest may be extracted in order to create files of manageable sizes, which can then be used for statistical analysis to answer desired clinical questions.

Conclusions: Whenever conducting research with databases it is important to evaluate their quality, validity, and generalizability. At minimum, it is imperative to evaluate how data was acquired and reported, the patient populations captured, the nature of variables collected, and the type of institutions that contribute to the database. NSQIP is an example of a robust database, which can be used to pose and answer clinically relevant questions. However, it has several shortcomings, including the absence of long term follow up data beyond 30 days, the presence of clustering within certain hospitals and regions, and the inclusion of certain erroneous data. Nonetheless, it has significant strengths, such as the inclusion of data from a wide range of surgeries and a high volume of patients. Finally, it is important to note that an advantage of large databases is that the quantity of available patients allows exclusion of patient entries with erroneous or nonsensical information, allowing the data to be refined while maintaining sufficient power.

Variation in Surgeon Operative Reporting for Ventral Hernia Repair

Beata Lobel, MD,^{1,2} Anna Karpinski, RN, MS, ACM,¹ Richard M. Newman, MD, FACS,^{1,2,3} James G. Bittner IV, MD, FACS^{1,2,3}
¹Saint Francis Hospital; ²University of Connecticut School of Medicine; ³ Frank H Netter MD School of Medicine

Introduction: Operative reporting is critical to surgical communication, quality care delivery, comparative outcomes assessment, and reimbursement, yet there remain deficiencies in formal training and standardization of reporting. This study compared narrative operative reports to reliable quality indicators of ventral hernia repair (VHR) and used those findings to create a VHR-specific dictation template for quality improvement and future comparative assessments.

Methods: Patient-level and clinical outcomes of all patients who underwent initial or recurrent ventral and/or incisional hernia repair at one university-affiliated/community hospital from June 2018 through November 2018 were abstracted from the NSQIP database. Two authors individually reviewed operative reports and performed qualitative assessments based on reliable quality indicators of VHR. Operative reports were dictated/attested by board-certified surgeons.

Results: In all, 15 board-certified surgeons submitted 100 unique VHR operative reports, of which 25% were dictated by trainees. Operative approaches for VHR included open (75%), laparoscopic (24%), and robotic-assisted (1%). Among VHR reports that coded for a component

separation (16%), all dictations substantiated the coding. All reports cited date of procedure, surgeon(s), diagnosis, anesthesia type, procedure performed, estimated blood loss, specimens obtained, and intraoperative complications. The electronic medical record automatically populated these fields or required citation before the report was submitted. Fifty-three percent of reports documented a perioperative time-out while just 10% detailed compliance with Surgical Care Improvement Project (SCIP) measures, though other perioperative documents confirmed fulfillment of SCIP measures. Almost all reports (99%) described some hernia-related anatomy, but 21% did so with description errors. VHR-specific deficiencies in reporting included failure to specify hernia number (6%), location (16%), or contents (38%) and failure to quantify hernia defect width (48%), length (59%), or both (48%). Most (69%) VHR reports mentioned implantation of mesh but 15% of those described the mesh type incorrectly. Additional deficiencies included absent or inaccurate reporting of mesh size (31%), location (42%), or both (31%). Among dictations reporting on mesh size, 18% failed to remark on size at implantation. Eight percent reporting on mesh location did not detail location accurately. Mesh fixation was mentioned in 67% of reports, but 9% of these contained deficiencies. Most reports mentioned defect closure (77%), technique (69%), and suture type (73%) and diameter (61%), but few (8%) detailed the needle type for defect closure. Only one report described the short stitch technique with 4:1 suture-to-wound-length ratio.

Conclusions: Narrative operative reports often contain notable deficiencies compared to quality indicators of VHR. Formal education in operative reporting, in this case quality indicators of VHR, and implementation of quality controls, for example a standardized VHR dictation template, may help improve care delivery and comparative outcomes assessment by reducing reporting errors.

Effect of Diabetes Mellitus on Postoperative Outcomes of Sleeve Gastrectomy and Gastric Bypass: A MBSAQIP Analysis

Santosh Swaminathan MD, Suraj Panjwani MD, Jahnavi Kakuturu MD, Shohan Shetty MD, FACS
Saint Mary's Hospital, Waterbury CT

Introduction: Pre-operative diabetes mellitus (DM) is a well-known risk factor for poor outcomes following general surgical procedures. With the increasing impetus for bariatric surgery as a possible therapeutic modality for diabetes in patients with obesity, the aim of the study was to identify the effect of diabetes mellitus on outcomes following minimally invasive sleeve gastrectomy and gastric bypass procedures.

Methods: Patients who underwent laparoscopic sleeve gastrectomy (SG) and laparoscopic Roux-en-Y-gastric bypass (RYGB) from 2015-2017 were identified using the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP) database. Thirty day postoperative outcomes were assessed for diabetic patients (insulin dependent DM – IDDM, non-insulin dependent DM – NIDDM).

Results: One hundred sixteen thousand and ninety patients were classified into four groups (RYGB-IDDM, RYGB-NIDDM, SG-IDDM, SG-NIDDM), with the predominant group being SG-NIDDM (45%). On multivariate analysis, 30-day postoperative mortality was significantly elevated in RYGB-IDDM (Table 1.). Thirty day postoperative morbidity, occurrences of ventilator requirement greater than 48 hours, bleeding requiring transfusion, postoperative sepsis and renal failure (Table 1.) were significantly higher in the three groups (RYGB-IDDM, RYGB-NIDDM and SG-IDDM).

Conclusion: With gastric bypass and sleeve gastrectomy being the two common bariatric surgical procedures and their use in diabetic patients, the risks of adverse postoperative outcomes are higher in patients with insulin dependent DM undergoing a gastric bypass.

Multivariate analysis (controlling for age, gender, ASA, BMI, Operative time) expressed as an odds ratio (95% CI)

Post-operative outcome	RYGB-IDDM	RYGB-NIDDM	SG-IDDM
Superficial SSI	4.51(3.62-5.63)*	2.79(2.25-3.46)*	1.34(1.01-1.77)*
Deep SSI	3.99(2.29-6.98)*	3.52(2.09-5.95)*	1.45(0.71-2.97)
Organ space SSI	1.73(1.25-2.40)*	1.49(1.1-2.03)*	1.16(0.8-1.68)
Difficile infection	2.83(1.58-5.07)*	1.67(0.93-2.98)	2.83(1.66-4.84)*
Prolonged ventilator requirement	2.41(1.5-3.87)*	1.98(1.24-3.17)*	1.77(1.08-2.9)*
Transfusion	2.08(1.74-2.49)*	1.98(1.68-2.33)*	1.34(1.11-1.61)*
Sepsis	1.88(1.18-3.01)*	1.54(0.98-2.4)*	1.63(1.00-2.64)*
Renal failure	2.17(1.37-3.42)*	1.63(1.03-2.59)*	1.99(1.28-3.10)*
30-day mortality	1.84(1.22-2.77)*	1.26(0.82-1.93)	1.34(0.88-2.03)
30-day morbidity	2.19(2.00-2.39)*	1.64(1.5-1.78)*	1.56(1.42-1.71)*
30 day readmission	2.03(1.87-2.21)*	1.6(1.48-1.73)*	1.71(1.58-1.86)*
30 day reoperation	1.96(1.7-2.26)	1.95(1.71-2.21)*	1.25(1.08-1.46)*

* indicates statistically significant variables (p<0.05)

Plastic and Reconstructive Surgery

Moderator: Alan Meinke, MD, FACS

Private Practice, Surgeons of Westport, Westport, CT
Vice Chairman, Department of Surgery and Director of Surgical Quality, Nuvance Health, Norwalk Hospital
President, CT Surgical Quality Collaborative & CTACSPA

Judge: Jillian Fortier, MD

UConn Health Center

Reducing Opioid Use in Outpatient Surgery: A Randomized, Placebo-Controlled, Double Blind Study

Austin Healy MD, Jeff Healy MD
University of Connecticut; Pali Momi Medical Center, Aiea HI

Background: Breast augmentation is the most commonly performed cosmetic surgery procedure in the U.S. Many patients receive opioid and benzodiazepine medications for pain relief after surgery. In light of the opioid epidemic, the ability to reduce opioid and benzodiazepine use after surgery can benefit the patient and society as a whole.

Methods: A randomized, placebo-controlled, double-blind study was performed to determine if celecoxib and/or gabapentin can decrease opioid and/or benzodiazepine usage in patients undergoing breast augmentation. Patient demographics, narcotics used in PACU, reported pain levels after surgery, opioid and benzodiazepine use after surgery and complications were analyzed. Sixty primary breast augmentation patients were randomized into four groups of fifteen patients each: Group I- placebo, Group II- gabapentin, Group III- celecoxib and Group IV- gabapentin and celecoxib.

Results: Demographic data was comparable across all groups. The number of patients requiring any narcotics in PACU was statistically lower in Group IV compared to the other groups. Patients were asked to record their pain levels utilizing the Wong-Baker FACES pain rating scale. Average pain scale scores were lower in Group IV but did not reach statistical significance. Patients recorded their medication usage (oxycodone/acetaminophen 5/325mg and/or diazepam 5mg) for two weeks after surgery. The average number of oxycodone/acetaminophen 5/325mg tabs taken after surgery was lower in Group IV compared to Group I on all post-operative days and reached statistical significance on post-operative day 2 and day 3. The number of patients not taking any oxycodone/acetaminophen was higher in Group IV compared to Group I and was statistically significant on post-operative day 1, day 2 and day 3. The average number of diazepam 5mg tabs taken after surgery was lower in Groups II, III and IV when compared to Group I. This was statistically significant on post-operative days 1-4 and day 6 for Group IV, day 2 and 3 for Group III and day 4 for Group II. The number of patients not taking any diazepam was higher in Groups II, III and IV when compared to Group I. This was statistically significant in Group IV on post-operative days 2-4, Group III on days 2 and 3, and Group II on post-operative day 4.

Conclusions: Administering celecoxib and gabapentin to patients prior to breast augmentation surgery decreases pain after surgery. This subsequently decreases the use of narcotics in the PACU and the use of opioid and benzodiazepine medications postoperatively. Decreasing opioid and benzodiazepine use after elective surgery will help to avoid negative side-effects of these drugs and possibly decrease the risk of opioid and benzodiazepine dependence.

Off the Shelf Technology Improves Efficiency in Global Surgery: A Case Study in Rural Ecuador

Alejandro Fajardo MD (1); David Babigian (4); Christopher D Hughes MD, MPH (2,3,4); Charles L Castiglione MD (2,3,4); Rick Silverman MD (4); Alan Babigian MD (2,3,4)
(1) University of Connecticut (2) Connecticut Children's Medical Center (3) Hartford Hospital (4) Hands Across the World, Natick, MA

Introduction: Surgical care in low-resource settings in low- and middle-income countries has been demonstrated to be a substantial public health burden among the world's

poorest populations. Data about the quality of surgical care delivered in the context of short-term teams is notably lacking, as is information regarding cost effectiveness and clinical efficiency. Process improvement in global surgery represents a fertile ground for research and investigation. We piloted a proof of concept study to integrate off-the-shelf digital technology into preoperative patient assessment for a plastic surgery mission in Ecuador. Initial use of this technology is to increase the efficiency of our preoperative evaluation and operative planning. However, the platform has potential to extend to all phases of patient care and to also assist in data analysis for outcome study.

Methods: We created a mock-up representation of a clinical scenario typically seen during our trips to rural Ecuador with Hands Across the World. External WiFi signals were limited and cellular service eliminated in order to simulate in-country scenarios. Apple iPads and MacBooks were the devices used in the simulation, as we routinely use the Apple platform on our current missions. Quality of data transmission was assessed.

Results: We found that off-the-shelf, handheld digital platforms can be used in regions with limited Internet access. By creating an internal closed network between our team members' devices, we were effectively able to transmit patient information in a reliable and accurate manner. There were specific benefits and limitations to each method that we tried; these will be presented in detail.

Conclusions: Simple process improvements that utilize commercially available, off-the-shelf technology may generate improved efficiency for surgical care in LMICs. It is important to also have a reliable backup system in place, as technologic failure can be catastrophic to mission completion.

Comparison of Irradiated and Non-Irradiated Free-Flaps Following Bilateral Breast Reconstruction with Unilateral Radiation

Catherine L. Ly, MD, Danielle R. Heller, MD, Sumun Khetpal, BA, Susan A. Higgins, MD, Brigid Killelea, MD, MPH, FACS, Michael Alperovich, MD, MSc, FACS, Tomer Avraham, MD, FACS

Yale University School of Medicine

Introduction: Recent evidence suggests that immediate autologous breast reconstruction in the setting of post-mastectomy radiation therapy (PMRT) results in acceptable cosmetic outcomes and complication rates. However, these studies are limited in that the PMRT course may be highly variable among patients. Furthermore, few reports have explored the role of PMRT in women who have undergone bilateral reconstruction with unilateral PMRT. Therefore, the true contribution of radiation on free-flaps outcomes is not well-delineated. In this study, we sought to evaluate the effect of a variety of factors, including various PMRT characteristics, on irradiated breast free-flaps and also

compared outcomes to those of contralateral non-irradiated free-flaps.

Methods: Patients who underwent bilateral free-flap breast reconstruction with unilateral PMRT at a single institution were identified through retrospective chart review from 2007 to 2017. Patients who had prior radiation in either breast were excluded. Comprehensive data collection was performed and included demographics, as well as disease and treatment characteristics. Outcomes included post-PMRT complications and revision surgery.

Results: A total of 73 women met the inclusion criteria. There was no significant difference between the complication rates among the irradiated and non-irradiated free-flaps (47.9 versus 39.7%; $p = 0.391$). Fat necrosis and asymmetry due to fibrosis or volume loss were the most common complications. Correspondingly, these two groups of free-flaps underwent a similar number of revision surgeries (32.8 versus 34.2%; $p > 0.99$). In addition, multivariate analysis of the irradiated free-flaps revealed that internal mammary node (IMN) irradiation was predictive of complications (OR 29.132, CI 2.07 to 411.07; $p = 0.013$) and the need for revision surgery (OR 15.032, CI 1.67 to 141.0, $p = 0.016$). In contrast, body mass index, age, smoking status, ASA, neoadjuvant or adjuvant chemotherapy, peri-operative morbidity, flap type, non-irradiated flap complications, and other radiation characteristics did not contribute significantly.

Conclusions: PMRT following autologous breast reconstruction does not have a marked effect on the rate of free-flap complications or the need for revision surgeries. However, PMRT that includes IMN irradiation appears to be associated with increased morbidity. Taken together, these findings support prior evidence that free-flap reconstruction should not be precluded in the setting of PMRT but also indicates that greater caution may be beneficial if IMN irradiation is required.

Functional Network Development in Sagittal Craniosynostosis Treated with Whole Vault Cranioplasty

Cabrejo, Raysa, BA; Lacadie, Cheryl, B.S.; Sun, Alexander, D; Chuang, Carolyn, MD, MHS; Yang, Jenny, MD, MHS; Brooks, Eric, MD, MHS; Beckett, Joel, MD, MHS; Jeffrey Eilbott, PhD; Gabrick, Kyle, MD; Steinbacher, Derek, DMD, MD; Charles Duncan, MD; Michael DiLuna, MD; Alperovich, Michael, MD, MSc; Pelphrey, Kevin, PhD; Pamela Ventola, PhD; Constable, Todd, PhD; Persing, John, MD
Yale University

Introduction: In this study we seek to clarify the neurological changes before and after whole vault cranioplasty (WVC) in patients born with sagittal craniosynostosis.

Methods: A case control study design was performed that included thirty fMRI scans, from twenty-five individual patients. Functional MRI (fMRI) and diffusion tensor imaging (DTI) data were analyzed with BioImageSuite (Yale University, USA). All nine functional brain networks were

analyzed with appropriate regions of interest and utilized for analysis.

Results: Comparing functional MRI the infants after WVC vs. infants before WVC group, the after WVC group demonstrated a increased connectivity in the left frontoparietal (LFPN), secondary (V2) and third (V3) visual network ($p < 0.001$). The right frontoparietal (RFPN) had decreased connectivity ($p < 0.001$). There is also a decrease and increase in anisotropy in the cingulum and precuneus despite surgery, respectively ($p < 0.05$). Adolescents treated with WVC compared to controls, demonstrated an increased connectivity in the salience (SA) and decreased connectivity in the RFPN relative to adolescent controls.

Conclusion: Patients born with sagittal craniosynostosis have different connections in infancy in most of the cerebral networks compared to controls. There are specific connectivity changes that occur in the RFPN, LFPN, V2, and V3 networks, which are areas ultimately associated with executive function and emotional control, after surgery. Changes in white matter tract microstructure connections could be influential in changes in functional connectivity. Although, the child develops, much of the abnormal network connections, seen in infancy pre-operatively, they correct after surgery to some extent, compared to age-matched controls; some aberrancies in the SA and RFPN networks remain

Surgical Subspecialties

Moderator: Ryan Bendl, DO, FACS, FASCRS

Colon and Rectal Surgeon, Nuvance Health, Norwalk Hospital

Judge: James G. Bittner, IV, MD, FACS

Advanced GI Minimally Invasive and Bariatric Surgeon; Co-Director, Advanced GI Minimally Invasive Surgery Fellowship at Saint Francis Hospital and Medical Center

Improved Cardiac Function after Myocardial Infarction with Exosomes Isolated from Thioredoxin-1 Genetically Overexpressed Mice

Jennifer Hubbard, MD^{1,2}; Pradeep Seetur Radhakrishna, PhD¹; Jacob Campbell, DO¹; Mahesh Thirunavukkarasu, PhD¹; David W. McFadden, MD, FACS¹; J. Alexander Palesty, MD, FACS²; Nilanjana Maulik, PhD, FAHA^{1,2}

¹UConn Health Center² Saint Mary's Hospital

Introduction: Cardiovascular disease is the number one cause of mortality in the United States, with myocardial infarction (MI) resulting from cell death due to a lack of blood flow, which often results in heart failure in many survivors. Thioredoxin-1 (TRX-1) has been shown to increase angiogenesis and decrease fibrosis by altering cell signaling. The alterations in cell signaling includes the production of proteins and genetic material that are packaged into a lipid bilayer exosome and released into the blood available for uptake by surrounding ischemic cardiac myocytes. This study evaluates the ability of exosomes isolated from TRX-1 enhanced mice to improve cardiac function post-MI.

Methods:

Part 1: Exosome isolation: TRX-1 enhanced mice and control mice were subject to MI by ligation of the left anterior descending artery (LAD). Post-MI, blood was collected from the TRX-1 enhanced and control mice and exosomes isolated.

Part 2: Study mice were subject to MI by ligation of the LAD. Mice were then injected with exosomes isolated from TRX-1 enhanced mice or control mice. Echocardiograms were performed at 30 days post-MI to assess cardiac function in the two groups. Cardiac tissue was stained to evaluate levels of angiogenesis and fibrosis.

Results: Echocardiographic analysis done 30 days post-MI showed that mice injected with exosomes isolated from TRX-1 enhanced mice, versus exosomes from control mice, had increased ejection fraction [42%±2.5 vs. 30.7%±1; p=0.0025] and fractional shortening [20.6%±1.4 vs. 14.5%±0.7; p=0.003] as well as decreased left ventricle internal diameter at systole (LVIDs) [3.5mm±0.2 vs. 4.2mm±0.2; p=0.013] respectively. Arteriolar density and VEGF expression was increased, and fibrosis by picrosirius-red staining was decreased [12.8%±1.2 vs. 21.6%±2.3; p=0.006], in the mice injected with exosomes isolated from TRX-1 enhanced mice versus exosomes from control mice.

Conclusions: Exosome isolates from TRX-1 enhanced mice improved cardiac function after MI. These lipid bilayers are easily reproduced in laboratory settings and do not have the immune rejection risk associated with stem cell therapy. Hence, this is a potential viable therapy to be further investigated for treatment of MI.

The Three Delays in Pediatric Surgical Care in Uganda: Insights from a Pediatric Surgery Outpatient Clinic at a Tertiary Center

Nensi M. Ruzgar¹, Amandine Godier-Furnemont¹, Nasser Kakembo², Maija Cheung¹, Sarah Ullrich¹, Ann Nabirye², Harriet Namboozee², Phyllis Kisa², Arlene Muzira², John Sekabira², Doruk Ozgediz¹

¹Yale University School of Medicine, New Haven, USA;

²Mulago Hospital, Kampala, Uganda

Introduction: Disparities in pediatric surgical (PS) disease burden and the operative backlog in resource-limited settings are not well-studied but have been used to evaluate pediatric capacity-building needs using the Three Delays Model. We evaluated the three delays—in care-seeking, accessing care-facilities, and receiving adequate care—for patients presenting to the PS Outpatient Clinic (PSOPC) at one of two hospitals with a dedicated PS unit in Uganda.

Methods: An interviewer-facilitated survey was administered over 21 months to caregivers of children presenting to the PSOPC. The survey captured demographics, medical history, diagnosis, admission status after visit, and barriers in accessing care.

Results: 1522 PSOPC visits represented 1406 unique patients with median age 1.3 years. 1203 (85.6%) presented with new concerns, 996 (82.8%) of which needed surgery. 108 (7.7%) presented for post-operative follow-up, and 92 (6.5%) presented for the next surgery in staged procedures. 1172 (83.4%) patients' caregivers first noticed the symptoms, with 1.0-year median delay before first seeking care. 446 (31.7%) visited another facility before PSOPC. Caregivers noted significant transportation barriers (Table). Most frequent diagnoses, inguinal and umbilical hernias, presented at median 1.3 and 1.6 years after symptom-onset, respectively. Undescended testes presented latest, 2.1 years after symptom-onset at median age of 5.0 years. Of 1088 needing surgery, 408 (37.5%) were admitted, with 254 (23.3%) surgeries booked. 62.5% were denied admission and advised to follow up in 29.7±83.5 days. 10.0% of denials were attributed to reaching ward capacity. Of 116 follow-up visits, 37.1% were for ongoing surgical concerns, 44.0% post-operative follow-ups, 19.0% awaiting next of staged procedures. Of 85 visits needing surgery, 63.5% were denied admission, and 34.1% advised to follow up in 20.4±43.1 days.

Conclusions: The PSOPC sees significant delays from symptom-onset to care-seeking, late ages of presentation, and transportation barriers. Only a minority of outpatients are admitted for surgery, attributable to resource- and space-shortages. Our results highlight the need for capacity- and infrastructure-building efforts to address all
Cont., next page

three delays to improve pediatric surgical care in Uganda.

Table. The transportation barriers and expenses faced by families before presenting at PSOPC

Cost of Travel (UGX)	n (%)	Travel Time (hrs)	n (%)	Borrowed Money	n (%)
0-20,000,000	883 (62.8%)	<1	52 (3.7%)	Yes	119 (8.9%)
20-40,000,000	193 (13.7%)	1-2	663 (47.2%)	No	1179 (88.4%)
40-60,000,000	91 (6.5%)	2-4	361 (25.7%)	Donation	7 (0.5%)
60-100,000,000	64 (4.6%)	4-8	183 (13.0%)	Organization assisted	12 (0.9%)
100,000,000+	113 (8.0%)	≥8	16 (1.1%)	No response	16 (1.2%)
No response	62 (4.4%)	No response	131 (9.3%)		
Total Vehicles Used	n (%)	Used Ambulance	n (%)	Sold Property	n (%)
Walked	26 (2.0%)	Yes	54 (4.1%)	Yes	51 (3.8%)
1	440 (33.0%)	No	1216 (91.2%)	No	1237 (92.8%)
2	766 (57.5%)	No response	79 (5.9%)	No response	45 (3.4%)
3	86 (6.5%)				
≥4	15 (1.1%)				

Admission to Surgery Expedites Care of Children with Choledocholithiasis

Nathan Maassel, Michael Caty, Robert Cowles, Emily Christison-Lagay, Doruk Ozgediz, David Stitelman, Daniel Solomon
Yale New Haven Children's Hospital

Introduction: Care pathways for pediatric patients with choledocholithiasis are variable. At our institution, children with common bile duct stones can be admitted to either pediatric surgery or pediatric medicine. We sought to determine the optimal care pathway for these complex patients.

Methods: This is a retrospective review of patients ≤16 years old, who underwent cholecystectomy for presumed choledocholithiasis at a tertiary children's hospital. Patients were divided based on admitting service: Pediatrics (Peds) vs. Pediatric Surgery (PS). The primary endpoints were time to surgery and total length of stay, with secondary endpoints being resource utilization (radiographic imaging) and complications. Categorical data were analyzed using Fisher's Exact test, and continuous data were analyzed using Wilcoxon-Rank Sum Test.

Results: Between 2013 and 2018, 123 children who had a cholecystectomy were identified, 22 of which were performed for choledocholithiasis (6 admitted to PS, 16 to Peds). The average age at surgery was 13.7 years. Comorbidities included: sickle cell disease (SCD) (3/22), hereditary spherocytosis (HS) (4/22), pancreatitis (4/22), cholecystitis (3/22). Time from admission to definitive surgery was faster for patients admitted to surgery (1.7 vs 2.7 days, p=0.02). Total length of stay was 2 days shorter for patients admitted to surgery (4.8 vs 2.8 days, p=0.08). There were no significant differences in MRCP utilization between admitting services (50% PS vs 75% Peds, p=0.33). There were no differences in co-morbidities, or blood transfusion requirements. In a sub-group analysis of patients with blood disorders (SCD or HS) there was a statistically significant difference in hemoglobin (10.86 vs 13.67, p=0.01), hematocrit (30.14 vs 40.54, p = 0.002), and transfusion requirement (0.86 units/patient vs 0, p=0.004), but no difference in resource utilization, length of stay or time to surgery.

Conclusions: Admission to pediatric surgery for the multidisciplinary care of choledocholithiasis accelerates prompt surgical care and could lead to shorter length of stay in these complex patients.

Demographics and Admission Characteristics

	Pediatrics	Surgery	p-value
N	16 /22 (73%)	6/22 (27%)	
Female	12(75%)	3(50%)	0.334
Age	13.31	14.67	0.350
BMI	25.68	24.44	0.854
SCD	2 (12%)	1 (17%)	1.000
HS	4 (25%)	0	0.541
Pancreatitis	2 (12%)	2 (33%)	0.292
Cholecystitis	1 (6%)	2 (33%)	0.169
Direct bilirubin	5.78	0.76	0.337
Total bilirubin	9.22	2.38	0.825
White blood count	10.48	12.38	0.747
Hemoglobin	12.37	13.85	0.104
Hematocrit	36.05	40.38	0.090

Length of Stay and Resource Utilization

	Pediatrics	Surgery	p-value
Transfusion (units/admission)	0.31	0.17	0.751
Time to Surgery	2.69	1.67	0.019
Length of Stay (post-op)	2.06	1.17	1.000
Length of Stay (total)	4.75	2.83	0.078
ERCP	13 (81%)	5 (83%)	1.000
MRCP	12 (75%)	3 (50%)	0.334
IOC	6 (38%)	1 (17%)	0.616
Stone on IOC	0	0	
30 Day Readmission	0	0	

Sub-group analysis of patients with Sickle Cell Disease (SCD) and Hereditary Spherocytosis (HS)]

	SCD/HS	Other	p-value
N	7	15	
Admitting Service			0.616
	Peds	6 (86%)	10 (67%)
	Pediatric Surgery	1(14%)	5 (33%)
Pancreatitis	0	4 (27%)	0.263
Cholecystitis	0	3 (20%)	0.523
Direct bilirubin	11.44	0.79	0.004
Total bilirubin	19.52	1.67	0.003
White blood count	12.44	10.17	0.298
Hemoglobin	10.86	13.67	0.011
Hematocrit	30.14	40.54	0.002
Time to Surgery	2.57	2.33	0.499
Length of Stay (post-op)	3.43	1.07	0.104
Length of Stay (total)	6	3.4	0.124

The Use of Human Induced Pluripotent Stem Cells to Treat Hyperoxia Induced Lung Damage in a Mouse Model of Bronchopulmonary Dysplasia

Heather Wanczyk, MS, Adam Mitchell PhD, Todd Jensen MHS, Christine Finck MD; FACS
University of Connecticut Health Center, Connecticut Children's Medical Center

Introduction: Prevention of bronchopulmonary dysplasia (BPD) in premature neonates with respiratory distress remains challenging. The underlying pathogenesis of BPD is chronic inflammation. Induced pluripotent stem cells (iPSCs) and their cell-free counterparts have been shown to possess anti-inflammatory properties. The purpose of this study was to assess the capacity of iPSCs and iPSC-derived exosomes to prevent the onset of BPD in a murine model.

Methods: C57 BL/6J mice at post-natal day 1 were exposed to 75% oxygen for a total of 14 days. Immediately following exposure, iPSCs suspended in HBSS were administered. Controls included hyperoxia alone, normoxia, and a vehicle (n=8/treatment group). Lungs were harvested at 7 and 14 days post treatment. Damage was assessed by mean linear intercept (MLI), with a lower MLI corresponding to a greater degree of damage. The expression of hyperoxia-associated genes/proteins *Il-6*, *Mmp2*, *Nfkb1* and *Tgfb1* were also evaluated. Exosomes derived from iPSCs were isolated, characterized by binding to supermagnetic beads and administered to mice under the same conditions above, including a bead control. Histomorphometric analysis of damaged lungs 14 days post exosome treatment was then performed.

Results: After both 7- and 14-days, post treatment there was no significant difference in the MLI between normoxia and hyperoxic mice treated with iPSCs, while the vehicle and hyperoxia controls had lower MLIs. At 14 days post exosome treatment there was a significant difference in MLI between normoxia vs. bead treated lungs, however there was also a significant difference between the bead

and exosome + bead treated groups, whereby the latter had a higher MLI. The expression of *Il-6* was significantly reduced in mice treated with iPSCs compared with undamaged mice, while expression of all other genes/proteins remained the same.

Conclusion: We conclude that based on a return to normal histology and gene/protein expression, iPSCs are able to mitigate the damage caused by hyperoxia exposure and potentially prevent the onset of BPD. Exosomes derived from iPSCs seem to exhibit a beneficial effect, however a therapeutic dosage will need to be determined.

Predicting the Impact on Women in a World Without Midurethral Slings: A Cost-Effective Analysis of Stress Incontinence Treatment Both With and Without Slings

Aparna Kailasam MD¹, Olivia H. Chang MD², Lauren A. Cadish MD³, Beri M. Ridgeway MD², Jonathan P. Shepherd MD, MSc

¹ Trinity Health of New England ² Cleveland Clinic, Cleveland, OH, ³ Providence Saint John's Health Center, Santa Monica, CA

Objective: With growing concerns over vaginal pelvic mesh procedures and the FDA's recent order to stop the distribution of transvaginal mesh in the United States, many wonder how women would be impacted if midurethral slings (MUS) were removed from the marketplace. Our objective was to perform a cost-effectiveness analysis (CEA) for the surgical and non-surgical management of stress urinary incontinence (SUI) with and without availability of MUS.

Methods: We created a CEA using TreeAge Pro modeling SUI treatments (Table 1). Time horizon was 2 years after initial treatment. Expert surgeons developed treatment pathways with and without the availability of MUS including cure, recurrence with potential reoperation, and complications. Costs (2019 US\$) included index surgery, surgical retreatment, and complications including urinary retention, de novo urgency, and mesh exposure. We measured effectiveness with quality-adjusted-life years (QALY) which ranged from 0-2. The incremental cost-effectiveness ratio (ICER) was calculated for non-dominated treatment strategies ($\Delta\text{cost}/\Delta\text{QALY}$). An ICER value $< \$50,000/\text{QALY}$ was considered cost-effective. Costs, probabilities, and utilities were gathered from Medicare data and published literature.

Results: The least costly treatment strategies were pessary, PFPT, no treatment, and midurethral sling, respectively (Table 1). Midurethral slings had the highest effectiveness with 1.86 QALY. The strategy with the lowest effectiveness was no treatment with 1.5 QALY. The three cost-effective strategies included pessary, PFPT and MUS (Table 1). No treatment was dominated by both pessary and PFPT with higher cost and lower effectiveness. No other surgical options were cost-effective as they were also dominated by MUS. If MUS were not available, all other surgical options were still "dominated" by PFPT. If a surgical option other than MUS was required, open Burch colposuspension was preferred, but this strategy was not cost-effective. Multiple one-way sensitivity analyses confirmed model robustness.

The only reasonable threshold where outcomes changed was if PUBLI costs decreased 12.6%.

Conclusions: MUS were the most effective SUI treatment and the only cost-effective surgical option. If MUS were removed from the market, there would be no cost-effective surgical treatment for SUI.

Table 1. Cost-effective Treatment Strategies for Stress Urinary Incontinence

Treatment Strategy	Cost (2019 \$US)	Increased Cost (€)	Effectiveness (QALY)	Increased Effectiveness (€QALY)	ICER* (€/\$QALY)
Pessary	1,052.54	-	1.757	-	-
Pelvic physical therapy	1,241.19	188.65	1.765	0.008	22,728.92
No treatment	1,392.00	n/a	1.5	n/a	Dominated
Midurethral sling	5,815.72	4,574.53	1.863	0.098	46,518.37
Open Burch colposuspension	6,864.55	n/a	1.731	n/a	Dominated
Pubovaginal autologous slings	7,665.80	n/a	1.683	n/a	Dominated
Laparoscopic Burch colposuspension	7,961.33	n/a	1.646	n/a	Dominated
Periurethral bulking	8,789.42	n/a	1.756	n/a	Dominated

Challenges with Database Research: A Comparison of Two Databases in Patients Undergoing Carotid Artery Stenting

Alexander Ostapenko, MD^a, Stephanie Stroeve, PhD, MPH^b, Alan Dietzek, MD^a

^aDepartment of General Surgery, Danbury Hospital, Danbury CT

^bDepartment of Research and Innovation, Nuvance Health, CT

Introduction: The Vascular Quality Initiative (VQI) is a prospectively collected registry of 12 major vascular procedures. A recent publication utilizing this database described an association between anesthesia type and stroke, cardiac complications, and mortality in patients undergoing carotid artery stenting (CAS). The American College of Surgeons (ACS) has a more robust but less specific database called the National Surgical Quality Improvement Program (NSQIP), which is a nationally-validated database tracking 30-day outcomes for selected patients undergoing a variety of procedures, including CAS. It includes similar outcomes and variables to VQI for this procedure. The aim of this study was to demonstrate the utility of the NSQIP database in studying vascular patients by validating the findings from the VQI database with the targeted CAS-NSQIP database and qualitatively assessing differences in the results from both databases.

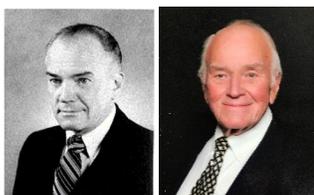
Methods: We conducted a cross-sectional retrospective analysis of the targeted CAS-NSQIP database for 2011 to 2017 with a primary outcome of death. We excluded patients with operative times less than 30 minutes or age greater than 90 years. We performed a univariate logistic regression analysis for the baseline characteristics and primary outcome of interest. We utilized a logistic multivariate regression model to identify variables predictive of the outcomes of interest. We then qualitatively compared the results from our NSQIP analysis to the results of the VQI study.

Results: After applying inclusion and exclusion criteria, the total sample size was N = 869. Of these, 270 (31%) received general anesthesia (GA) and 599 (69%) received local anesthesia (LA). In comparison, the VQI study contained 12,919 patients from 2005 to 2017, of which 2024 (15%) received GA and 10,895 (85%) received LA. The primary

outcome, death, was reported as 30-day mortality in CAS-NSQIP and in-hospital death rate for VQI. Mortality was 2.6% for GA and 0.5% LA in CAS-NSQIP, whereas for VQI these rates were 2.1% and 0.5%, respectively. Univariate analysis in CAS-NSQIP demonstrated that anesthesia type was a significant predictor of death ($p=0.031$). However, after utilizing forward selection to control for potential confounding, anesthesia was no longer a significant predictor. Nevertheless, on multivariate analysis, patients who died had 3.4 times the odds of having received GA (OR 3.4; 95% CI, 0.87-13.4; $p=0.08$) than those who did not die. Although not statistically significant in our study, these odds are comparable to those reported by VQI (OR, 2.52; 95% CI, 1.26-5.04, $p=0.01$).

Conclusion: In this study we attempted to validate the findings of a recent VQI study using the CAS-NSQIP database, as well as qualitatively compare the findings. We found that the results were similar across studies with both sets of patients demonstrating a higher odds of general anesthesia exposure among those who died. Additionally, we found that the CAS-NSQIP database did not record all of the same variables as the VQI (i.e. hypertension, coronary artery disease, P2Y2 inhibitors, etc.), which made exact replication of the prior regression analyses difficult. This limitation demonstrates an important obstacle when working with database data since it is not possible to go back and pull additional variables. Another important limitation when working with large national databases is that we must rely on internal quality assurance at the time of data entry. We cannot perform our own quality assessments and must therefore trust the validity of the data. Lastly, while both databases provide large samples, they are not necessarily representative of the entire United States. Both the VQI and NSQIP participants were primarily White, non-Hispanic, and older. We cannot make generalizations on the findings of the studies to populations outside of those sampled. However, overall, we can see that both the VQI and targeted NSQIP databases are useful in assessing vascular patient outcomes among specific groups in the U.S.

John D. MacArthur, MD, FACS Trauma Competition



John MacArthur, MD, FACS was born in Minnesota. Dr. MacArthur was graduated from the University of Minnesota Medical School. He completed his General

Surgery Residency at Peter Bent Brigham (now Brigham and Women's Hospital) with Dr Fanny (Francis) Moore.

Dr. MacArthur joined Bridgeport Hospital as Chair of Surgery in 1979. In the 80's he worked with Lenworth Jacobs, MD, FACS, Chip Baker, MD, FACS, James Barone, MD, FACS, and Tony Morgan, MD, FACS to modernize the medical transportation system in Connecticut. Their work also included EMT training and certification. In the early 90's they testified in front of the State Senate encouraging Connecticut to adopt the ACS trauma designation system and use the "optimal resources" document as bases for the designation. They were successful and forever changed the way trauma patients are cared for in our state.

He served as President of this organization from 1995-1996 and retired from practice in Connecticut in the late 90s. Dr. MacArthur continued to practice on Nantucket for many years before moving to Colorado, where he now resides.

Moderator: Brendan Campbell, MD, MPH, FACS
Director of Trauma, Pediatric Surgical Quality and Safety Officer, Donald Hight Endowed Chair of General Pediatric Surgery, Connecticut Children's Medical Center
Chair, Connecticut State Committee on Trauma

Judges:

Roselle E. Crombie, MD, FACS

Yale New Haven Health System, Bridgeport Hospital

Kevin Schuster, MD, MPH, FACS, FCCM

Associate Professor of Surgery (Trauma), Yale School of Medicine

Primary Care Recommendations and Fall Risk Assessments are not Enough to Inspire Exercise Program Participation in Elders

Erin White, MD, MBS; Ann Dyke, RN; Andrew Stone, BS;
Nicholas Bertini, MD; Shea Gregg, MD
Yale New Haven Health - Bridgeport Hospital

Introduction: Every year, roughly one third of people over the age of 65 and half of people over 80 years old fall. This population has decreased ability to maintain balance as

John D. MacArthur, MD, FACS Trauma Competition

well as a decline in certain sensory and motor functions. Fear of falling itself leads to distress and reduced quality of life, increased medication use and activity restriction, further decline in physical functioning, and ultimately a greater risk of falling and admissions to institutional care. Many studies have shown exercise programs that focus on balance, strength, and endurance effectively restore balance, increase ability to walk and reduce risk of falls. Furthermore, decreased fear of falling improves health and wellness overall. Despite overwhelming evidence that participation in exercise programs is beneficial, there is insufficient data to demonstrate that at-risk elders in the community will participate in such exercise programs. Therefore, we present a study to determine: does an assessment of fall risk combined with a primary care physician's recommendation for community exercise programs lead to participation in fall prevention programs?

Methods: Patients aged 60-75 were referred to the study by physicians in a busy private suburban primary care practice. Those deemed eligible underwent fall risk evaluations in the office waiting room using a "Timed Up and Go" (TUG) test and a Falls Efficacy Scale-International (FES-I) survey. Patients who scored "at risk" (see figure) were referred to a list of community fall prevention exercise programs by their doctor. Follow up was conducted via telephone or during office visits at 4 week, 8 week and 12 week periods to assess exercise program participation. All recommended exercise programs were vetted by study staff and deemed to be high quality programs.

Criteria for identifying as "At Risk" for fall	
Falls Efficacy Scale-International survey (FES-I) ≥23	
and/or	
"Timed Up and Go" (TUG) Test	
60-69	>8.1
70-79	>9.2

Results: From October 2016 to June 2017, 85 patients aged 60-75 were screened, of which 36 eligible patients underwent fall risk assessment. Of those, 17 were deemed at risk for falls and were referred to an exercise program. Only two (11.8%) of those receiving a referral went on to enroll in a class, and only one (5.9%) completed a 12-week exercise program. A large number of patients did not respond to our follow-up enquiries despite consenting to the study (29%). Main reasons cited for exercise program non-participation were lack of time (17.6%), lack of interest (5.9%), or disliked program instructor (5.9%).

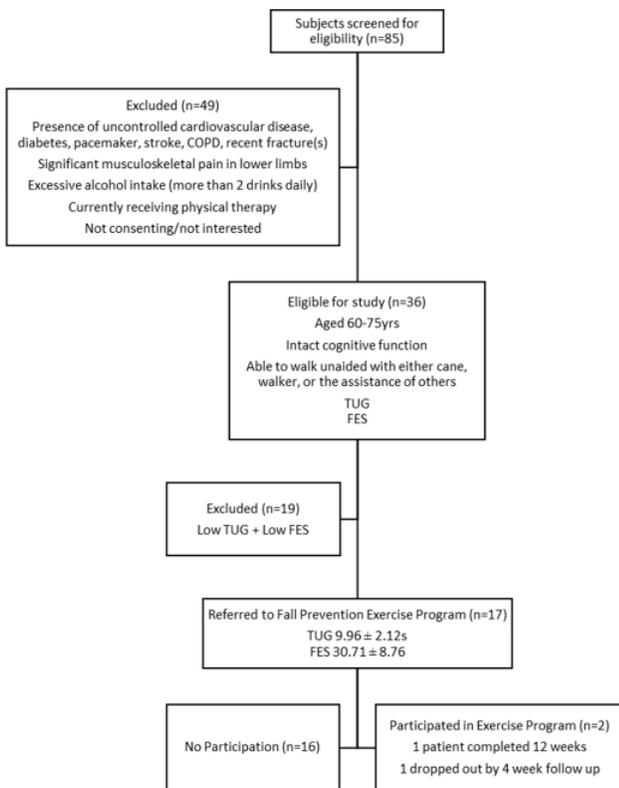
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completely characterized because no standard method of reporting exists.

Methods: Saint Francis Hospital, is a 617 bed ACS verified level 1 trauma center. All admitted, injured patients evaluated by the trauma service were screened. Patients that met criteria were approached, consented, and reliable contact information was obtained. Data such as mechanism of injury, length of stay, injury severity score (ISS), abbreviated injury scale (AIS) and discharge disposition were obtained. Consented patients were called 30 days after discharge and asked a brief questionnaire regarding follow up with providers, awareness of injuries, unplanned emergency department (ED) visits, readmissions and interventions. (Figure 1) Data points for those patients with readmissions were compared to those without using independent sample *t*-test, significance denoted as a *p* value < 0.05. (Table 1)

Results: A total of 140 patients have been enrolled so far. Charts were reviewed at 30 days post discharge and phone calls were made. There were 2 patients discharged alive that are now listed as deceased of unknown cause. A total of 98 patients have been called and included in our preliminary analysis; 74 (75.5%) were reached. The combination of the phone calls and chart review identified that 24 patients (24.5%) accounted for a total of 35 emergency department (ED) visits; 6 occurring at outside institutions. There were 14 patients that accounted for a total of 19 readmissions, a rate of 19.4%. Outside institutions accounted for 4 of these readmissions. There were 4 patients that required a total of 5 invasive procedures, and 2 patients required intensive care unit (ICU) admissions. Regarding follow up, 11 of the 74 patients reached (14.9%) had no follow up with any providers after discharge and 18 patients (24.3%) were not aware of what injuries they had as a result of their trauma. Patients with readmissions had significantly higher AIS scores for extremity and higher total ISS (*p* < 0.05). Although not statistically significant the AIS for chest approached statistical significance (*p* = 0.0800). (Table 1)

Discussion: Our preliminary data suggests that readmission rates in our trauma population are higher than reported in the literature. Without accurate real time comparisons, however, program improvement strategies are difficult to implement. Comparison between our patients with 30-day readmissions to those without, demonstrated some significant differences as well as notable trends. (Table 1) The readmission group was overall more severely injured, particularly with extremity injuries. Older patients, those discharged to rehab centers and patients with head or chest injuries all trended towards significance. It is possible that with a greater sample size these may prove significant. In addition to readmission rates, unplanned ED visits were also high. There is a paucity of literature available for comparison, so its significance is unclear. Individual trauma centers may track this information but there is no standardized national process to report this. It was also noted that a significant portion of these patients did not have any follow up, and almost a quarter of our patients were not aware of all the injuries they had incurred. Although speculative in nature, we do not believe our institution is unique in regard to follow up and injury



Conclusion: While exercise programs have been proven repeatedly to benefit those at risk of falls, development of an intervention, consisting of an assessment and referral system at a primary care office failed to generate participation in such programs. Future efforts to reduce falls among community-dwelling elders need to focus lowering barriers to participation.

Using a Modified Trauma Quality Improvement Program to Enhance Reporting of Unanticipated Events

Brendan Gontarz
Saint Francis Hospital

Introduction:

The American College of Surgeon’s (ACS) Trauma Quality Improvement Program (TQIP) utilizes existing trauma registries to provide risk adjusted benchmarks to centers with accurate national comparisons.(1) This feedback helps trauma centers identify areas for improvement. Currently over 825 centers participate in the United States (US).(1) Information however, is limited to in hospital events, and no data regarding readmissions is captured. This is important as previous studies vary significantly on trauma readmission rates, ranging from 6-14%.(2, 3) Of those readmissions approximately half occurred at the institution that treated the index injury.(3) The most common causes for readmissions were complications from the initial injury and subsequent injuries.(2, 3) The transient and diverse nature of the trauma population makes studies at the individual institution level limited. Not only is there morbidity to the patient, but there is also a significant financial and resource burden to the healthcare system. The annual cost of trauma in the US exceeds \$400 billion, but the cost of subsequent readmissions is unclear.(4, 5) Recidivism and readmission among trauma patients is not

Improvement Program to Enhance 30-Day Post-Trauma Readmission Detection. Journal of the American College of Surgeons. 2016;222(5):865-9.
 5. Strosberg DS, Housley BC, Vazquez D, Rushing A, Steinberg S, Jones C. Discharge destination and readmission rates in older trauma patients. The Journal of surgical research. 2017;207:27-32.

awareness. Without benchmarks to compare these outcomes, trauma centers have little feedback as to which specific areas require improvement.

We propose a follow up phone call 30 days after discharge, in conjunction with routine chart review to better characterize the trauma populations post-discharge events. This has the potential to better characterize these events, which in turn can lead to more effected implementation of strategies to improve patient outcomes. Providing more education to patients and/or caregivers regarding injuries and follow up may also reduce unplanned ED visits. Our institution will continue recruitment with a goal of 500 patients in our modified TQIP study.

Traumatic Cerebrospinal Fluid Leak after a Back Stab Injury

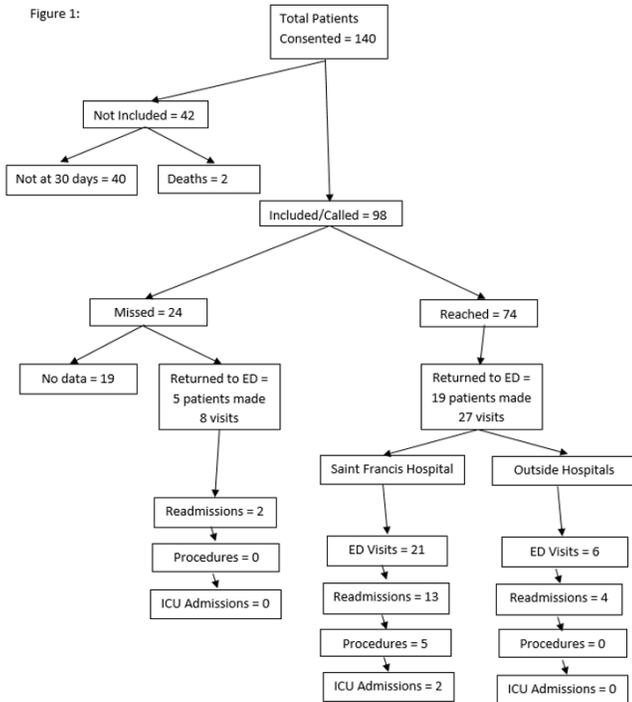
Suraj Panjwani MD, Jahnvi Kakuturu MD, Jennifer Hubbard MD, John Strugar MD, J Alexander Palesty MD
 St. Mary's Hospital

Introduction: Spinal stab wound resulting in an external cerebrospinal fluid (CSF) leak is rare. Traumatic CSF leakage can be potentially complicated by pneumorrhachis and pneumocephalus that can be neurologically debilitating and life threatening. Here, we describe the case of a patient who suffered CSF leak after being stabbed in the back.

Method: 31 y/o M presented to the emergency room after he was stabbed in four areas on his back, including a posterior cervical horizontal wound at around the level of C7, four centimeters para-median on right. Patient had no other traumatic injuries. He was neurologically intact, with 5/5 motor exam in both upper and lower extremities, intact sensation and normal reflexes. Wounds were irrigated and stapled. Patient returned to the emergency room five days later for clear drainage from the cervical para-median wound. He also had associated headaches and photophobia without any focal neurological deficits.

Results: Case was discussed with our neurosurgical colleagues and an MRI of the cervical spine was performed that revealed a linear tract containing fluid extending from the skin to C5-C6, with small fluid collection contiguous with the spinal canal, suspicious for CSF leak (Fig.1). There was also a defect in the posterior inter-spinous ligament suggestive of penetrating ligamentous injury. Drainage and symptoms persisted despite primary closure of the wound. Hence, the patient was taken to the operating room for a lumbar drain placement. Post operatively, patient was kept flat, serial neurological examinations were performed, and he was given broad-spectrum antibiotics. His symptoms improved and the lumbar drain was discontinued on post-op day three, after which he was discharged on oral antibiotics. Post discharge course was uneventful, drainage ceased and wound healed well.

Discussion: Most cases of CSF leakage resolve spontaneously. If conservative management fails, treatment involves primary closure of the wound to prevent air escaping into the wound. In addition, placement of a downstream lumbar drain reduces the intradural pressure and decreases outflow through the traumatic wound.



Variables	Readmission (n=14)	No readmission (n=65)	p
Age, mean (SD)	64.57 (19.67)	58.23 (19.29)	0.2697
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-Head/Neck	1.14 (1.79)	0.85 (1.37)	0.4825
-Face	0.07 (0.27)	0.15 (0.36)	0.4356
-Chest	1.29 (1.73)	0.62 (1.17)	0.0800
-Abdomen	0.64 (1.34)	0.49 (0.95)	0.6213
-Extremity	0.29 (0.83)	0.92 (1.11)	*0.0488
-External	0.0 (0)	0.03 (0.17)	0.5132
Total ISS	11.57 (7.02)	7.48 (5.20)	*0.0145
Critical Care LOS	1.29 (1.77)	0.69 (1.67)	0.2312
Total LOS	4.71 (4.27)	3.74 (3.09)	0.3243
Disposition to Rehab (%)	7 (50.00%)	25 (38.46%)	0.4279

*denotes statistical significance identified as p < 0.05

Resources:

1. Trauma Quality Improvement Program. American College of Surgeons 2019; <https://www.facs.org/quality-programs/trauma/tqip/center-programs/tqip>.
2. Moore L, Stelfox HT, Turgeon AF, Nathens AB, Le Sage N, Emond M, et al. Rates, patterns, and determinants of unplanned readmission after traumatic injury: a multicenter cohort study. Annals of surgery. 2014;259(2):374-80.
3. Petrey LB, Weddle RJ, Richardson B, Gilder R, Reynolds M, Bennett M, et al. Trauma patient readmissions: Why do they come back for more? The journal of trauma and acute care surgery. 2015;79(5):717-24; discussion 24-5.
4. Shapiro DS, Umer A, Marshall WT, Hansen K, Boucher E, Emmanuel A, et al. Use of a Modified American College of Surgeons Trauma Quality

Fig.1 – MRI Cervical Spine demonstrating tract and CSF leak



Need for CT Scanning of the Chest After Fall in the Elderly

JL Hubbard MD, N Pozzi MD, J McAuliffe BS MSTP, J Alexander Palesty MD FACS, A Zarif MD FACS
Saint Mary's Hospital

Introduction: Fall is the main cause of trauma in the elderly and evidence has shown the number of rib fractures correlates with patient morbidity¹. This study aims to analyze the additive benefit of computed tomography (CT) scanning after X-ray of the chest for fall in the elderly and whether this information changes management, including the need for additional opioid medications.

Methods: The trauma database of a large community hospital was reviewed for patients greater than 60 years of age found to have rib fractures after a fall. Exclusion criteria were: Injury Severity Score (ISS) of 15 or greater, individuals who did not have a CT scan of the chest after initial plain imaging, individuals requiring ICU level of care, or individuals with a traumatic brain injury. Each patient's length of stay and pain medication regimen was recorded.

Results: The total population included in the study was 12 patients. Of these, 30.77% had a diagnosis of rib fractures on x-ray without additional findings on follow up CT scan. Almost 70% of patients had additional findings on CT scan including new or additional rib fractures or occult pneumothorax.

Of the population of patients without additional CT scan findings, the average number of received doses of narcotic pain medications in the first two days of admission were as follows: hydromorphone: 1.17 doses /day, oxycodone 2.5 doses / day, and morphine 0.67 doses/ day. In addition, 50% of these patients were on a muscle relaxant, 67% were with lidocaine patch, and 100% were given acetaminophen and / or NSAIDs.

Of the population of patients with additional CT scan findings, the average number of received doses of narcotic pain medications in the first two days of admission were as follows: hydromorphone 0 doses /day, oxycodone 1.3 doses / day, and morphine 0.5 doses / day. In addition, 0% of these patients were on a muscle relaxant, 33% were with lidocaine patch, and 100% were given acetaminophen and / or NSAIDs.

For both groups, the hospital length of stay was on average 2 days. There were no patients who had additional interventions based on traumatic CT scan findings.

Conclusion: Thoracic trauma in the elderly after fall contributes significantly to health care cost burden. Rib fractures and associated minor hemopneumothorax which are only found on CT scan of the chest required no additional intervention nor prolonged hospital stay. Findings of additional rib fractures on CT of the chest did not result in a need for increased pain medication. Hence, the addition of CT scan to x-ray of the chest after minor fall in the elderly does not change management.

John D. MacArthur, MD, FACS Trauma Competition Epidemiology of Pediatric Basketball-Related Injuries on a Local and National Scale

Nathan Maassel, MD¹, Erin Peterec¹, Pina Violano, PhD, RN-BC², Patricia Morrell³, James Dodgington⁴, Emily Christison-Lagay, MD¹, David Stitelman MD¹

¹ Yale School of Medicine, Department of Surgery, Division of Pediatric Surgery; ² Yale New Haven Hospital Injury Prevention; ³ Yale School of Medicine, Department of Surgery, Division of Trauma; ⁴ Yale School of Medicine, Department of Pediatrics, Section of Emergency Medicine

Introduction: Over the past two decades, Connecticut (CT) collegiate basketball has enjoyed a period of consistent success on both men and women's teams with 14 national championships between the two teams. Statewide participation in high school basketball has increased in parallel with this collegiate success despite a nationwide decline over the same period according to data from the National Federation of State High School Associations (NFHS). Given the increased popularity of basketball in CT, we sought to determine rate and pattern of basketball-related injury in CT compared to national data.

Methods: Retrospective review of CT and national data from the National Electronic Injury Surveillance System (NEISS) database from 2007-2017. Patients ≥ 5 and < 18 years old with injury codes related to basketball were included. Patients were further characterized by sex, and anatomic location of injury. Using population data from the American Community Survey (ACS), normalized rates of projected injury per population were determined at the state and national level. A simple linear regression was performed on raw injury counts for local and national levels, and rate of injury over time was determined using a Poisson regression, both with R statistical software.

Results: In CT there were an average of 8342 projected basketball injuries for children ≥ 5 and < 18 years old over a 10-year span. (Table 1). Seventy-Five percent of the injuries occurred in males. Patterns of injury varied by age with head and neck injuries predominating in elementary school children (35%, age 5-9), injuries to the lower arm (35%) predominating in middle school age children (age 10-14), and ankle/foot injuries most prevalent in high schoolers (29%, age 15-17) (Figure 1). When divided by gender, females had growing proportion of knee injuries with age (2.3% 5-9 yr, 5.64% 10-15 yr, 16.3% 15-17.yr). Simple linear regressions of CT and national raw injury counts yielded R squared values of 0.86 and 0.02 respectively. A Poisson regression comparing normalized rates of projected basketball-related injuries demonstrated a statistically significant relationship between rate of injury and time, with a 3.7% per year increase in injuries in CT compared to 0.08% per year nationally ($P < 0.0001$) (Figure 2).

Conclusions: We found a significant increase in rate of basketball injuries per year in CT, in contrast to stable rates nationally. With basketball participation and injuries both on the rise at the state level, recreational and competitive leagues have an opportunity to focus on safety and injury mitigation strategies. Future work will involve contacting local basketball leagues to discuss injury prevention techniques. *cont., next page*

Table 1 Injury Estimates for Connecticut and National Populations

Year	Connecticut Injury Count	Connecticut Population Estimate	National Injury Count	National Population Estimate
2007	6771	919,722	319632	81,863,588
2008	7086	913,937	319799	82,104,950
2009	7435	916,801	320393	82,717,676
2010	7863	914,746	344753	82,483,180
2011	8495	909,723	354259	82,111,889
2012	8416	901,974	381400	81,817,386
2013	8387	893,343	350931	81,604,973
2014	8838	880,660	351952	81,552,743
2015	8404	869,341	328321	81,561,240
2016	9974	859,242	320614	81,620,120
2017	10099	845,604	337135	81,673,436

Figure 1

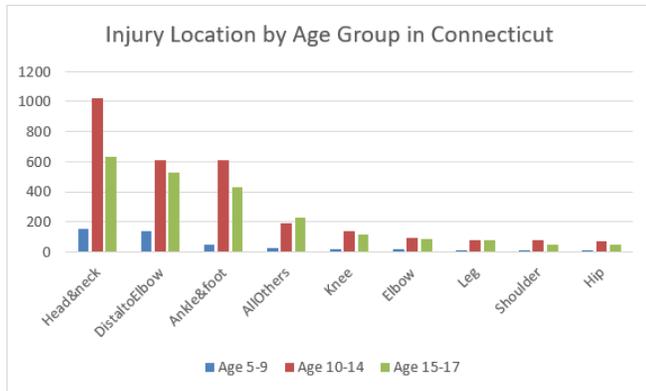
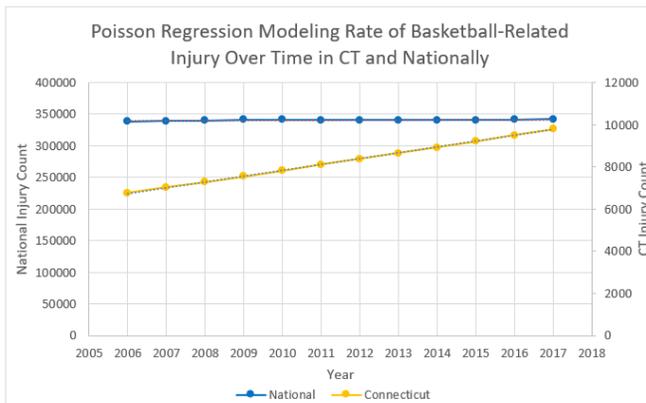


Figure 2



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