

17th Annual

Women in Medicine Research Day

March 6, 2023 • 9 am to 2 pm

ORGANIZER The Office of Faculty Affairs at the
Renaissance School of Medicine



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Renaissance School of Medicine
Stony Brook University

Program Agenda

9 – 9:15 am

Welcome Remarks

Stella E. Tsirka, PhD

Vice Dean, Faculty Affairs

Department of Pharmacological Sciences

Peter Igarashi, MD

Dean, Renaissance School of Medicine

9:15 – 10:15 am

The HNF1A variant provides a genomic landscape for EO-CRC to develop in the setting of a specific diet type

Juanita L. Merchant, MD, PhD

Professor of Medicine

Chief, Division of Gastroenterology

Research Member, Cancer Biology Program, University of

Arizona Cancer Center

10:15 – 11 am

Panel Discussion

Panelists:

Juanita L. Merchant, MD, PhD

Professor of Medicine

Chief, Division of Gastroenterology

Research Member, Cancer Biology Program,

University of Arizona Cancer Center

Bettina Fries, MD

Chief, Division of Infectious Diseases;

Professor of Medicine Surgery; Director, Bariatric and

Metabolic Molecular Genetics and Microbiology Surgery

Fellowship Renaissance School of Medicine

Sharon Nachman, MD

Chief of Division of Pediatric Infectious Diseases;

Director of Office of Clinical Trials

Professor of Pediatrics

Renaissance School of Medicine

Anissa Abi-Dargham, MD

Chair, Department of Psychiatry and Behavioral Health

SUNY Distinguished Professor, The Lourie Endowed

Chair in Psychiatry

Associate Vice President and Associate Dean for Clinical and

Translational Science

Director, Multi Modal Translational Imaging (MMTI) lab

Director, Long Island Network for Clinical and Translational

Science (LINCATS)

Stony Brook University

Helen Hsieh, MD, PhD

Assistant Professor of Surgery
Principal Investigator, Wollmuth-Hsieh Lab
Division of Pediatric Surgery
Department of Surgery Translational Science
Renaissance School of Medicine

- 11 am – 12:30 pm** **Poster Session - Hospital Pavilion, 4W-0101
Voting for The Best Poster**
- 12:30 – 1:30 pm** **Short Talks from Abstracts Finalists***
- 1:30 – 1:50 pm** **Awards for Abstract Finalist and The Best Poster Winners**
- 1:50 – 2 pm** **Closing Remarks**
Agnieszka Bialkowska, PhD
Associate Professor
Department of Medicine

(selected abstracts are labeled with *)

SPECIAL RECOGNITION

Abstract Review Committee:

Tahmeena Ahmed, MD • Meera P. Bhardwaj, MD • Helen Hsieh, MD, PhD
Hong Lin, PhD • Rina Meyer, MD • Anisha Mohandas, MD • Rong Pan, PhD
Julie A. Rageul, PhD • Sunitha M. Singh, MD

Special acknowledgements to:

Lyn Hastings • Susan T. LeGrady • Kimberly Malamutt
Rachel G. Velocci • Therese A. Xeller

for their generous support for the Women in Medicine Research Day event

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KEYNOTE SPEAKER – ABSTRACT



Title: The HNF1A variant provides a genomic landscape for EO-CRC to develop in the setting of a specific diet type

Author: Juanita L. Merchant, MD, PhD

Affiliation: Division of Gastroenterology and Hepatology, University of Arizona College of Medicine

Abstract

Background: About 10 percent of all colorectal cancers are in subjects who are not yet 50 (EO-CRC) and the occurrence of early onset colorectal cancer (EO-CRC) is rising in the US. Patients with CRC are twice as likely to have diabetes or be overweight. Using targeted exome sequencing of germline DNA from EO-CRC subjects, we identified a missense mutation at Ala98Val within the DNA binding domain of Hepatic Nuclear Factor 1 alpha (HNF1A, 12q24.31, Rs1800574). HNF1A is the most frequently mutated gene in diabetic individuals whose onset of diabetes occurs typically before age 25 (MODY3 locus). **Aim:** To demonstrate that the HNF1A variant provides a genomic landscape for EO-CRC to develop in the setting of a specific diet type.

Methods: HNF1A was identified using targeted exon sequencing of archived leukocyte DNA from subjects with EO-CRC. Flag-tagged WT and HNF1AA98V expressing plasmids were transfected into HCT116 colon cancer cells and nuclear extracts were prepared for Electrophoretic Mobility Shift Assays (EMSAs) to test binding differences. An Hnf1aA98V mutant mouse model was generated using CRISPR/Cas9. WT, Hnf1a A98V/+ and Hnf1a A98V/A98V mice were placed on 3 diets--normal chow, a high fat (~34%) diet (HFD) or a high sugar (~62% fructose) diet (HSD) after weaning at 3 weeks. The mice were followed for 12 months, weighed monthly, and observed for clinical signs of morbidity. After euthanizing, blood, colon and liver were collected for histology and qPCR.

Results: HNF1AA98V was identified in 13/145 subjects with EO-CRC. An additional 3 subjects exhibited mutations elsewhere in HNF1A. Flag-tagged WT and mutant HNF1A-expressing plasmids were transfected into HCT116 colon cancer cells and nuclear extracts showed reduced HNF1AA98V binding to its consensus DNA element by EMSA. Only heterozygous or homozygous Hnf1aA98V mice on the HFD showed a significant number of colon polyps (~19%). Only 1/22 heterozygous mice developed a polyp on the HSD. RNA-Seq analysis of colonic mucosa from the homozygous mutant compared to WT mice revealed an increase lipid and b-catenin regulated genes. Specifically, there was an increase in b-catenin, LEF 1 and MYC by immunohistochemistry in the polyp of HNF1AA98V, but not in the adjacent normal tissue. Liver steatosis in the Hnf1aA98V versus WT mice on the HFD was observed.

Conclusions: Occurrence of the HNF1AA98V variant is increased among a cohort of EO-CRC patients and is a loss of function mutation that creates a genetic landscape for colon polyps on a HFD.



UNDERGRADUATE STUDENTS



1.* Title: Elucidating Apoptosis Signaling Pathways During Murine Skeletal Regeneration

Authors: Nadine Areikat¹, Christina Rymond², Edie Duque¹, Sardar M. Z. Uddin¹, Yi-Xian Qin³, David Komatsu¹

¹ Department of Orthopaedics and Rehabilitation, Stony Brook University, Stony Brook, NY

² Renaissance School of Medicine, Stony Brook University, Stony Brook, NY

³ Department of Biomedical Engineering, Stony Brook University, Stony Brook, NY

Presenting Author: Nadine Areikat, Nadine.Areikat@stonybrookmedicine.edu,

Category: Undergraduate Student

Skeletal fractures are a common injury, yet much is unknown regarding the complexity of the cellular and molecular mechanisms that underlie skeletal regeneration. Our previous studies have found that mice with partial HIF-1 alpha deficiency had greater bone regeneration compared to wildtype mice, in which a reduction in apoptosis was identified. Thus, it is crucial to further investigate the role of apoptosis during fracture healing. We hypothesized that specific apoptotic signaling pathways are upregulated during fracture healing, with a peak at post fracture day (PFD) 14. Based on the data collected, we also hypothesize that inhibition of apoptosis will improve the rate and quality of bone regeneration.

The animal study consisted of male, 4-month-old C57/B6 mice randomly assigned to be euthanized and analyzed at post fracture day (PFD) 5, 10, 14, and 21. Surgery consisted of anesthetization and insertion of an intramedullary needle into the left femur before a closed transverse midshaft femur fracture was induced using a 3-point impulse load. RNA was isolated and purified, and gene expression of apoptotic signaling pathways was then measured by qPCR using RT2 Profiler™ PCR Arrays (Qiagen), which contain primers for 84 apoptosis related genes. Data were analyzed using ABI SDS software and Qiagen GeneGlobe to quantify background normalized fold regulation values between intact and fractured femoral samples.

Harvested femurs were decalcified, embedded in paraffin, and sectioned. Fluorescent immunohistochemistry (IHC) was performed using Caspase-6 and LTBR polyclonal antibodies.

The qPCR results indicated that upregulation of caspases was notable on PFD 14 with significant increases seen for caspase 3, caspase 4, caspase 6, and LTBR, which were upregulated by 155-, 93-, 223-, and 309-fold, respectively. Given the high levels of expression, caspase 6 and LTBR were selected for IHC analyses. The results indicate that apoptosis is abundant in chondrocytes and osteoblasts within the femoral fracture callus on PFD 14. Minimal staining was seen on PFD 5 and 21. Moreover, staining was most prevalent in active osteoblasts and hypertrophic chondrocytes, particularly in regions undergoing endochondral ossification.

These findings support our hypotheses that apoptotic signaling peaks at PFD 14 during murine fracture healing, and only specific members of this large class of signaling pathways are activated. This study has provided insight into which types and to what extent genes are activated during skeletal repair. Further investigation is needed to determine if pharmaceutical intervention of these specific pathways can reduce apoptosis and consequently improve skeletal regeneration.

Funding: Funding for this study was provided by a seed grant from the Office of The Vice President for Research at Stony Brook University.

2. Title: MODIFIED MIR-15A INHIBITS ACTIVATION AND PROLIFERATION OF PANCREATIC STELLATE CELLS BY TARGETING BCL-2 AND YAP-1 IN VITRO

Authors: Diaz Almanzar, Vanessa Margarita; Shah, Kunal; LaComb, Joseph F.; Mojumdar, Aisharja; Patel, Hetvi R.; Cheung, Jacky; Tang, Meiyi; Ju, Jingfang; Bialkowska, Agnieszka B

Presenting Author: Vanessa Margarita Diaz Almanzar/vanessa.diaz@stonybrook.edu

Presenting Author' Category: Undergraduate Student

Abstract:

Introduction: Characterized by structural damage due to chronic inflammation and fibrosis, chronic pancreatitis is associated with significant morbidity. Its major histological feature is widespread fibrosis, which results from the progressive activation of pancreatic stellate cells (PSCs). Perturbations to non-coding microRNAs (miRNAs) have been demonstrated to be directly involved in pancreatitis. Recent publications have demonstrated that miR-15a, which targets YAP1 and BCL-2, is significantly downregulated in patients with chronic pancreatitis as compared to healthy controls. We have developed a novel miRNA modification strategy to enhance the therapeutic efficacy of miR-15a by replacing Uracil with 5-Fluorouracil (5-FU). We hypothesize that ectopic delivery of 5-FU-miR-15a will inhibit the progression of chronic pancreatitis by targeting activated PSCs (human and murine).

Methods: We induced chronic pancreatitis using four weeks of intraperitoneal injections of cerulein (injury inducer) in Ptf1aCre and Ptf1aCre ;LSL-Kras mice. Mice treated with PBS were used as controls. We performed H&E and immunohistochemistry staining on tissues obtained from animals in each experimental group. For in vitro studies, we employed murine pancreatic stellate cells. In vitro studies included cell viability, proliferation, assessing of the activity of various signaling pathways using western blot analysis, cell migration of PSCs, and invasion assay for murine pancreatic cancer cells. PSCs were treated with TGFb1, PDGF, 5-FU, control miR, miR-15a, and 5-FU-miR-15a alone or in combination with TGFb1 or PDGF over the course of six days. Statistical analysis was performed using GraphPad Prism software.

Results: We demonstrated increased levels of YAP-1 and BCL-2 (both targets of miR-15a) in pancreatic tissues obtained from Ptf1aCre and Ptf1aCre; LSL-Kras mice after chronic pancreatitis induction as compared to controls. In vitro studies showed that delivery of 5-FU-miR-15a significantly decreased proliferation and viability of murine pancreatic stellate cells over the course of six days as compared to 5-FU, TGFb1, control miR, and miR-15a treatments. In addition, treatment of murine pancreatic stellate cells with 5-FU-miR-15a in the context of TGFb1 treatment exerted a stronger effect than TGFb1 alone or in a combination with other miRNAs. Similar effects were observed upon PDGF co-treatment. Importantly, we demonstrated that treatment with 5-FU-miR-15a reduced the levels of YAP-1 and BCL-2 observed in activated PSCs. Treatment of murine PSCs with 5-FU-miR-15a reduced their migration. Furthermore, conditioned medium obtained from 5-FU-miR-15a-treated PSCs reduced invasion of murine pancreatic cancer cells.

Conclusion: Our results strongly suggest that ectopic delivery of miRNA mimetics are a promising therapeutic approach for pancreatic fibrosis and that 5-FU-miR-15a shows specific promise.

Funding (if applicable): This study was supported by NIH grant to A.B.B.

Financial disclosures N/A

3. Title: Co-Administration of Methylphenidate and Fluoxetine Adversely Impacts Weight Gain in Adolescent Rats with Negligible Effects on Skeletal Development

Authors: Edie Duque¹, Rachel Jones¹, Nadine Areikat¹, Alexander A. Chirokikh², Sardar M.Z. Uddin¹, Carly Connor³, Panayotis K. Thanos³, Michael Hadjiargyrou⁴, David E. Komatsu¹

¹Department of Orthopaedics and Rehabilitation, Stony Brook University, Stony Brook, NY

²University of Rochester School of Medicine and Dentistry, Rochester, NY

³BNNLA -Research Institute on Addictions, Department of Pharmacology and Toxicology SUNY University at Buffalo, Buffalo, NY

⁴Department of Biological and Chemical Sciences, New York Institute of Technology, Old Westbury, NY

Presenting Author: Edie Duque (edie.duque@stonybrook.edu)

Category: Post-baccalaureate Student

Methylphenidate (MP), sold as Ritalin, is a widely prescribed psychostimulant used to treat Attention Deficit Hyperactivity Disorder (ADHD). Clinically, our laboratory and others have demonstrated that long-term MP treatment adversely impacts growth patterns. Fluoxetine (FLX) is an anti-depressant that is frequently co-prescribed with MP for depression and anxiety. The use of FLX, like MP, is also associated with skeletal defects. We sought to elucidate the skeletal effects of exposure to MP and FLX, singly and in combination.

Four-week-old male Sprague Dawley rats were randomized into 4 groups (Water, MP, FLX, and MP + FLX). The drugs were administered daily using an 8-hour drinking protocol. After 4 weeks of treatment, the animals were euthanized and bones were collected for analyses. Bone morphology was assessed using digital calipers, microCT, and histology using safranin O/fast green and picosirius red staining. Biomechanical outcomes were determined by 3-point bending tests. Growth plate height was measured using ImageJ. As body weights in the MP, FLX, and MP + FLX groups were all lower than Water, the data were compared directly and after adjusting to body weight via linear regression.

Through direct comparison, rats in the MP + FLX group had significantly shorter and narrower, femora and tibiae compared to most other groups. The MP + FLX group also displayed shorter, disorganized growth plates. MicroCT analyses of the trabecular compartment of the proximal tibia identified reductions of TV, BV, BV/TV, Tb.N, Tb.Th, and vBMD accompanied by increases in Tb.Sp for MP + FLX compared to Water. Similar analyses of femoral midshaft cortical bone identified reductions for Ct.V, Ps.V, Ec.V, pMOI, as well as increases for Ct.Th and for TMD for MP + FLX compared to Water. Biomechanically, there was a decrease in ultimate force in MP + FLX compared to Water. The micro-structural and biomechanical effects of MP + FLX were eliminated after adjustment for body weight, however, the detrimental effects on growth plate morphology remained.

These data initially suggested that exposure of adolescent rats to MP and FLX for 4 weeks contributed to significant adverse skeletal effects. Yet after the adjustment for body weight, many of these effects were excluded, which indicates that the hindrance of weight gain, influenced by MP+FLX, is largely responsible for the skeletal changes. Our study demonstrates the need for further preclinical and clinical studies of the effects of MP and FLX on the skeletal health of adolescents.

This work was supported by the National Institutes of Health [NIH/NCIHHD 5R01HD070888-05(DEK)].

Financial Disclosure: Grant support from NIH and NASA.

4. Title: AUM-302, a novel triple kinase PIM/PI3K/mTOR inhibitor, is a potent pancreatic cancer growth inhibitor

Authors: Komala Ingle¹, Joseph F. LaComb¹, Lee M. Graves², Antonio T. Baines^{2,3}, Agnieszka B. Bialkowska¹

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³Department of Biological & Biomedical Sciences, College of Health & Sciences, North Carolina Central University, Durham, NC, USA

Presenting Author: Komala Ingle (Undergraduate Student)

E-mail: Komala.Ingle@stonybrook.edu

Abstract:

Introduction: Pancreatic cancer is the third leading cause of cancer deaths, with pancreatic ductal adenocarcinoma (PDAC) being the most common subtype. Usually, PDAC is diagnosed at an advanced stage with limited treatment opportunities. Gemcitabine is the standard chemotherapy and can be used as a single agent or in combination. However, poor penetration through stroma and development of chemoresistance within weeks of treatment initiation limit its efficacy. Activation of signaling pathways such as PI3K, EGFR, MAPK, NF- κ B, and SHH has been shown to lead to the development of chemoresistance. Previous studies demonstrated that proto-oncogene serine/threonine-protein kinases 1 and 3 (PIM1 and PIM3) are upregulated in PDAC compared to control cell lines. PIM kinases have been shown to regulate the activity of PI3K and JAK-STAT pathways. Downregulation of PIM1 and PIM3 via siRNA significantly reduced PDAC cell proliferation. **Aim:** This study assessed the efficacy of compounds targeting PIM kinases in the context of PDAC. **Methods:** We tested the effectiveness of TP-3654, a known PIM inhibitor, and AUM-302, a novel triple PIM/PI3K/mTOR inhibitor, in five human PDAC cell lines. We assessed cells' viability using Cell-Titer Glo, proliferation, cell cycle with FACS analysis, and activity of signaling pathways regulated by PIM kinases via western blot. Additionally, we compared the efficacy of both compounds in MIA PaCa-2 Gemcitabine-resistant and MIA PaCa-2 Gemcitabine-sensitive cell lines. Statistical analysis was performed using one- and two-way ANOVA with GraphPad Prism 9. **Results:** We determined that IC₅₀ values for TP-3654 were in the micromolar range whereas AUM-302 was in the low-nanomolar range in tested cell lines. Cell proliferation assay over 72h showed that AUM-302 at 10nM and 100nM concentrations significantly reduced the growth of tested PDAC cell lines compared to control and TP-3654 treatment. Cell cycle analysis showed that AUM-302 treatment significantly increased G₀/G₁ and G₂/M phases and reduced S-phase compared to controls and TP-3654 treatment. Western blot analysis revealed reduced levels of phospho-AKT (Ser473), phospho-S6 (Ser235/236) ribosomal protein, and c-MYC in cells treated with AUM-302 as compared to controls and TP-3654-treated cells. AUM-302 inhibited the proliferation of MIA PaCa-2 Gemcitabine-resistant cells at 10nM and 100nM and resulted in cell death at 1mM concentration, while TP-3654 was not effective at these concentrations. Significantly, AUM-302 reduced phospho-AKT (Ser473) in MIA PaCa-2 Gemcitabine-resistant cells at low nanomolar concentrations. **Conclusion:** *In vitro* studies show that the AUM-302 compound strongly inhibits the growth of PDAC cells and has the potential to overcome the gemcitabine-resistant phenotype of pancreatic cancer cell lines, and thus has the potential to be an effective drug for PDAC therapy.

Funding: This work was supported by a grant from the National Institutes of Health awarded to A.B.B. (DK124342).

5. Title: Assessing Variability in Pre-Operative Self-Reported Pain

Authors: Susannah Oster¹, James Espeleta, BS², Harry Divaris³, Sarah Landman¹, Maheen Khan¹, Rohit Bhan, MS², Alexa Christophides, BS¹, Samuel Stanley, III, MS¹, Sunitha M. Singh, MD⁴, Martin Kaczocha, PhD¹, Elliott Bennett-Guerrero, MD¹, David E. Komatsu, PhD³

Department of Anesthesiology¹, Renaissance School of Medicine², Department of Orthopedics and Rehabilitation³, and Department of Perioperative Surgical Services⁴, Stony Brook University Medical Center, NY

Presenting author: Maheen Khan/maheen.khan@stonybrookmedicine.edu

Presenting author's category: Undergraduate student

Introduction: The recent surgical literature was thoroughly reviewed to identify studies reporting on changes in self-reported pain from 'pre-operative' to post-operative timepoints. Only a few of these studies clearly defined when and where the 'pre-operative' pain scores were measured. It is important to describe this timepoint since patients can have multiple pre-operative visits such as the surgeon's office and/or the pre-operative holding area prior to surgery. This study aimed to determine the potential variability in self-reported pain occurring between the pre-operative office visit and day of surgery in a group of surgical patients at Stony Brook University Hospital.

Methods: We performed a retrospective chart review of select patients who underwent surgery at Stony Brook University Hospital from January 1, 2017 to December 31, 2021 after obtaining IRB approval with a waiver of consent. Two groups of surgeries were considered: Group 1—those in which patients were likely to report pain pre-operatively since one of the procedure indications is treatment of a painful condition (elective total knee arthroplasty, total hip arthroplasty, and spinal fusion); and Group 2— a control group of procedures in which patients were much less likely to report pain before surgery (thyroidectomy, parathyroidectomy, and nephrectomy). Exclusion criteria included trauma patients, those less than 18 years of age, multiple surgeries at the time of the index surgery, and greater than 90 days between the office visit and surgery. The data collected from electronic medical records included demographics, preoperative history and medications, and pain scores at the pre-operative visits i.e., surgeon's office visit and pre-operative holding area on the day of surgery. Level of agreement between these pre-operative pain scores will be assessed. An analysis will be performed to confirm internal validity of the pain assessments. Group 1 pain scores should be greater than Group 2, regardless of which pre-operative assessment is analyzed.

Results: Data from more than 2,000 patients undergoing surgery were abstracted: total knee arthroplasty (n>400), total hip arthroplasty (n>400), spinal fusion (n>350), thyroidectomy and parathyroidectomy (n>570), and nephrectomy (n>250). Results are currently undergoing statistical analysis.

Conclusion: The primary analysis will assess the variability in self-reported pain across the two pre-operative visits.

Funding sources: N/A

CORIHS approval: IRB2022-00300, approved 6/21/2022.

Financial disclosures: The authors have nothing to disclose.

6. Title: Anti-capsular Antibody Against Carbapenem-Resistant *Klebsiella pneumoniae* shows broad cross reactivity across a panel of CR-Kp and ESBL Kp strains

Authors: Marissa Lindner¹, Jonathan Mui¹, Sanjana Sankaran¹, Bettina Fries^{1,2,3}, Camila Boniche-Alfaro^{1,2}

¹Department of Medicine, Infectious Disease Division, Stony Brook University, Stony Brook, New York, USA,

²Veteran's Administration Medical Center, Northport, New York, USA, ³Department of Molecular Genetics and Microbiology, Stony Brook University, Stony Brook, New York, USA

Presenting Author: Marissa Lindner / marissa.lindner@stonybrookmedicine.edu

Presenting Author's Category: Undergraduate Student

ABSTRACT

Carbapenem-resistant *Klebsiella pneumoniae* (CR-Kp) are a threat to the global health care system. The polysaccharide capsule (CPS) of CR-Kp is highly immunogenic and a key virulence factor that shields CR-KP from the host defense. Developing CPS-specific monoclonal antibodies (mAbs) as novel therapeutics to treat CR-Kp infections is being considered, but one concern is that the CPS of CR-Kp strains is very heterogenous. The most common clonal group (CG) of CR-Kp is CG258, which in the US represents 74% of carbapenemase-producing CR-Kp. Of 382 CG258 CR-Kp 364 (95%) were carbapenemase-producing, harboring primarily blaKPC-2 (200, 55%) and blaKPC-3 (161, 44%). Among carbapenemase-producing CG258 CR-Kp isolates, ST258 encompassed 92% of the isolates followed by CG307 (7%). CPS of CR-Kp can be typed by sequencing of the *wzi* gene. *Wzi* sequencing data from 380 US CR-Kp strains showed 47.9% express *wzi*154 CPS, also referred to as capsule type KL107; 31 % *wzi*29 (KL106); 6.6% *wzi*50; 6.0% *wzi*168). Our laboratory generated an IgG2b mAb (mAb24D11) that binds *wzi*50, *wzi*29 and *wzi*154- type CPS of CR-Kp. This mAb has shown protective efficacy *in vivo* even if given 4 hours post infection. **In this study we extended our study and investigated if mAb24D11 binds to a collection of *K. pneumoniae* strains expressing *wzi*29, *wzi*154 and *wzi*50- type CPS.** The reactivity of mAb24D11 was investigated by agglutination tests, direct immunofluorescence, affinity ELISA with whole cells and phagocytosis assays with J774.1 murine macrophages. The *K. pneumoniae* collection included 28 CR-Kp and 12 ESBL (Extended Spectrum Beta-Lactamase) isolates. The agglutination findings confirmed a broad cross-reactivity of mAb24D11 with 37 tested strains that was consistent with whole cell ELISA and direct immunofluorescence results. The phagocytosis assays results were variable especially in *wzi*154 strains. They showed that mAb24D11 mediated opsonophagocytosis can be complement-independent, and or dependent when compared to non-opsonized controls. Furthermore, our data showed that mAb24D11 induced significant killing of most of the CR-Kp strains, which is best shown in peripheral blood cell killing assays. Our results confirm that mAb24D11 is broadly reactive with different *Klebsiella pneumoniae* strains, including CR and ESBL strains. In future studies, we will analyze *in vivo* protection with low agglutination strains, to investigate if agglutination titers correlate with protective efficacy in an intranasal infection model.

FUNDING SOURCES

This study was funded by US Veterans Affairs Merit Review Award 5I01BX003741.

FINANCIAL DISCLOSURES

None of the authors have any finances to disclose.

7. Title: Increased rates of Lung Cancer in Woman: A literature review
Authors: Denise Albano, DNP (Department Surgery/SBU Chest)
Ankit Dhamija, MD (Department Surgery/SBU Chest)
Allison Mclarty, MD (Department Surgery/SBU Chest)
Mark Ashamalla, MD (Department radiation/ RAD/ONC)
Esther Kim (Department surgery/ Med student)
Hannah Talavera (Department surgery/ SBU Chest)

Presenting Author: Hannah Talavera

Introduction:

Lung cancer is the leading cause of death in woman. More than 61,360 deaths in 2022 have been reported which is more than breast cancer, uterine and ovarian cancer combined. Lung cancer cases in woman also differ from those of men and are not necessarily associated with smoking. This study is aimed to see if there is difference in the characteristics of women diagnosed with lung cancer compared to men.

Methods:

This retrospective study included review of published articles as well as data collected from the Lung Cancer Evaluation Center. Inclusion criteria included patients diagnosed with lung cancer from 2013-2020. Demographics, radiologic, histology, smoking status were investigated.

Results:

612 patients diagnosed with lung cancer were reviewed. 321 patients were woman, 19 patient's nonsmokers, all of which were female. Histology was mainly adenocarcinomas with a few bronchoalveolar carcinomas. Literature review indicated risk factors for woman including radon exposure, stove top use, aspirin use, previous radiation exposure, and delay of care from guilt.

Conclusion/Clinical Relevance:

Lung cancer remains the leading cause of death in the USA. Woman have an increased chance of getting lung cancer even if they do not smoke. Lung cancer screening may need to incorporate higher risk woman to diagnose them earlier for improved outcomes.

IRB Approval: 12/28/22 2022-00521

Financial Disclosures: None



GRADUATE STUDENTS



1. Title: Biochemical and structural characterization of human neutral sphingomyelinase 2 (nSMase2) enzyme

Authors: Khalayi Martha Aywa¹, Shujuan Gao¹, Yusuf A. Hannun¹, Michael V. Airola¹ (¹Department of Biochemistry and Cell Biology, Stony Brook University, Stony Brook, NY 11794)

Presenting Author: Khalayi Martha Aywa khalayimmartha.aywa@stonybrookmedicine.edu

Category: Graduate Student

Abstract

Ceramide is a bioactive lipid that regulates various cellular processes such as growth arrest, apoptosis, inflammation, cell survival and differentiation. A major source of ceramide is the hydrolysis of sphingomyelin into ceramide and phosphocholine by sphingomyelinases. Neutral sphingomyelinase 2 (nSMase2) is the major neutral SMase in mammalian cells for stress-induced generation of ceramide. Although nSMase2 is widely expressed in the plasma membrane and Golgi apparatus of many mammalian cell types, its highest expression is in the brain. In particular, nSMase2 has been implicated in extracellular vesicle biogenesis as a critical regulator of exosomes that package and transfer pathogenic factors including metastasis-promoting microRNAs, tau protein and amyloid β . Here we show that we have successfully purified active human nSMase2. Going forward, we plan to determine the structure and characterize effect of inhibitors on nSMase2 activity and study regulation by other phospholipids, including phosphoinositides.

Funding Sources: Renaissance School of Medicine

Financial Disclosures: None

2. Title: Preliminary Analysis of FDG PET for Assessment of Novel Mini-Beam Radiation Therapy in Alzheimer's Disease.

Authors: Jaclyn Brunner (BME), Lemise Saleh (BME), Jann Stavro (Radiology), Eric Muir (Radiology), Dinko Franceschi (Radiology), Mark Menna, Paul Vaska (BME, Radiology), Avraham Dilmanian (Radiology)

Presenting author: Jaclyn Brunner, jaclyn.brunner@stonybrook.edu

Presenting author' Category: Graduate Student

Introduction:

Alzheimer's disease (AD) is characterized by amyloid plaques, depressed glucose metabolism, and cognitive decline. Studies in transgenic mouse and rat models of AD have shown that irradiation of the brains of these animals with high doses of x rays ablates a large portion of the amyloid plaques and improves the animal's cognitive function. These doses are too high to be used in patients but arrays of parallel, thin x-ray beams, called x-ray minibeam are known to be tissue-sparing in experiments carried out over the last 25 years. We hypothesize that minibeam will have similar therapeutic effect without the side effects.

Methods:

Nine transgenic AD mice had the right half of their brain irradiated with x-ray minibeam beginning 1mm caudal to the eyes. After recovery, these mice underwent a 10 minute CT scan followed by a 30 minute static PET scan directly after being injected with ¹⁸F fluorodeoxyglucose, a metabolic tracer. The Ma-Benveniste-Mirrone mouse atlas was used for image analysis after each brain region had been split into a left and right hemisphere. The average voxel concentration within each left and right volume of interest was collected and a percent difference between them was recorded. All statistics were performed using a two tailed paired T-test.

Results:

The uptake was larger on the irradiated side compared to the contralateral side in multiple individual regions, as well as a combined region representing the entire irradiated area ($p < 0.05$). The largest differences were found in the amygdala, basal forebrain septum, and the hippocampus.

Conclusions/clinical relevance:

These findings are consistent with metabolic recovery from AD pathology due to minibeam therapy. Histology studies are underway to determine whether plaque and tangle pathology have been reduced, and whether there is an immune response to the therapy, which could affect interpretation of the PET signal.

Funding source:

NIH

Financial disclosures:

No disclosures.

3. Title: A direct-indirect dual-layer detector technique for contrast-enhanced breast X-ray imaging

Authors: Xiaoyu Duan, Hailiang Huang, Wei Zhao. Dept. of Radiology, Stony Brook Medicine

Presenting author Xiaoyu Duan. Email: xiaoyu.duan@stonybrook.edu

Presenting author' Category: Graduate Student

Introduction:

In contrast-enhanced digital mammography (CDEM) and contrast-enhanced digital breast tomosynthesis (CEDBT), two exposures are taken separately with beam energy below and above the k-edge of iodine to generate dual energy subtracted images and highlight uptake of iodinated contrast agent. This is referred to as the dual shot technique, which switches kVp and filters between exposures. However, patient motion could lead to artifact in subtracted images, which reduces lesion conspicuity and cannot be completely eliminated, especially for CEDBT which needs longer acquisition time (around 10~30 s). We propose to use a direct-indirect dual-layer detector to obtain LE and HE images simultaneously for CE breast imaging.

Methods:

Proposed dual-layer technique uses a 150 μm Ag filter to shape the beam into two peaks. A direct a-Se detector was designed as the front layer (FL) for low-energy (LE) images. A CsI indirect detector was designed as the back layer (BL) for high-energy (HE) images. Monte Carlo simulations were conducted on a digital breast phantom with iodinated masses for both conventional dual-shot and proposed dual-layer techniques. Experiments were performed on a CIRS phantom with iodinated masses, using a modified Siemens Mammomat Inspiration prototype system for dual-shot technique and an experimental laboratory setup for dual-layer technique. A workflow to further improve the dual-layer technique was designed based on the spectral analysis and a denoising deep learning algorithm. Dual-energy (DE) images of dual-shot, dual-layer, and dual-layer after the improvement workflow were generated using weighted subtraction. Iodinated mass signal difference to noise ratio squared per mean glandular dose ($\text{SDNR}^2/\text{Dose}$) was calculated as the figure of merit (FOM) for lesion detectability.

Results:

Our results showed that the dual-layer and dual-shot techniques have similar breast tissue background cancellation and detectability for iodinated mass. The improvement workflow reduced the HE photon contamination in FL images and increased iodinated mass FOM for dual-layer technique (2.3 times improvement for thickness between 6 to 10 mm, 3.75 times improvement for thickness between 1 to 4 mm. Iodine concentration was 2 mg/ml).

Conclusion:

We conducted both Monte Carlo simulations and physical experiments to investigate the feasibility of the proposed direct-indirect dual-layer detector for spectral breast imaging. The iodine object detectability for CEDM in different imaging conditions was evaluated qualitatively and quantitatively. Dual-layer technique showed equivalent iodinated masses detectability with dual-shot, with the benefit of no patient motion between front LE and back HE images.

Financial disclosures: Nothing to disclose

4. Title: The Effect of Multi-Pronged Interventions on Abdominal Aortic Aneurysm Screening Practice in Primary Care

Authors: Sung Hee Kam (School of Nursing / Doctor of Nursing Practice)
Kathleen Shurpin (School of Nursing / Doctor of Nursing Practice)

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Presenting author's category: Graduate student (DNP student)

Abstract:

Introduction

Abdominal aortic aneurysm guidelines have been active by the United States Preventive Task Force since 2005; however, the screening rates have been insufficient. This study aimed to improve AAA screening practice by adopting the integrated screening action model (I-SAM) in a large urban healthcare organization's primary care settings with low AAA screening rates.

Methods

The Plan-Do-Study-Act (PDSA) model was employed to conduct a sequential process of the study's implementation. The intervention of the study was designed by the conceptual framework of the I-SAM that uses multi-pronged approaches to change behavior. A survey was administered to identify the barriers to AAA screening practice, and the response analysis was displayed using a fishbone diagram. The organization's environmental factors of the AAA screening process were assessed with the stockholders of this study. The EHR modification and education delivery interventions were implemented after identifying the barriers to AAA screening practice. The measure of AAA screening practice barriers and AAA screening order rate were analyzed by descriptive statistics. The AAA screening order was presented with a run chart.

Results

Of the 129 primary care providers, 24% participated in the barrier identification survey. More than half of the participants were nurse practitioners, and around 70% of the providers had less than six years of practice. The highest-scored barriers were found in the categories of environmental, use of EHR, and knowledge. Interventions (the reminder and order link to AAA screening on EHR and providing education programs) were delivered to overcome identified barriers. Two months after initiating intervention, 35% of the providers had participated in the education program. The AAA screening order rates showed no improvement.

Conclusions & limitations

Two months after implementing EHR modifications and education delivery on enhancing AAA screening practice, the rate of AAA screening orders showed no change. A longer period of observation may be needed to evaluate the effect of interventions. This study highlights the complexity of the AAA screening practice improvement, requiring the exploration of more effective strategies to overcome barriers to AAA screening practice.

Funding source: None

Human subjects: Not applicable

Financial disclosure: No conflict

5. Title: Loss of the Membrane-Binding Protein ciBAR1 in Mice Leads to Ciliary Defects

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Presenting author category: Graduate Student

Abstract

Introduction

Cilia—ubiquitous, microtubule-based organelles that protrude from the apical cell surface—play a variety of roles in the body, including mechano- and chemosensation, cell signaling, and fluid dynamics. Ciliary defects can result in devastating pleiotropic diseases known as ciliopathies. The current body of literature suggests that the unique composition and morphology of the ciliary membrane are needed to maintain ciliary function and homeostasis; however, the molecular players and mechanisms underlying the formation and maintenance of the ciliary membrane remain poorly understood. Previous work by our lab and other groups demonstrated that the coiled-coil protein Chibby1 (Cby1) localizes to the ciliary base and plays key roles in ciliogenesis. Our lab has also reported that the membrane-binding proteins ciBAR1 and 2 physically interact with Cby1 to promote ciliogenesis. Proteins that contain BAR domains are known to dimerize, forming crescent-shaped structures that generate and maintain membrane curvature to facilitate a plethora of cellular processes. To elucidate the role of ciBAR1 in mammalian development, we have generated a novel ciBAR1 KO mouse model.

Methods

Mouse embryonic fibroblasts (MEFs) were cultured from E12.5 wildtype and ciBAR1 KO embryos. Immunofluorescence staining was done using antibodies against Arl13b, gamma-tubulin, acetylated alpha-tubulin, ciBAR1, ciBAR2, Cby1, DBA, and PNA. To quantify the total number of primary ciliated cells in MEF cultures, a total of >400 cells were counted for each genotype from three independent experiments. Percentage of ductal cell area over acinar cell area was found by averaging 15-20 images per pancreas (N = 3 for WT, N = 4 for ciBAR1 KO). Total percentage of cilia per basal body was quantified by analyzing 2-3 images of ducts or islets per pancreas. 50-100 cilia per category for each genotype were measured to assess ciliary length. Unpaired t-tests were performed, and data are represented as means ± SEM. *, P<0.05, **, P<0.01; ***, P<0.001; ****, P<0.0001.

Results

20% of ciBAR1 KO mice show embryonic lethality; the remaining 80% survive into adulthood with no gross morphological abnormalities. ciBAR1 KO MEFs showed a lower primary cilia count. Both wildtype and ciBAR1 KO MEFs show little to no expression of ciBAR2, and Cby1 is detectable at the ciliary base in the absence of ciBAR1. Lastly, ciBAR1 KO mice show ciliopathic defects in the pancreas, which may be due to dysfunctional primary cilia.

Conclusion

Taken together, our findings indicate that ciBAR1 may play a critical role in ciliogenesis, at least in certain ciliated cell types, in mice.

Funding source(s):

Work in the laboratory of K.-I. T was supported by grants from the National Heart, Lung, and Blood Institute (R01HL139643) and the National Institute of Diabetes and Digestive and Kidney Disease (R01DK123641). E.K. also received funding from the Scholars in Biomedical Sciences (SBMS) Training Program (5T32GM127253-05).

Financial disclosures: None

6. Title: Colorectal cancer-associated mutations impair EphB1 kinase tumor suppressor function

Authors: Yunyoung Kim, Sultan Ahmed, and W. Todd Miller (Department of Physiology and Biophysics)

Presenting author: Yunyoung Kim (yunyoung.kim@stonybrookmedicine.edu)

Presenting author's category: graduate student

Abstract: Eph receptor tyrosine kinases regulate migration and adhesion of cells required for many developmental processes and adult tissue homeostasis. In the intestinal epithelium, Eph signaling controls the positioning of cell types along the crypt-villus axis. In colorectal cancer, Eph activity suppresses tumor progression. The most frequently mutated Eph receptor in metastatic colorectal cancer is EphB1. However, the functional effects of these mutations are mostly unknown. In our study, we expressed and purified the kinase domains of wild-type and mutant forms of EphB1. Using the purified proteins, we show that four colorectal cancer-associated mutations inhibit EphB1 kinase activity. We also show that these mutations reduce the activation of MAPK and STAT3 signaling by mammalian cell expression. Lastly, we demonstrate that mutant EphB1 receptors increase migration and decrease compartmentalization of DLD-1 human colorectal cancer cells. In conclusion, our results support that somatic mutations disrupt the kinase-dependent tumor suppressor function of EphB1 in colorectal cancer.

Funding source: This work was supported by VA Merit Award #BX002292 and NIH Grant R01 AI64424.

7. **Title:** Differences in the Regulation of Longevity in Two Mating Types of *Cryptococcus neoformans*

Authors: Natalia Kronbauer de Oliveira^{1*}, Kyungyoon Yoo¹, Rina Gambhir², Bettina C. Fries^{1,2}

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Category: Graduate Student

Introduction. *Cryptococcus neoformans* is an opportunistic yeast that infects immunocompromised individuals, causing meningoencephalitis. Yeast cells divide asymmetrically, leading to progressive aging and accumulation of age-associated phenotypic variations. Older cells are more resistant to treatment and macrophage-mediated killing during infection, leading to persistence. Calorie restriction (CR) is an intervention that has been associated with longevity. It is crucial for *C. neoformans* because fungal cells grow in low-glucose environments during infection. The effects of CR-mediated stress can differ among strains and have been only studied in MAT α strains. *C. neoformans* cells can replicate sexually and has two distinct mating types, MAT α and MAT α , which only differ in their mating locus. MAT α is hypothesized to be more dominant in both clinical infections and the environment due to its ability to respond better to stress. **Methods.** We sought to compare the effects of CR stress and the regulation of important longevity pathways, such as sirtuins and TOR, between MAT α and MAT α cells by qPCR. The RLS was determined by microdissection. **Results.** Both MAT α and MAT α cells show extensions of the RLS in response to CR. The sirtuins are NAD-dependent histone deacetylases that play an important role in promoting longevity. During CR *SIR2*, the most well-characterized sirtuin, is upregulated in MAT α , in addition to *HST2* and *HST4*, whereas in MAT α cells the expression of the sirtuins is unchanged under CR conditions. The RLS extension under CR conditions is dependent on *SIR2* in MAT α , but not in MAT α , which still exhibits extension of RLS in the Δ *sir2* strain. Regulation of the TOR pathway, a nutrient-sensing pathway, shows differences in regulation between MAT α and MAT α . Specifically, in MAT α strains, the *C. neoformans* cells demonstrate no differences in the expression of TOR pathway genes under CR conditions, while in MAT α cells the pathway is downregulated. In addition, we found MAT α cells show enhanced CR-mediated fluconazole (FLC) tolerance, while MAT α cells remain sensitive to treatment. The tolerance in MAT α is not dependent on the presence of *SIR2* but a result of upregulated ABC transporter function. MAT α cells show an increase in ATP levels during CR, which powers the ABC transporters to efflux FLC from the intracellular space. In contrast, MAT α cells do not overexpress ABC transporters and maintain low ATP levels during CR. **Conclusion.** Our findings show that MAT α and MAT α cells show distinct longevity regulation and response to stress.

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8. Title: Evolutionary Conservation of Phosphoproteome Remodeling among Diverse Lentiviral Vifs

Authors: Adeline M. Luperchio, Department of Microbiology and Immunology. Nicholas Saladino,

Department of Microbiology and Immunology. Daniel J. Salamango, Department of Microbiology and Immunology.

Presenting Author: Adeline M. Luperchio, adeline.luperchio@stonybrook.edu. Graduate Student.

Introduction

Like all pathogenic viruses, HIV hijacks cellular machinery to facilitate virus replication and evade host defenses. To achieve this, HIV deploys several multi-functional accessory proteins to manipulate the cellular environment. One such protein, Vif, counteracts host APOBEC3 antiviral restriction factors by hijacking a cellular E3-ubiquitin ligase complex to induce APOBEC3 degradation. In addition, recent work by our lab and others demonstrated that Vif also induces remodeling of the cellular phosphoproteome by antagonizing protein phosphatase 2A (PP2A), a major cellular phosphatase responsible for a vast majority of serine/threonine dephosphorylation events in most cell types. Here, we investigated the clinical prevalence and evolutionary conservation of this activity among patient-derived Vif isolates and diverse lentiviral species.

Methods

We leverage live-cell fluorescence microscopy, fluorescence degradation assays, and flow cytometry to monitor Vif-induced degradation of cellular targets in real time. These experiments are performed using a panel of patient-derived isolates and Vif proteins from diverse lentiviral species.

Results

We establish that Vif-mediated PP2A antagonism is prevalent in clinical isolates and diverse lentiviral species. Approximately 30 patient isolates encompassing HIV-1 subtypes in global circulation were examined for PP2A antagonism. Roughly half of the isolates tested could efficiently antagonize PP2A in addition to 5 subtype reference isolates derived from global consensus sequences. Additionally, roughly two-dozen primate and non-primate Vif isolates were examined, and most (~70%) could efficiently antagonize PP2A. The most divergent of these isolates was from Maedi-Visna virus (MVV) Vif, which is a sheep lentivirus that shares less than 15% identity with HIV-1 Vif. Further investigation revealed that MVV Vif antagonizes PP2A through a functionally discrete surface compared to HIV-1 Vif, which suggests that the binding mode has evolved over time.

Conclusion/clinical relevance

Our findings suggest that remodeling of the cellular phosphoproteome by Vif proteins is an ancient function that is conserved across diverse lentiviral lineages and in clinical isolates. Functional conservation of this activity raises the possibility that this function is beneficial for lentiviral replication or pathogenesis.

Funding sources and financial disclosures:

This work was supported by a K99/R00 award from NIAID (AI147811), and startup funds provided by the Department of Microbiology and Immunology and Renaissance School of Medicine. All authors declare no conflict of interest.

9. Title: Keratin 17 Impact DHODH Subcellular Levels and Drives Chemoresistance in PDAC

Authors: Yinghuan Lyu^{1,2}, Chun-Hao Pan³, Luisa F. Escobar-Hoyos^{1,4*}, Natalia Marchenko^{1*}, Kenneth R. Shroyer^{1*}

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Presenting author' Category: Graduate Student

Main body of the abstract:

Introduction

Prior research from our laboratory reported that keratin 17 (K17) is a novel negative prognostic and predictive biomarker for pancreatic ductal adenocarcinoma (PDAC). Overexpression of K17 drives resistance to Gemcitabine (Gem) and 5-fluorouracil (5-FU), two key components of the main chemotherapeutic regimens for pancreatic cancer. To address the questions whether K17 drives metabolic reprogramming and consequentially leads to chemoresistance, we previously performed unbiased metabolomic analyses and found that K17 reprograms several key metabolic pathways including up-regulating pyrimidine biosynthesis. Notably, K17-expressing cells were more sensitive to Brequinar, a specific inhibitor of dihydroorotate dehydrogenase (DHODH), the rate-limiting enzyme in de novo pyrimidine biosynthetic pathway. Targeting DHODH by small interfering RNA or by Brequinar with Gemcitabine synergistically inhibited the viability of K17-positive PDAC cells. Therefore, we are focusing on understanding the mechanism how K17 may affect DHODH, thus causing metabolic change and chemoresistance.

Methods

Mitochondria isolation (Thermo Scientific Mitochondria Isolation Kit) followed with western blot was applied to detect DHODH subcellular levels in mitochondria and cytosol fractions in PDAC cell lines. Immunofluorescence was applied to detect localization of K17 and DHODH in PDAC cell lines.

Results

DHODH expression level in whole cell lysates showed no significant change between K17-negative and K17-positive cells. Based on mitochondria isolation assay, L3.6 K17 WT cells showed more DHODH mitochondria translocation than L3.6 K17 knockout cells, which indicates mitochondria DHODH level was increased by K17. Immunofluorescence of L3.6 K17 WT cells showed colocalization of K17 and mitochondria marker protein, which is the evidence of our further hypothesis that K17 might enter mitochondria and affect DHODH levels and activity.

Conclusion

We identified a novel pathway of chemoresistance where K17 impact key enzymes in nucleosides metabolism and drives chemoresistance. Further study of the metabolic target could lead to the development of a biomarker-based therapy for K17-expressing PDAC.

Funding source This work was supported by academic enrichment funds of the Department of Pathology at Stony Brook Medicine

Financial disclosures There are no financial conflicts of interest to disclose.

10. Title: An Interprofessional Team-based Service-learning Program to Promote Hypertension (HTN) Screening and Access to Care in a Non-Clinical Setting

Authors: Gabriella Pandolfelli, MPH^A, Leah Topek-Walker, LCSW^B, Amy Hammock, PhD^B, Denise Snow, JD, RN^C, Lynn Timko-Swaim, MS, PAC^D, Carol Della Ratta, PhD, RN, CNE^C, Lisa Benz Scott, PhD^A

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Presenting Author Category: Graduate Student

Introduction: Almost half of adults have hypertension (HTN), a major risk factor for cardiovascular disease (CVD), the leading cause of death in the U.S. HTN is commonly detected in the clinical setting which excludes those who do not regularly visit a provider. It is essential to assess strategies that may improve access to HTN screening, care and control in non-clinical settings where communities are at elevated risk of HTN frequent. Public libraries are a trusted place among vulnerable populations for accessing health information and resources, yet are an underutilized setting for health interventions. The Stony Brook Medicine Healthy Libraries Program (HeLP) is an interprofessional (IP) team-based service-learning model that aims to improve interprofessional education (IPE) and collaborative practice competencies while providing BP screenings, culturally appropriate health education, assistance with accessing care and social services, and case management at no cost in public libraries throughout Suffolk County, NY. The purpose of this study is to evaluate the BP screening-related interactions between HeLP team members and library patrons. **Methods:** Fifty-seven students participated in IP teams in 10 public libraries in the 2022 Fall semester. Nursing and Physician Assistant (PA) students provide BP screenings. Social Welfare students assisted patrons with accessing health insurance and care, in addition to social needs. Public health students provided evidence-based health information and evaluated program outcomes. **Results:** There were a total of 375 patron encounters, 55% (n=201) were a first visit. Clinical students (Nursing/PA) performed 261 BP screenings; 56% (n=133) were considered high according to national guidelines. Of those screened, 6% (n=15) of patrons did not have a primary care provider (PCP) and 10% (n=25) had not visited their PCP in the last year. Social work students met with patrons 97 times and assisted with housing (n=41), health insurance (n=19), medical services (n=18), employment (n=17), food insecurity (n=12), and mental health (n=10). Public health students provided health education on CVD/BP (n=4), diabetes (n=4), nutrition (n=1), and medication management (n=1). **Conclusions/Clinical relevance:** The findings support partnerships with public libraries as a viable setting for both IPE competency attainment and community impact. An IP team offering BP screenings combined with assistance accessing social services and healthcare, in a non-clinical setting such as the public library, may promote HTN and CVD risk factor reduction among at-risk communities.

Funding Source: N/A

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11. Title: Replisome Dysfunction Upon Inducible TIMELESS Degradation Synergizes with ATR Inhibition to Trigger Replication Catastrophe

Authors: *Jinal A. Patel¹, Camryn Zezelic¹, Julie Rageul¹, Joanne Saldanha², Arafat Khan¹, Hyungjin Kim^{1,3*}

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Improper control of DNA replication is a source of genome instability and tumorigenesis. The structure of DNA replication forks is preserved by TIMELESS (TIM) in the fork protection complex (FPC) to support seamless fork progression. While the scaffolding role of the FPC to couple the replisome activity is much appreciated, the detailed mechanism whereby inherent replication fork damage is sensed and counteracted during DNA replication remains largely elusive. Here, we implemented an auxin-based degron system that rapidly triggers inducible proteolysis of TIM as a source of endogenous DNA replication stress and replisome dysfunction to dissect the signaling events that unfold at stalled forks. We demonstrate that acute TIM degradation activates the ATR-CHK1 checkpoint, whose inhibition culminates in replication catastrophe by single-stranded DNA accumulation and RPA exhaustion. Mechanistically, unrestrained replisome uncoupling, excessive origin firing, and aberrant reversed fork processing account for the synergistic fork instability. Simultaneous TIM loss and ATR inactivation triggers DNA-PK-dependent CHK1 activation, which is unexpectedly necessary for promoting fork breakage by MRE11 and catastrophic cell death. We propose that acute replisome dysfunction results in a hyper-dependency on ATR to activate local and global fork stabilization mechanisms to counteract irreversible fork collapse. Our study identifies TIM as a point of replication vulnerability in cancer that can be exploited with ATR inhibitors.

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Financial disclosures: None.

12.* Title: Investigating podocyte-parietal epithelial cell communication through intercellular bridges in kidney disease

Authors: Nina Cintron Pregosin, Department of Molecular and Cellular Pharmacology; Dr. Sandeep Mallipattu, Division of Nephrology and Hypertension, Department of Medicine

Presenting author: Nina Cintron Pregosin, nina.pregosin@stonybrook.edu

Presenting author's Category: Graduate Student

Introduction

Podocytes are terminally differentiated visceral epithelial cells that are necessary for maintenance of the glomerular filtration barrier. Podocyte loss is characteristic of multiple kidney diseases, including focal segmental glomerulosclerosis (FSGS) and rapidly progressive glomerulonephritis (RPGN) which have a high risk of progression to end-stage kidney disease, requiring dialysis. In these diseases, podocyte loss triggers the activation and proliferation of neighboring parietal epithelial cells (PECs) which reside along the Bowman's capsule. Aberrant PEC proliferation leads to crescent or pseudo-crescent formation in the Bowman's space and eventual glomerular injury.

Recent evidence suggests that in the setting of injury podocytes may physically interact with neighboring cells by forming cytoplasmic bridges. These "intercellular bridges" were previously identified in a variety of cell types including neuronal cells, epithelial cells, and immune cells, and have been established to serve as a direct mechanism of cell-cell communication. However, the role of these bridges between podocytes and PECs has not been characterized. The goal of this study is to investigate how podocyte-PEC bridges form, what they do, and whether they are pathological or physiological. The long-term impact of this project is to investigate intercellular bridges as potential therapeutic targets for ameliorating podocyte loss.

Methods

We investigated the formation of intercellular bridges in three models of podocyte injury: podocyte-specific loss of Krüppel-like factor 4 (*Klf4^{ΔPod}*) nephrotoxic serum nephritis (NTS) and diabetic nephropathy. Immunohistochemistry, immunofluorescence staining, and electron microscopy were used to identify intercellular bridges in glomeruli. Single nucleus (sn)RNA-seq was performed on each injury model.

Results

Periodic-acid schiff staining and electron microscopy revealed *de novo* bridges glomeruli of *Klf4^{ΔPod}* mice and in mice treated with NTS. Intercellular bridge formation appeared to be correlated with the severity of injury, as few intercellular bridges were observed in mice with diabetic nephropathy. In the NTS treated mice and *Klf4^{ΔPod}* mice we observed colocalization of endogenous podocyte markers (synaptopodin, nestin) and markers for activated PECs (CD44), suggesting that intercellular bridges form between injured podocytes and activated PECs. Enrichment analysis of differentially expressed genes between wild type and *Klf4^{ΔPod}* mice and NTS treated mice showed common upregulated pathways including focal adhesion, axon guidance, and actin cytoskeleton regulation in the podocyte and PEC clusters. Immunofluorescence staining reveals that intercellular bridges contain actin, BIRC3, RAb8A, and Rab11A.

Conclusions

This is one of the first studies to demonstrate that intercellular bridges extend between injured podocytes and activated PECs.

Funding Sources

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13. Title: Roles of TIMELESS in genome maintenance through the suppression of ssDNA gaps and mutagenesis

Authors: J. Saldanha¹, J. Rageul², C. Gao², J.A. Patel², H. Kim^{2,3}

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Presenting author's Category: Graduate Student

Funding sources: National Institutes of Health (R01 GM144399), American Cancer Society (13225-RSG-18-037-DMC), and Breast Cancer Alliance.

Financial disclosures: None

The integrity of DNA replication forks is maintained by the fork protection complex, a member of which, TIMELESS (TIM) couples the DNA unwinding and synthesis processes. While the structural role of TIM as a scaffold to support DNA replication is well appreciated, the mechanism through which TIM coordinates leading- and lagging-strands to promote replication fork progression remains largely elusive. DNA lagging-strand synthesis accompanies the challenge of processing discontinuous Okazaki fragments (OF), whose defect leads to the accumulation of single-stranded DNA (ssDNA) gaps, a major source of fork stalling and breakage. Emerging evidence supports the role of polyADP-ribose polymerase 1 (PARP1), a DNA repair enzyme that is critical for the repair of single-strand DNA breaks (SSB), in resolving unligated OF intermediates via activating XRCC1-dependent SSB repair to fill ssDNA gaps. In this study, we demonstrate that TIM stably associates with PARP1 at DNA replication forks, whose interaction is critical for PARP1 to engage back-up lagging-strand synthesis and thus suppress replication-associated ssDNA gaps. An engineered human cell line in which TIM is rapidly degraded fails to induce PARP1 activity at replication forks in the event when the canonical OF processing pathway is inhibited, resulting in accumulation of excessive replication-associated ssDNA gaps. By implementing the inducible system to compete the binding interface of PARP1 with TIM, we further showed that the TIM and PARP1 interaction is necessary for the PARP1 activity to resolve OF intermediates and suppress ssDNA gaps. Accordingly, deficiency of TIM impairs the recruitment of XRCC1 in PARP1-dependent manner. Together, our study identifies TIM as a key regulator of PARP1-dependent SSB repair machinery to process unligated OF fragments and suppress ssDNA gap formation, thereby preserving the integrity of the replicating genome. We propose that TIM could a synthetic lethal target that can be combined with the inhibition of canonical OF processing factors as a means to exacerbate the replication vulnerability of cancer cells.

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14. Title: Cell Cycle Regulation of Invasiveness in Zebrafish Developmental and Cancer Models

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Presenting author' Category: Graduate Student

Cells must be able to regulate when they will divide, migrate, or adopt a specialized cell identity. These cellular behaviors are important and necessary for organismal development and their execution at inappropriate times can lead to developmental disorders or diseases, such as cancer. To study the regulation of cell behavior we turn to the zebrafish model. In zebrafish, morphogenesis of midline tissue structures such as the notochord drive axis elongation of the developing embryo. The notochord is derived from a progenitor population in the tailbud known as midline progenitor cells (MPCs). MPCs destined to become notochord must undergo a dramatic cell rearrangement and intercalation event called convergent extension (CE). During this process, MPCs use polarized actin protrusions to crawl between one another and intercalate to join the developing notochord. Published data from our lab and others show notochord progenitors are held in G1 arrest prior to CE. We have treated zebrafish embryos with various CDK inhibitors to determine if promoting G1 arrest induces increased invasiveness of MPCs, and in turn, more cells joining the notochord. Using embryos expressing a fluorescent cell cycle reporter, preliminary data suggests more cells enter the notochord after CDK inhibitor treatment as compared to the control treatment, resulting in a striking bend in the body axis as the fish develops. This developmental model of cell cycle arrest modulating invasive cell behaviors may give us insight into cancer pathogenesis and treatment, as cancer often co-opts developmental processes to grow and metastasize.

To determine whether pharmacologically induced G1/G0 cell cycle arrest acts as a causative factor in the metastatic capabilities of tumors, a series of experiments were performed using the triple-negative breast cancer cell line MDA-MB-231. These cells were fluorescently labeled with cell cycle and cell membrane indicators, to create a distinction between proliferating and quiescent cells. They were injected into the blood vessel of zebrafish that have fluorescently labeled vasculature at 48 hours post fertilization. Cells were treated with palbociclib, an FDA-approved, small-molecule inhibitor of CDK4/6 that results in G1 cell-cycle arrest; and evaluated for migration to the tail and its capillary beds and subsequent extravasation. The data acquired through the comparison of invasive behavior in palbociclib treated and non-treated cells suggest the possibility that single drug pharmaceutical solutions to halting proliferation may increase metastatic capabilities.

Funding source(s):

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15. Title: Temporal and spatial analysis of structural and cellular changes in arterial and venous thrombi

Authors: Shiffoni Sukhlal¹, Gurtej Singh², PhD, Miriam Rafailovich³, PhD, Nicos Labropoulos², PhD

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Category: Graduate Student

Abstract: Thrombosis is a life-threatening disease that afflicts half a million Americans annually. The central feature of thrombosis is the formation of a fibrin-rich thrombus that blocks flow within the veins and arteries. Our experiment objective is to understand, characterize and target the source of thrombi formation as a comprehensive method for improving the outcomes of thrombosis. Extensive preliminary work indicates fibrin and collagen remodeling within the thrombus formation. We aim to understand this complex remodeling process on a novel rat arterial and venous thrombosis model to represent how a thrombus ages from acute to chronic phases. The thrombus and vessel wall will be removed and analyzed on days 2, 4, and 8. The analysis will be accomplished by immunohistochemical staining for fibrin and thrombotic cellular components. Supercritical CO₂ will decellularize the thrombus to study the 3D structure of the fibrin and compare its tensile strength in the periphery and center of the thrombus from the arteries and veins. Structural analysis of whole thrombi and fibrin will be accomplished via SEM, TEM, and rheometric experiments. This study could illuminate why some thrombosis results in severe complications for some patient populations while others recover without such sequelae. In time, we can determine those at higher risk of recurrence or uncover new targets for novel therapeutic agents for the prophylaxis and treatment of both arterial and venous thrombosis.

16. Title: Interpreting Bone Morphogenetic Protein Gradients in Vertebrate Development

Authors: Courtney Tello & Dr. Benjamin Martin, Genetics Ph.D. Program/Biochemistry and Cellular Biology Department

Presenting Author: Courtney Tello courtney.tello@stonybrook.edu
Graduate Student

Animal development consists of complex cell coordination and rearrangement via intercellular communications. It is not well understood how progenitor cells interpret external cell signals that impact cell fate decisions. One critical signaling element in animal development is morphogen signaling. Bone morphogenetic protein (BMP) acts as a morphogen to pattern the dorsoventral (DV) axis during vertebrate development, where BMP concentration gradients correlate with different cell identities. It has been recognized that within vertebrate animals, areas of no BMP lead to notochord fate, intermediate BMP levels result in somite fates, and high levels of BMP contribute to ventral mesodermal fates in wildtype conditions. To study how progenitors interpret BMP gradients, I utilize zebrafish development. Using zebrafish embryos, I will manipulate BMP concentration, progenitor cell location, and BMP signal duration within mesodermal progenitors and determine their morphogenetic outcome, in terms of their migration and cell fate determination. Along the DV BMP gradient, cells may be positioned in embryonic domains where the microenvironment affects a binary fate switch. To answer my question, I will be using transgenic embryos to conditionally overexpress ectopic BMP signal. Transplanting transgenic cells into wildtype (WT) embryos prior to gastrulation allows for the of transgenic cell fate decisions within the WT environment. The BMP gradient will be simulated by altering activation conditions of transgenic cells. This is possible due to the transgenes being driven by a heat-shock promoter. Upon heat shock of transplanted WT embryos, the transplanted cells will have varied levels of transgene expression corresponding to their heat-shock temperature. I will visualize the change of cell fates along the BMP gradient using spinning disk confocal microscopy. Cell fates will be genetically assessed using *in situ* hybridization with fate-specific fluorescent probes. My preliminary data suggests BMP signaling is carefully coordinated so that homeobox domain transcription factors induce cell migration target genes and helix-loop-helix transcription factors target genes are involved in progenitor fate acquisition. Transplanted embryos heat-shocked at 36C show very little cell fate change, whereas embryos heat-shocked at 40C show significant shift in cell identities as compared to wildtype cells. Further experimentation is required with more temperature conditions to simulate the dynamics of the BMP gradient. These results have a significant positive impact by providing us with a better understanding of how the vertebrate body plan is established in early development and advancing the understanding of developmental pathways that could be utilized for disease treatments or regenerative medicine.

Funding:

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National Institute of General Medical Sciences

Financial Disclosures:

None

17. Title: HIV-1 Vif inhibits the DNA damage repair kinase ATM to block activation of host antiviral defenses

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Presenting author: Hoi Tong Wong (hoitong.wong@stonybrook.edu)

Presenting author's category: Graduate student

Introduction

Like all viruses, HIV-1 hijacks cellular machinery to facilitate replication and evade host antiviral defenses. Emerging evidence indicates that manipulation of cellular DNA damage repair (DDR) pathways is critical for multiple facets of HIV-1 replication, including viral genome integration, post-integration repair, minimizing dead-end reverse-transcription intermediates, and evasion of innate immune sensing. Ataxia-telangiectasia mutated (ATM) is a major DDR kinase that engages diverse antiviral defense mechanisms in response to abnormal activation of DDR signaling. ATM induces an antiviral state by activating pro-inflammatory NF- κ B signaling in addition to activating several members of the TRIM family of antiviral restriction factors. ATM activity and subsequent DDR responses are regulated at multiple levels by protein phosphatase 2A (PP2A), a major cellular phosphatase complex that was recently shown to be antagonized by the HIV accessory protein Vif; however, the functional consequences of this activity have yet to be established experimentally. Here, we demonstrate that Vif-mediated antagonism of PP2A leads to inactivation of ATM and blocks activation of antiviral defense mechanisms in response to abnormal DDR activation.

Methods

We utilize a combination of biochemical, pharmacologic, and fluorescence microscopy approaches to assess activation of DNA repair mechanisms and pro-inflammatory signaling pathways following HIV-1 infection. Infections were carried out using HIV-1 expressing wild-type Vif or a mutant deficient for PP2A antagonism. Studies were performed in a variety of cell types, including physiologically relevant myeloid and lymphoid models.

Results

We demonstrate that expression of wild-type Vif, but not a Vif mutant defective for PP2A antagonism, led to inhibition of DNA repair and induction of DNA strand breaks in a variety of cell types. Additionally, investigation of a large panel of diverse Vif-derived patient isolates revealed that this activity is prevalent clinically. Furthermore, a peptide inhibitor that specifically blocks PP2A activity also inhibited DNA repair, further confirming Vif-mediated effects. Subsequent investigation revealed that Vif inactivates ATM, which blocks activation of subsequent proinflammatory signaling pathways as well as activation of antiviral TRIM factors.

Conclusion/clinical relevance

We determined Vif inactivates ATM to inhibit the activation of DNA repair pathways, proinflammatory signaling responses, and TRIM antiviral restriction factors. Further investigation is warranted to determine the impact of this activity on HIV replication and pathogenesis.

Funding sources and financial disclosures:

This work was supported by a K99/R00 award from NIAID (AI147811), and startup funds provided by the Department of Microbiology and Immunology and Renaissance School of Medicine. All authors declare no conflict of interest.

18. Title: A scatter correction framework for contrast-enhanced digital breast tomosynthesis

Authors: Xiangyi Wu, Xiaoyu Duan, Hailiang Huang, Wei Zhao

Dept. of Radiology, Stony Brook Medicine

Presenting Author: Xiangyi Wu, xiangyi.wu@stonybrook.edu, Graduate Student

Abstract

Introduction: Dual-energy contrast-enhanced digital breast tomosynthesis (CEDBT) utilizes iodinated contrast media to highlight breast tumors with neo-angiogenesis. Conventional dual-shot (DS) CEDBT suffers from artifacts caused by patient motion between two separate exposures. A novel CEDBT system with a direct-indirect dual-layer (DL) detector was proposed recently. It acquires low- and high-energy (LE and HE) images simultaneously with a single exposure, which minimizes patient motion. However, image quality for both DS and DL CEDBT is degraded by scatter radiation, which causes cupping artifact and reduces lesion contrast. We developed a scatter correction framework for CEDBT and evaluated its performance with both Monte Carlo simulations and patient images.

Methods: The proposed scatter correction framework combined convolution-based and interpolation-based methods. For each projection image, iterative convolutions between the image and pre-calculated scatter-to-primary ratio (SPR) kernels were used to provide an accurate estimate of scatter distribution in the central breast region. In the peripheral breast region, the breast thickness roll-off causes lower scatter radiation than the central breast region and thus two SPR kernels were applied within the two regions, respectively. Scatter radiation in the background (non-breast) region was experimentally measured and incorporated into the interpolation step to improve scatter estimation. The proposed framework can be applied to both DL and DS techniques. For evaluation, this scatter correction framework was performed on simulated DL CEDBT images of 6 digital anthropomorphic breast phantoms. Mean absolute percentage error (MAPE) was calculated between the estimated scatter distributions and the ground truths. We evaluated the performance of the method to correct scatter in patient images acquired from a DS CEDBT prototype system, which is modified from the Siemens Mammomat Inspiration DBT system. Scatter correction was conducted for images of a patient with biopsy-proven invasive ductal carcinoma. Signal difference to noise ratio (SDNR) of the iodinated lesion was calculated as the figure of merit for lesion detectability and compared between images before and after scatter correction.

Results: Our simulation results showed that the MAPE was consistently less than 5% from the ground truth over all 6 phantoms and outperformed the single-kernel convolution method. The patient images acquired from DS CEDBT showed less cupping artifact and higher lesion SDNR (19.3%) after performing scatter correction.

Conclusions: A framework was developed to perform scatter correction for CEDBT. The proposed scatter correction method showed better scatter removal and improved lesion detectability compared to the single-kernel method.

Funding source(s): NA

Date/number of Committee on Research Involving Human Subjects (CORIHS) approval: Date: 11/02/2022, IRB ID: 696047

Financial disclosures: Research supports from Siemens Medical Solutions USA Inc.

19. Title: Reducing acetylcholine signaling in the dorsal striatum prevents the onset of OCD-like phenotypes in the SAPAP3-cKI mouse model

Authors: Felicia Lu-Tang Yang, Zachary B. Hobel, Kimberly Jimenez, Jeffrey M. Malgady, Joshua L. Plotkin

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Presenting author' Category: Graduate Student

Main body of the abstract:

Obsessive-compulsive disorder (OCD) is characterized by persistent intrusive thoughts and repetitive actions, and affects about 2% of the world population. Dysfunction of the striatum has been strongly linked to OCD. The striatum is the input nucleus of the basal ganglia and plays a central role in action selection and motor learning. Among different striatal cell types, cholinergic interneurons (CINs) account for 1-2% of the total cell population. Despite the subtle proportion, they ramify extensively and send projections widely throughout the striatum, creating an essential role in regulating striatal output. Post-mortem studies have reported cholinergic dysfunction in several neurodegenerative and neuropsychiatric movement disorders, such as Tourette syndrome and Parkinson's disease. Our lab has also shown that striatal CIN density and evoked acetylcholine (ACh) release is increased in the SAPAP3 knockout mouse model of OCD. However, whether cholinergic dysfunction plays a causal role in compulsive behavior is unknown. We hypothesized that pathologically increased striatal cholinergic transmission contributes to the development of OCD-like behaviors in SAPAP3 KO mice.

In this study, we reduced dorsal striatal ACh release in pre-symptomatic SAPAP3 KO mice by knocking down of the vesicular acetylcholine transporter (VACHT) gene, which is necessary for storage and release of acetylcholine. Lentivirus particles encoding shRNA to VACHT or control shRNA were stereotaxically injected into the dorsal striatum. After the recovery, mice were monitored daily for their compulsive, anxiety-like, and motor-related behaviors for one month, after which electrically evoked ACh release was measured to confirm the knockdown of VACHT. We found that after VACHT-knockdown, SAPAP3 KO mice did not develop compulsive behaviors, while their control-injected counterparts developed severe over-grooming and self-inflicted skin lesions at the expected rate. Taken together, these findings suggest a potential therapeutic role for ACh modulation in the treatment of compulsive behaviors.

Funding source(s)

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Financial disclosures

n/a

20. Title: Simultaneous 18F-FDG PET/MRI reveals concurrent more extensive brain damage in unilateral mesial temporal lobe epilepsy with hippocampal sclerosis

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Introduction

Drug-resistant mesial temporal lobe epilepsy (MTLE) patients commonly resort to anterior temporal lobectomy for seizure control; however, many still suffer from seizures post-surgery, which may relate to their extensive brain network damage. It is still unclear whether the white matter diffusivity changes topographically coincide with cortical hypometabolism in MTLE. In this study, we investigated the changes in glucose uptake, white matter tracts, and their differences in brain networks of MR-hippocampal sclerosis (HS) versus MR-negative MTLE patients using simultaneous PET/MR.

Methods

Fifty-four drug-refractory unilateral MTLE patients (age \geq 18; without other lesions) were scanned on a hybrid PET/MR scanner with 18F-FDG. During the PET acquisition, MRI sequences including T1-weighted MPRAGE and DTI were also acquired. Other clinical records, such as MR-HS/negative status and presurgical diagnosis, were collected.

Brain region parcellation was performed on the MPRAGE images using Freesurfer (v7.0). The standardized uptake value ratio (SUVR) normalized to the cerebellar gray matter was obtained.

Correlational tractography analysis was conducted with DSI-studio. A multiple regression model was used to remove the effects of sex, age, disease laterality, and encoding direction. An FDR threshold of 0.05 was used. The SUVR discordance of bilateral brain regions was obtained as $SUVR_{diff} = SUVR_{ipsi} - SUVR_{contra}$. Metabolic connectivity matrices of the regional 18F-FDG SUVRs were generated by calculating pair-wise Pearson correlation between two ROIs across subjects.

Results

Patient demographics are summarized in Table 1.

Mesial temporal structures, such as hippocampus, amygdala, parahippocampus, and middle temporal cortex, were found to have a significantly larger $SUVR_{diff}$ in the MR-HS group compared to the MR-negative group ($P < 0.001$). Notably, the thalamus was also affected ($P = 0.00758$). Table 2 shows the results of all the ROIs. Figure 1 demonstrates the tracts with higher mean diffusivity (MD) or lower fractional anisotropy (FA) in the MR-HS group. Noteworthily, the fornix of the brain showed reduced FA and increased MD; this could reflect subtle microstructural damages due to recurrent seizures. Furthermore, the inter-subject metabolic connectivity matrices (Figure 2) demonstrate a loss of structure in the MR-HS group. The root-mean-square errors were 4.19 and 3.42 for the ipsilateral and contralateral connectivity matrices of the MR-HS group when compared to the ipsilateral matrix of the MR-negative group, indicating the ipsilateral brain of the MR-HS group is more affected.

Conclusions

This study identified extensive network damage in MR-HS patients among patients with unilateral MTLE. Further investigation is warranted to study if other more personalized treatment approaches are needed beyond anterior temporal lobotomy alone.

Footnote

This study used de-identified human data provided by the external collaborations in the author list. The data acquisition was approved by their local ethics committee.

There are no financial conflicts of interest to disclose.

Table 1. Demographics of the study population

	MR-HS (N=27)	MR-negative (N=27)
Age (years), median (range)	30 (20-58)	24 (18-54)
Sex (M/F)	13/14	19/8
Laterality (L/R)	12/15	12/15
Age at onset (years), median (range)	16 (1-47)	16 (1-53)
Epilepsy duration (years), median (range)	12 (3-43)	5 (1-42)

HS, hippocampal sclerosis

Table 2. P values of all regions of interest between MR-hippocampal sclerosis and MR-negative groups

ROI	P value	ROI	P value
Thalamus	0.007579	ctx-parahippocampal	0.000108
Caudate	0.910538	ctx-paracentral	0.767194
Putamen	0.833615	ctx-parsopercularis	0.419344
Pallidum	0.460007	ctx-parsorbitalis	0.211043
Hippocampus	2.63E-06	ctx-parstriangularis	0.595476
Amygdala	0.000235	ctx-pericalcarine	0.268402
ctx-caudalanteriorcingulate	0.887039	ctx-postcentral	0.653610
ctx-caudalmiddlefrontal	0.396894	ctx-posteriorcingulate	0.265624
ctx-cuneus	0.116230	ctx-precentral	0.037411
ctx-entorhinal	0.040497	ctx-precuneus	0.090795
ctx-fusiform	0.012022	ctx-rostralanteriorcingulate	0.501887
ctx-inferiorparietal	0.035303	ctx-rostralmiddlefrontal	0.726476
ctx-inferiortemporal	0.010382	ctx-superiorfrontal	0.528987
ctx-isthmuscingulate	0.049559	ctx-superiorparietal	0.228663
ctx-lateraloccipital	0.186585	ctx-superiortemporal	0.001844
ctx-lateralorbitofrontal	0.531805	ctx-supramarginal	0.057913
ctx-lingual	0.468114	ctx-transversetemporal	0.014696
ctx-medialorbitofrontal	0.543374	ctx-insula	0.048382
ctx-middletemporal	0.000908		

ROI, region of interest

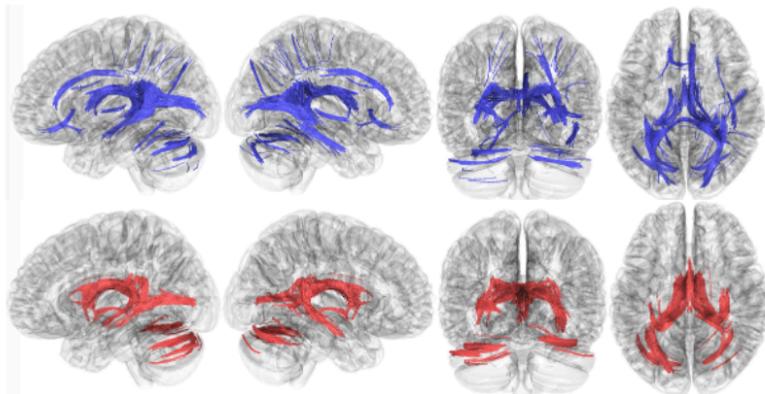


Figure 1. The correlational tractography results in the MR-hippocampal sclerosis group (top) as compared to the MR-negative group (bottom).

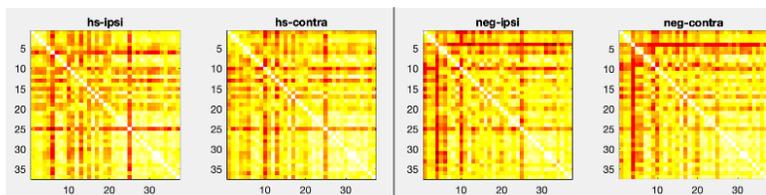


Figure 2. The inter-subject metabolic connectivity matrices in the MR-hippocampal sclerosis group (left) when compared to the MR-negative group (right).



MEDICAL STUDENTS



1. **Title:** Degree of Progressive Dilatation of the External Iliac Artery After Endovascular Stent Placement

Authors: Sintia Escobar Avelar, Camilo Martinez MD, Tarek Afifi, Apostolos Tassiopoulos MD, Nicos Labropoulos PhD

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Over 200,000 people are diagnosed with abdominal aortic aneurysms in the U.S. every year. Endovascular aneurysm repair (EVAR) is a minimally invasive procedure that has become the standard of care due to lower perioperative morbidity and mortality rates when compared to abdominal aortic aneurysm open repair. Currently, the EVAR distal seal zones are the common iliac arteries (CIA). These arteries, however, present complications due to their risk for degeneration caused by progression of aneurysmal disease and the presence of stenotic and tortuous iliac vessels. In this study, we seek to establish whether the external iliac artery (EIA) would be a viable option to patients with compromised CIAs by evaluating the degree of progressive dilatation of both stented and non-stented CIAs in comparison to EIAs. 28 patients that underwent EVAR with limb extensions into the EIA, either with primary or subsequent intervention, and 20 patients with a bifurcated EVAR and a distal seal in the CIA with no re-intervention were selected using CPT codes. In the group that had undergone EVAR with limb extensions, EIAs were measured pre- and post-operatively, using centerline reconstruction software of corresponding CT scans at three different distances: 1 cm from the iliac bifurcation, towards the end of the stent, and 2 cm past the stent, with corresponding distances measured in the non-stented preoperative or contralateral artery. In the group with a bifurcated EVAR, pre- and post-operative measurements were acquired using centerline reconstruction software of corresponding CT scans. The measurements were acquired at four distances: CIAs at end the of the stent, EIAs at 1 cm from the iliac bifurcation, mid-EIA, and distal-EIA with corresponding distances in the non-stented preoperative artery. The average diameter of the CIA and EIA were recorded, as well as the interval pathologic growth between the studies. With a $p < 0.001$, there was a significant difference found in the change in diameter over time between the CIA to the EIA between the two groups. The study found that both stented and non-stented EIAs demonstrated less progressive dilatation relative to CIAs. Further research would help determine if EIAs are more suitable for patients with compromised CIAs.

2. Title: Noninvasive Measures of Diminished Liver Function Predict Short-Term Postoperative Complications following Open Reduction Internal Fixation of Distal Radius Fracture

Authors: Jane Burgan¹, BS; Steven H. Liu¹, BS; Kenny Ling¹, BS; Rachel A. Loyst¹, BS; David E. Komatsu², PhD; Edward D. Wang², MD

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Introduction: The purpose of this study is to investigate the association between liver function and postoperative complications in patients with distal radius fractures (DRF) within 30 days of open reduction and internal fixation (ORIF) using preoperative aspartate aminotransferase (AST)-to-platelet-ratio-index (APRI) as a noninvasive measure of liver function.

Methods: The American College of Surgeons National Surgical Improvement Program database was queried for all patients who underwent ORIF for DRF between 2015-2021. The study population was divided into two groups based on preoperative APRI: normal liver function (APRI \leq 0.5) and abnormal liver function (APRI $>$ 0.5). Postoperative complications within 30 days of ORIF were collected. Multivariate logistic regression analysis was conducted to analyze the relationship between preoperative APRI and postoperative complications.

Results: A total of 7,344 patients undergoing ORIF for DRF between 2015 to 2021 were included in this study. 6,541 (89.7%) patients had normal APRI and 754 (10.3%) patients had abnormal APRI. In comparison to the normal liver function group, patients with abnormal liver function were significantly associated with the patient factors: male sex, diabetes mellitus, bleeding disorders, American Society of Anesthesiologists (ASA) classification \geq 3, and higher body mass index (BMI) (p-values of $<$ 0.001, 0.026, 0.048, 0.009, and 0.011, respectively). The abnormal APRI group was found to be significantly associated with major complications, overall complications, septic shock, bleeding transfusions, readmission, and nonhome discharge (p-values of 0.023, 0.010, $<$ 0.001, 0.010, 0.006, and $<$ 0.001, respectively). After controlling for significant patient demographics and comorbidity factors, multivariate analysis identified the abnormal APRI group to be significantly associated with septic shock, bleeding transfusions, and nonhome discharge (odds ratios, p value (95% confidence interval) of 16.03, 0.001 (2.89-88.77); 3.98; 0.005 (1.51-10.47); 1.73, $<$.001 (1.30-2.31) respectively).

Conclusion: Abnormal liver function is significantly associated with 30-day postoperative complications following ORIF DRF. This is the first study to investigate the relationship between noninvasive estimated liver function using APRI and postoperative outcomes following DRF ORIF. APRI is a quick, noninvasive alternative to estimate patients' liver status compared to the gold standard of liver biopsy. Therefore, this study contributes to the growing research on the relationship between liver disease and orthopedic surgeries, and suggests the utility of APRI to predict surgical outcomes in DRF patients who undergo ORIF.

Funding Sources: N/A

Financial Disclosures: N/A

3. Title: Diabetes Mellitus as a Risk Factor for Postoperative Complications Following Arthroscopic Rotator Cuff Repair

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Presenting author' Category: Medical Student

Title: Diabetes Mellitus as a Risk Factor for Postoperative Complications Following Arthroscopic Rotator Cuff Repair

Introduction: The number of adults with diabetes mellitus in the United States is expected to increase significantly over the next few decades. Along with altered metabolic function, those with diabetes frequently experience upper limb musculoskeletal pathologies, and are more likely to undergo arthroscopic rotator cuff repair than non-diabetics. Previous studies have shown that patients with diabetes who undergo arthroscopic rotator cuff repair have an increased risk of postoperative complications when compared to non-diabetics. To further investigate these complications, we used a large national database to determine the 30-day postoperative complications of insulin-dependent and non-insulin-dependent diabetics compared to non-diabetics. We hypothesized that both NIDDM and IDDM were independent risk factors for postoperative complications.

Methods: The American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database was queried for all patients who underwent arthroscopic rotator cuff repair (aRCR) between 2015 and 2020. The study population was categorized into cohorts based on diabetes mellitus status: non-insulin-dependent (NIDDM), insulin-dependent (IDDM), and no diabetes. Bivariate analysis was used to compare patient demographics and comorbidities among the cohorts. Multivariate analysis, adjusted for confounding demographics and comorbidities, was used to determine independently associated 30-day postoperative complications.

Results: There were 39,877 cases of aRCR in NQSIP included in this study. Diabetics comprised 6,575 (16.7%) of these cases, with 4,758 being NIDDM (11.9%) and being 1,817 IDDM (4.6%) Bivariate logistic regression found both NIDDM and IDDM cohorts to be significantly associated with higher BMI, ASA class ≥ 3 , hypertension, COPD, bleeding disorders, and preoperative wounds or infection ($p < 0.001$). NIDDM was significant associated with sepsis (OR 2.77, $p = 0.047$, CI: 1.01-7.58), and IDDM with pneumonia (OR 2.40, $p = 0.038$, CI: 1.05-5.47), readmission (OR 1.71, $p = 0.003$, CI: 1.21-2.42), myocardial infarction (OR 0.33, $p = 0.047$, CI: 0.11-0.99), and on a ventilator > 48 hours (OR 5.27, $p = 0.029$, CI:1.18-23.41).

Conclusion: Overall, we found that NIDDM is an independent risk factor for sepsis, while IDDM is an independent risk factor for pneumonia, myocardial infarction, and remaining on a ventilator for greater than 48 hours following aRCR. These findings encourage that use of precautionary measures to help limit adverse cardiopulmonary events in diabetics prior to aRCR.

Funding source(s): None.

4. Title: Liver Dysfunction as Predicted by Noninvasive Measures Predicts Short-Term Adverse Outcomes Following Total Shoulder Arthroplasty

Authors: Patricia Cerri-Droz¹ BS, Steven H. Liu¹ BS, Kenny Ling¹ BS, Rachel A. Loyst¹ BS, David E. Komatsu² PhD, Edward D. Wang² MD.

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Presenting author: Patricia Cerri-Droz, patricia.cerri-droz@stonybrookmedicine.edu,

Presenting author' Category: Medical Student

Introduction: The prevalence of total shoulder arthroplasty has exponentially increased over the past two decades, serving as an effective solution to restoring function and minimizing the pain that results from shoulder pathology, including proximal humerus fractures, osteoarthritis, and rotator cuff injuries. Much of the observed growth has concentrated within the older patient population, which experiences a greater rate of chronic comorbidities and consequent surgical complications. Liver damage is an expanding comorbidity that has the potential to be determined through non-invasive techniques, such as the aspartate aminotransferase (AST)-to-platelet ratio index (APRI), a value calculated from AST and platelet count. As liver damage has been previously associated with a greater number of postoperative complications in previous orthopedic studies, the purpose of this study was to investigate the association between predicted liver disease, with the calculation of ARPI, and postoperative complications following TSA.

Methods: The American College of Surgeons National Surgical Quality Improvement Program database was used to collect data on 14,547 TSA operations that occurred between the years 2015-2021. These data were then divided into two cohorts of abnormal (APRI > 0.5) and normal (APRI ≤ 0.5) based on calculated ARPI values. Patient demographics and comorbidities were then compared among cohorts through bivariate logistic regression. 30-day postoperative complication data were collected and multivariate analysis, controlling for significant patient demographics and comorbidity factors, was performed to determine complications independently associated with abnormal APRI.

Results: Abnormal ARPI scores were significantly associated with the male sex (p<0.001), greater BMI (p=0.001), older age (p<0.001), and higher American Society of Anesthesiologists Classification status (p<0.001). In general, the overall complication rate was greater in the abnormal ARPI group (11.2%) when compared to the normal group (6.4%). Similarly, the rate minor complications (3.2% vs. 8.3%), bleeding transfusions (1.8% vs. 5.5%), readmission (3.1% vs. 4.2%), pneumonia (0.5% vs 1.5%), and nonhome discharge (9.0% vs 13.0%) were greater in the abnormal ARPI cohort. Increased ARPI score was an independent risk factor for greater overall rate of complications (p<0.001), minor complications (p<0.001), pneumonia (p<0.001), bleeding transfusions (p<0.001), remaining on a ventilator after 48 hours (p<0.001), and non-home discharge following TSA (p<0.001). In general, those with abnormal ARPI faced a higher rate of and were independently associated with more complications than the normal ARPI group. These results encourage the assessment of liver damage during preoperative risk stratification through accessible values such as ARPI, to limit negative postoperative outcomes following TSA.

Funding source(s): None.

5. Title: Antenatal Anxiety as a Predictor for Postpartum Depression

Authors: Christy Chan BS, Brynn Franz BS, Mahesh Tiwari BS, Joseph Chappelle MD

Presenting Author: Christy Chan

Presenting Author Category: Medical Student

Abstract:

Introduction

Postpartum depression affects 30-37% of new mothers in the United States. Psychiatric illness is a leading cause of maternal morbidity and mortality, and maternal distress in the postpartum period is associated with long-term developmental and behavioral effects in infants. Our objective was to evaluate the correlation between the Generalized Anxiety Disorder 7-Item Scale (GAD-7) taken in the 1st trimester and the Edinburgh Postnatal Depression Scale (EPDS).

Methods

We conducted a prospective observational study of pregnant women. Women were enrolled between 11-14 weeks and completed the GAD-7 questionnaire in addition to their routine prenatal care. Women who experienced pregnancy loss or were lost to follow-up were excluded. A EPDS score of ≥ 10 in the postpartum period was considered to be a positive screen. Chi-square, t-tests, and non-parametric tests, and logistic regression were used where appropriate.

Results

100 women were enrolled in the study, with 94 being included in the final analysis. The average EPDS and GAD-7 scores in the first trimester were 4.4 ± 4.5 and 4.5 ± 4.3 . Thirteen women (13.4%) had a positive postpartum EPDS. The 1st trimester EPDS and GAD-7 were both significantly correlated with a positive postpartum EPDS ($p=0.006$ and < 0.001). An optimal cut-off of 5 was found for both tools using logistic regression and ROC curves. Logistic regression with these cut-offs found that the GAD-7 had an odds ratio of 18.4 (95%CI 3.2-107.2), and the 1st trimester EPDS was found to be non-significant. Using a GAD-7 cut-off of 5 had a NPV of 97% and a PPV of 40.4%. No other patient data was found to be significantly associated with a positive postpartum screen.

Conclusion

Peripartum mood disorders are a major cause of maternal morbidity, and our work has shown that the GAD-7 may be useful as a screening tool. Future studies will determine whether interventions designed for these women can decrease their risk of postpartum depression

Funding Source: N/A

IRB: IRB2019-00205

6. Title: Why the Capacity Consult? The Perspective of Medicine Hospitalists on their Reasons for Consulting Psychiatry to Determine Patient Medical Decision-Making Capacity

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Abstract:

Background: Research points to the high utilization and varying clinical impact of routine psychiatric consultation to determine medical decision-making capacity (DMC). The underlying drivers for this demand have not been well characterized. We surveyed general medicine hospitalists to understand their most common reasons for requesting DMC assessments.

Methods: Twenty-six hospitalists at a tertiary-care academic hospital completed a 7-item survey, using a 5-point Likert scale rating their reasons for requesting DMC consults (1-least common to 5-most common). Rating score frequencies, means, standard deviations, medians, and associations were analyzed.

Results: The two most common reasons for requesting psychiatric consultation for DMC determinations, an Underlying Psychiatric/Neurocognitive Diagnosis (m=4.40, SD=0.65, Mdn=4) and High Stakes Decision (m=4.16, SD=0.80, Mdn=4) were correlated (r=0.44, p<0.05). Consultations Requested by Risk Management (m=3.92, SD 0.93, Mdn= 4) and Requested by Social Work (m=3.92, SD=0.93, Mdn=4) were also correlated and endorsed as ≥ 4 by more than 75% of respondents (i.e. 5= most common; r=0.48, p<0.05). Over 60% of respondents rated To Protect Myself Legally (m=3.50, SD=1.14, Mdn=4) ≥ 4 , which correlated with Low Confidence (m=2.58, SD=0.95, Mdn=3) (r=0.49, p <0.05).

Conclusions: This study points to several important drivers of routine psychiatry consultations for DMC assessments, including requests by social workers and risk managers and legal defensiveness. Our findings have implications for further research, education and procedures that empower staff to resolve routine DMC questions and focus utilization of limited psychiatry resources towards higher complexity and risk cases.

Funding source(s): None.

If human subjects are included, indicate **date/number of Committee on Research Involving Human Subjects (CORIHS) approval:** Not Applicable.

Financial disclosures: None.

7. Title: Diversity of Patient Population Represented on United States Plastic Surgeon’s Webpages

Authors: Nicole DePaola, BS¹, Katherine Wang, BA¹, James Frageau, BA¹, Tara L. Huston, MD²

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Introduction: Representation of individuals from diverse backgrounds in healthcare media is critical for healthcare accessibility, inclusivity, and equity. In plastic surgery, where many procedures are elective, it is important to communicate values of patient-centered care. Previous literature has demonstrated a lack of racial diversity on academic plastic surgery center webpages, advertisements for nonsurgical cosmetic products, and plastic surgery social media. However, no study has yet examined the racial diversity of webpage content from a patient search perspective. This study seeks to characterize the patient experience of self-representation in the media when seeking care from a plastic surgeon. The objective is to determine if there is a racial discrepancy in the media appearance of implied patients depicted on United States plastic surgeon’s webpages from a patient search perspective.

Methods: A Google search for plastic surgeons in each of the 50 United States was completed. Their webpages were analyzed on the basis of patient diversity in media presented on the homepage. The words, “(state) plastic surgeon,” were searched. The first 10 relevant websites were collected. The patients and implied patients on the homepages were counted and classified into one of 6 skin colors, designated I to VI. These somewhat correlate to Fitzpatrick skin phototype, but the Fitzpatrick Scale is a measure of the skin’s response to UV exposure, rather than skin color. Percentages of people in each skin tone classification were tabulated and classified as white (I-III) or nonwhite (IV-VI). This data was then compared to the 2020 ASPS demographics report and the 2020 U.S. Census.

Results: 4010 individuals were derived from 496 webpages. 91.89% were classified as “white” and 8.11% “nonwhite.” Across the 50 states, 264 individuals fell into category I, 826 into category II, 2586 into category III, 260 into category IV, 69 into category V, and 5 into category VI. Chi-square analyses determined that there was a statistically significant difference between the racial diversity of our sample of patient-appearing people compared to that of the 2020 US Census ($p < 0.001$), 2020 ASPS Cosmetic Summary Data ($p < 0.001$), and 2020 ASPS Reconstructive Summary Data ($p < 0.001$).

Conclusions: This study highlights the significant difference in media depictions on plastic surgeon webpages and the demographics of patients they are serving. Based on this data, further analyses are needed to identify the influence of these representational disparities and unequal representation on patient care and clinical outcomes.

Funding Sources: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Financial Disclosures: The authors have no financial interests or relationships to disclose.

8. Title: Chronic Steroid Use as a Risk Factor for Postoperative Complications Following Arthroscopic Rotator Cuff Repair

Authors: Richelle Fassler¹, BA; Kenny Ling¹, BS; Ryan Tantone², MD; David E. Komatsu², PhD; Edward D. Wang², MD

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ABSTRACT

Background: Steroids are a common treatment for many rheumatologic and inflammatory disorders. Chronic steroid use has been studied in joint arthroplasty and arthroscopy, but studies specifically on preoperative chronic steroid use in arthroscopic rotator cuff repair (aRCR) are limited. The purpose of this study is to determine association between chronic steroid use and 30-day postoperative outcomes following aRCR.

Methods: The American College of Surgeons National Surgical Quality Improvement Program (NSQIP) was queried to identify all patients who underwent aRCR between 2015 and 2020. Patients were divided into two cohorts, non-steroid users and chronic steroid users. Univariate binomial regression analysis was used to compare demographics, comorbidities, and postoperative outcomes between cohorts. Multivariate regression analysis, adjusted for all significant demographics and comorbidities, was used to identify significant 30-day postoperative outcomes.

Results: A total of 39,876 patients remained after exclusion criteria, with 39,068 (97.97%) in the non-steroid group and 808 (2.02%) in the chronic steroid group. Patient demographics and comorbidities significantly associated with chronic steroid use were age ≥ 65 ($p < 0.001$), female gender ($p < 0.001$), BMI ≥ 35 , ASA ≥ 3 ($p < 0.001$), dependent functional status ($p < 0.001$), non-smokers ($p = 0.046$), higher rates of dyspnea ($p < 0.001$), COPD ($p < 0.001$), CHF ($p < 0.001$), hypertension requiring medication ($p < 0.001$), open wound infection ($p = 0.018$), unintentional weight loss ($p < 0.001$), bleeding disorders ($p < 0.001$), and inpatient procedure ($p = 0.013$). Multivariate analysis found preoperative chronic steroid use to be an independent predictor of mortality within 30 days following aRCR (OR 8.15, CI 1.45-45.86; $p = 0.017$).

Conclusion: Preoperative chronic steroid use is independently associated with higher rates of 30-day mortality following aRCR. Chronic steroid use was also significantly associated with UTI and nonhome discharge following aRCR. As the utilization of aRCR continues to rise, it is important to understand these potential risk factors to minimize adverse outcomes. This knowledge can guide physicians in preoperative management and patient education to properly manage their chronic illnesses and avoid adverse outcomes.

Funding: n/a

Financial Disclosures: None

9. Title: Disparities in Postoperative Outcomes Between Black and White Patients Following Total Shoulder Arthroplasty

Authors: Richelle Fassler¹, BA; Kenny Ling¹, BS; William Leatherwood², MD; Jane Burgan¹, BS; David E. Komatsu², PhD; Edward D. Wang², MD

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Intro: Despite the rise in surgical volume for total shoulder arthroplasty (TSA) procedures, racial disparities exist in outcomes between White and Black populations. Prior studies have demonstrated racial disparities in orthopedic surgery, but there are limited studies on racial disparities in outcomes following TSA. The purpose of this study was to compare 30-day postoperative complication rates between Black and White patients following TSA.

Methods: The American College of Surgeons National Surgical Quality Improvement Program database was queried for all patients who underwent TSA between 2015 and 2020. The study population was divided into two groups based on race: Black or African American and White. Patient demographics and comorbidities were compared between cohorts using bivariate analysis. Multivariate logistic regression, adjusted for all significantly associated patient demographics and comorbidities, was used to identify associations between Black or African American race and postoperative complications.

Results: A total of 23,499 patients were included in this study. There were 22,229 (94.6%) patients in the White cohort and 1,270 (5.4%) patients in the Black or African American cohort. Demographics and comorbidities that were significantly associated with Black or African American race were age 40-64 ($p < 0.001$), BMI ≥ 40 ($p < 0.001$), female gender ($p < 0.001$), ASA classification ≥ 3 ($p < 0.001$), smoking status ($p < 0.001$), non-insulin and insulin dependent diabetes mellitus ($p < 0.001$), hypertension requiring medication ($p < 0.001$), disseminated cancer ($p = 0.023$), and operative duration ≥ 129 minutes ($p < 0.001$). Multivariate logistic regression identified Black or African American race to be independently associated with higher rates of readmission (OR 1.44, 95% CI 1.09-1.91; $p = 0.001$).

Conclusion: Black or African American race was independently associated with higher rates of 30-day readmission following TSA. Given the growth of TSA surgical volume, it is important to investigate racial disparities in TSA outcomes to help reduce these disparities and guide future interventions.

Funding Sources: N/A

Financial Disclosures: N/A

10. Title: Dupuytren's disease and diabetes mellitus: An analysis of 100,000 Dupuytren's patients

Authors: Sandhya Ganesan, BS, Ryan P. Tantone, MD, David E. Komatsu, PhD, Lawrence C. Hurst, MD; Department of Orthopedics and Rehabilitation, Stony Brook University

Presenting author: Sandhya Ganesan (Sandhya.Ganesan@stonybrookmedicine.edu)

Presenting author' Category: Medical Student

Main body of the abstract:

Introduction: Dupuytren's disease (DD), a fibroproliferative disorder of the hand, has been associated with various medical conditions including diabetes mellitus (DM). The association between DD and DM has been widely reported, but the prevalence of DM within DD patients varies widely from 2-63% in the literature. A major reason for this wide range is the small sample sizes of most studies. In order to more accurately ascertain the true prevalence of DD and its association with DM, we conducted a study using data from a TriNetX database cohort of 88,661,090 patients that included 100,218 patients with DD and 6,019,023 patients with DM.

Methods: This was a retrospective cohort study of patients with DD and DM. Patient cohorts were created based on the following diagnoses: DD, DM, type 1 diabetes mellitus (T1DM), or type 2 diabetes mellitus (T2DM). The overall risk difference of having a DD diagnosis and prevalence of DD during the years 2010-2020 were analyzed and compared across the DM, T1DM, and T2DM cohorts. Patients with DM were further stratified into groups according to HbA1c values: prediabetes (HbA1c <6.5%), diabetes (6.5%<HbA1c<7.5%), or uncontrolled diabetes (HbA1c>7.5%) and prescribed anti-diabetic agents: insulin or metformin. The risk of having a DD diagnosis associated with each group was compared to one another using risk differences and ratios.

Results: The overall prevalence of DD, T1DM, and T2DM in this cohort was 100,218, 178,168, and 5,537,511, respectively. The prevalence of DD in patients with T2DM was greater than the prevalence in patients with T1DM. Patients with T2DM carried a higher risk of DD than patients with T1DM (RR: 1.641; 95% CI: [1.356, 1.986]). Diabetic patients taking insulin carried a lower risk of DD compared to diabetic patients taking metformin (RR: 0.801, 95% CI: [0.774, 0.83]). Finally, diabetic patients with HbA1c levels within the diabetic range carried a risk of 0.463%, whereas patients with HbA1c levels within the prediabetic or uncontrolled diabetes range carried lower risks of 0.392% and 0.416%, respectively.

Conclusions/clinical relevance: This study further specified the relationship between DM and DD. Specifically, patients with T2DM, diabetic patients who take metformin, and diabetic patients with HbA1c levels between 6.5-7.5% carry the highest risk for DD. These findings may be explained by the increased accumulation of advanced glycosylated end products (AGE's) in patients with diabetes. Future studies investigating the relationship between AGE accumulation and the development of DD may elucidate the connection between DD and DM.

Funding source(s): N/A

Financial disclosures: The authors have no financial interests or relationships to disclose.

11. Title: Impact of COVID-19 on Rates of Burnout and Choice of Specialty Among Medical Students at Each Year of Training

Authors: Hren, G., Mockler, G. M.D., Reykhart, O. M.D., Lopez, O., Hou, W.

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Presenting Author category: Third year Medical Student

Abstract:

Burnout is at the forefront of discussions regarding physician wellness. Burnout is defined as a three-pronged issue, with emotional exhaustion, depersonalization, and lack of accomplishments comprising each of the prongs. Burnout has reached levels of significant concern in the medical field, due to the COVID-19 pandemic. We investigated the effects that the COVID-19 pandemic has had on medical students, specifically, by using the Maslach Burnout Inventory (MBI) and administering it to medical students at each year of study at Stony Brook RSOM. Additionally, we added a brief series of open-ended questions at the end of the survey to assess changes in choice of residency specialty in the setting of COVID-19. Finally, open-ended questions were used to determine if students engage in any activities to help mediate burnout. This cross-sectional study was conducted as an electronic, survey/questionnaire that was distributed to students in each phase of medical training. M1 to M4 students at SB RSOM were surveyed within a six-month period of each other. The survey used was the MBI, a licensed and validated study to measure rates of burnout. The MBI asks students to use a Likert scale from 0-6, to rank how frequently they feel emotionally exhausted, depersonalized, and a lack of personal achievement based on a series of questions. At the end of the survey were questions regarding the impacts of COVID-19 and choice of medical specialty. The response rate was 42%. The mean scores of each category across classes was determined. The mean of emotional exhaustion was 3.1-3.56, depersonalization was 1.98-2.27, and personal achievement was 3.88-4.36. For the open-ended questions, a common theme students reported was that COVID-19 affected their learning due to limited in person anatomy time and decreased ability to practice their physical exam schools. They stated they mitigated burnout by cooking/baking, spending time with family and friends, and exercising. They stated their choice in specialty has not changed regarding the COVID19 pandemic. In conclusion, medical students at Stony Brook: feel emotionally exhausted a few times per month, have feelings of depersonalization once a month, and feel personal achievement once a week. We can say that students have employed coping skills – such as exercise, and time with family/friends, to mitigate burnout. Students also have negatively felt the impact of COVID-19 on their studies. This data can be used to inform decisions made on a systematic level regarding medical student wellness and steps to mitigate burnout.

Funding Source: none

Financial Disclosures: none

12. Title: Preoperative Dehydration as a Risk Factor for Postoperative Complications Following Open Reduction Internal Fixation of Distal Radius Fractures

Authors: Rosen Jeong¹, Kenny Ling¹, Edward Wang¹

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Presenting Author Category: Medical Student

ABSTRACT

Introduction: Distal radius fractures (DRF) are one of the most common upper extremity fractures. The incidence of DRF is increasing each year, with a disproportionate increase in patients 65 years and older, likely due to greater life expectancy and increased activity. The most common mechanism of DRF is a fall on the outstretched hand. Dehydration is a risk factor that has been associated with falls, particularly in the elderly population. Dehydration has been identified as a risk factor for complications in other orthopedic surgery. However, dehydration prior to DRF surgery has not been investigated. Therefore, the purpose of this study was to investigate dehydration as a risk factor for complications following ORIF of DRF.

Methods: The American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database was queried for all patients who underwent open reduction internal fixation (ORIF) of DRF between 2015 and 2020. Patient demographics and comorbidities were compared between cohorts using bivariate analysis. Multivariate logistic regression, adjusted for all significantly associated patient demographics and comorbidities, was used to identify associations preoperative dehydration status and postoperative complications.

Results: 10,864 patients were included in the analysis, of which 6,751 (62.1%) patients were in the non-dehydrated cohort, 2,307 (21.2%) patients were in the mildly dehydrated cohort, and 1,806 (16.6%) were in the severely dehydrated cohort. Compared to the non-dehydrated cohort, patients with mild dehydration had significantly higher rates of pulmonary embolism ($p = 0.030$) and non-home discharge ($p = 0.002$). Compared to the non-dehydrated cohort, patients with severe dehydration had significantly higher rates of readmission ($p = 0.019$), non-home discharge ($p < 0.001$), and mortality ($p < 0.001$). After controlling for significant patient variables, mild dehydration was independently associated with higher rates of pulmonary embolism (OR 4.43, 95% CI 1.03-19.03; $p = 0.045$). Severe dehydration was independently associated with higher rates of readmission (OR 1.43, 95% CI 1.00-2.03; $p = 0.047$), non-home discharge (OR 1.39, 95% CI 1.09-1.76; $p = 0.008$), and mortality (OR 5.74, 95% CI 1.88-17.55; $p = 0.002$).

Conclusion: Mild dehydration is a clinically significant risk factor for pulmonary embolism following ORIF of DRF. Severe dehydration is a clinically significant risk factor for readmission, non-home discharge, and mortality following ORIF of DRF. Treatment of dehydration during the preoperative period may help to minimize adverse outcomes.

Funding Sources: not applicable

Financial disclosure: none

13. Title: Does having a home urology program affect match rate into urology residency?

Authors: Annie Chen¹, Pankti Kothari¹, Jacob-Hartman-Kenzler¹, Hyun Woo Joo², Jonathan Aronov², Tal Cohen¹, Michael Ernst¹

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Presenting Authors: Hyun Woo Joo

Presenting Author's Category: Third-year Medical Student

Abstract:

Introduction: Matching into urology residency is a competitive process. Applicants from medical schools without a home program may be at a disadvantage due to a lack of mentorship that is crucial to a successful match. Studies have shown a positive correlation between the presence of a home program and a successful match in a 6-year period. Our study seeks to investigate trends for a successful match to urology residency for applicants from medical schools with or without a home program. **Methods:** Deidentified AUA Match data from 2009-20 was used for the analysis of applicant characteristics. Categorical variables were analyzed with Pearson Chi-square statistics. Numerical variables were analyzed with student t-tests, and univariable and multivariable linear regression where appropriate. Significance was defined as $p < 0.05$. **Results:** There were 4811 applicants including 3539 male applicants. 1478 applicants did not match. 494 applicants with unidentified medical school were excluded. 3590 of 4317 remaining applicants had home programs. There was a steady increase in the proportion of students applying to urology residency without a home program (11% from 2009-12 to 18.5% from 2017-20). The percentage of matched versus unmatched applicants with (84.6% v 88.9%) or without (58.7% v 52.3%) a home program both increased from 2017-20 when compared to 2009-12. Applicants with home programs were more likely to match when compared to those without a home program (OR=1.35 95%CI: 1.29,1.42). The number of interviews pursued was higher for applicants with a home program when compared to applicants without (M=13.0,SD=5.90 v M=7.52,SD=5.91, $p < 0.001$ 95%CI: -5.99,-5.00), but the number of applications submitted was not significantly different (M=60.9,SD=23.9 v M=61.4,SD=34.0, 95%CI: 1.09,1.64, $p = 0.64$). Among applicants with a home program, those who matched had more interviews versus those who did not (M=14.23,SD=5.37 v M=7.19 SD=4.78, 95%CI: 6.60,7.50, $p < 0.001$), but submitted a similar number of applications (M=60.9,SD=22.9 v M=61.1,SD=28.2, 95%CI: -2.26,1.82, $p = 0.83$). Among applicants without a home program, those who matched had more interviews (M=11.3,SD=5.50 v M=3.67,SD=3.27 $p < 0.001$ 95%CI: 6.88,8.28) and submitted more applications (M=68.3,SD=29.9 v M=54.3,SD=36.4 $p < 0.001$ 95%CI: 8.86,19.1) when compared to applicants who did not match. **Conclusion:** There has been a steady increase of applicants and higher number of matched applicants from schools without home programs over time. Applicants with home programs were more likely to match and had a higher number of interviews compared to those without home programs despite a similar number of applications. Future studies should focus on the role of mentorship in successful matching.

Funding Sources: None.

Human Subjects Disclaimer: This project used the de-identified AUA Match database and therefore received an IRB written exemption as “not human subjects” research by the Stony Brook University’s Committee on Human Subjects Research (CORIHS) office.

Financial Disclosure: No authors have competing interests that may influence the quality of research in this abstract, and we have no personal or financial disclosures.

14. Title: New York State Patients' Vulnerability Impacts their Three-Year Post-Screening Prostate Cancer Care

Authors: Seth Greenspan^{1*}, Mansi Chandra^{1*}, Hyun Woo Joo¹, Netanel Sapir¹, Jonathan Robert Gorman², Jie Yang, PhD³, Xiaoning Li, PhD³, Barghav Cavale², Allegra Fierro, MD⁴, Annie Laurie Shroyer, PhD^{5**}, John Fitzgerald, MD^{4**}

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Presenting Authors: Hyun Woo Joo & Netanel Sapir

Presenting Author's Category: Third-year Medical Students

Abstract:

Introduction: Ranked second for America's male cancer deaths, prostate cancer poses substantial healthcare burdens. Given initial prostate cancer screening commonly utilizes a Prostate Specific Antigen (PSA) test, this study investigated if "vulnerable" (Black, Hispanic, and/or self-pay) patients received differential post-PSA prostate cancer screening care. **Methods:** From 2013 to 2015, this New York retrospective cohort study extracted billing information for male residents (aged 55-75) with an initial PSA test, but without prior prostate cancer or prostate biopsy. Adjusting for prostate cancer risk factors, vulnerable versus non-vulnerable patients' post-PSA three-year prostate cancer-related screening care (prostate biopsy or subsequent prostate specific antigen) was evaluated. Multivariable logistic models examined three-year follow-up screening care, evaluating the impact of vulnerability while holding other risks constant. Model eligible risks included age, initial screening year, Charlson comorbidity score, family history of prostate cancer, smoking, and morbid obesity. Evaluating for differential three-year follow-up, observed-to-expected ratios were contrasted between vulnerable versus not-vulnerable patients. **Results:** Of 33,840 men with an initial PSA test, 22.9% (n=7,748) had subsequent routine PSA screening, 12.0% (n=4,072) had elevated PSA results, 6.6% (n=2,243) had a prostate biopsy, and 58.4% (n=19,777) had no follow up post-PSA screening care within three years. Vulnerable patients had a lower observed/expected ratio (0.93; 95% CI:0.91-0.94) of follow-up screening care versus non-vulnerable patients (1.05; 95% CI:1.04-1.05). **Conclusion/Clinical Relevance:** Vulnerable (Black, Hispanic, and/or self-pay) patients were less likely to receive post-PSA three-year follow-up prostate cancer screening care. Future interventions may be directed to address disparities in cancer screening for patients with socioeconomic vulnerabilities.

Funding Sources: We recognize Dr. Howard B. Fleit, Dr. A Laurie Shroyer and Ms. Rhonda Kearns who lead the Scholarly Concentrations Program which provides funding for medical student research at the Renaissance School of Medicine. Furthermore, we recognize Stony Brook Medicine Department of Urology for providing partial funding support for our research. We also thank Dr. A. Laurie Shroyer and Dr. Yusuf A. Hannun (director) for funding from the Stony Brook Cancer Center. We acknowledge statistical support from the Biostatistical Shared Resource (Dr. Jie Yang, Director), Stony Brook Cancer Center.

Human Subjects Disclaimer: This project used the de-identified NYS SPARCS database and therefore received an IRB written exemption as "not human subjects" research by the Stony Brook University's Committee on Human Subjects Research (CORIHS) office as IRB2020-00534 "Prostate Cancer Care in New York State" on November 19, 2020.

Financial Disclosure: No authors have competing interests that may influence the quality of research in this abstract, and we have no personal or financial disclosures.

15. Title: Intrathecal Rituxan as a Novel Treatment for Refractory NMDA Encephalitis

Authors: Soo Kyung Kim MS4, Simran Arya MS4, Olga Syrityna, MD, Nikita Patel, MD, Ellen Song, MD.

Presenting Authors: Soo Kyung Kim MS4, Simran Arya MS4

Presenting Author Category: Medical Student

Anti-NMDA Receptor encephalitis is the most common type of autoimmune encephalitis in young women and typically presents with neuropsychiatric symptoms, autonomic instability, and rapid progression to death if left untreated. In 40% of patients, the condition is associated with ovarian teratoma; in these cases, oophorectomy has been shown to be therapeutic.

Anti-NMDA receptor antibody in the CSF is key to make the diagnosis; however treatment should be initiated even without conclusive assay results if clinical suspicion is high. We present a 20 year old female complaining of headache, hallucinations, and memory lapses that quickly progressed to psychosis, dyskinesias, autonomic instability, and seizures consistent with anti-NMDA receptor encephalitis. This report showcases the use of intrathecal rituximab as an effective treatment for anti-NMDA receptor encephalitis that is refractory to initial treatment.

The patient was initially treated with high dose steroids and intravenous immune globulin with no improvement, and a course of IV Rituximab was initiated. The patient finally began to show clinical improvement after several doses of intrathecal Rituximab.

Despite appropriate treatment, the patient's hospital course was complicated by autonomic instability and respiratory failure requiring multiple intubations. Ultimately she required a tracheostomy and PEG tube. Of note she also exhibited orofacial dyskinesias (constant chewing) that led to tongue injury and damage to the endotracheal tube which needed to be replaced several times.

When the patient presented at follow-up 1 month after discharge, she was able to ambulate independently and PEG removal was planned for later that month. Her tracheostomy was removed a month after it was placed as she was able to breathe spontaneously. Despite reported fatigue and poor appetite, the patient ultimately had a good recovery after a 2 month hospitalization and there is hope that she will return to prior functional status.

16. Title: Concordance of Ultrasound and MRI Findings for Diagnosis of Placenta Accreta Spectrum

Authors: Harmehar Kohli, Bijal Parikh*, Chaitali Korgaonkar-Cherala*, Tiffany Yang*, Emily Stetler*, Megan Gorman*, Diana Garretto*, David Garry*, Kimberly Herrera*, Cassandra Heiselman*

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Presenting Author Category: Medical Student

CORIHS Approval: IRB 2020-00422

No funding sources or financial disclosures

Introduction: Early and accurate diagnosis of placenta accreta spectrum (PAS) is key for appropriate prenatal care and operative planning. This study sought to determine the accuracy of ultrasound and MRI for prenatal diagnosis of PAS by comparing final postnatal placental pathology.

Methods: This retrospective cohort study included women diagnosed with PAS from January 2013 to December 2021 at a single academic institution. Women were divided according to preoperative diagnosis: suspected abnormal placenta, focal accreta, accreta, increta, and percreta. Clinical outcomes, imaging characteristics, and final placental pathology were abstracted from charts. Statistical analysis included Fischer Exact, Chi-square, and student t tests using SPSS with statistical significance of $p < 0.05$.

Results: Forty patients had a preoperative diagnosis of PAS: 3 (4.2%) suspected abnormal placentation, 8 (11.1%) focal accreta, 16 (22.2%) accreta, 9 (12.5%) increta, and 4 (5.6%) percreta. Eleven (34.7%) patients had a correct preoperative diagnosis (Table 1 shows demographics). Accuracy was associated with preoperative type of accreta ($p = 0.001$), and women with increta or percreta were more likely to have concordant pathology (Figure 1). Placental location (e.g anterior) was the only factor associated with discrepancy between ultrasound and MRI findings ($p = 0.026$). No specific ultrasound finding were associated with accurate prenatal diagnosis, however MRI finding of uterine bulging was significantly predictive ($p = 0.003$). A high risk of incorrect preoperative diagnosis was observed in patients without previa/low lying placenta ($p = 0.002$).

Conclusion: There is a high but variable rate of accuracy between preoperative imaging findings of PAS and postoperative placental pathology. Preoperative findings of increta or percreta on imaging along with women with previa/low lying placenta were more likely have a correct preoperative diagnosis of PAS.

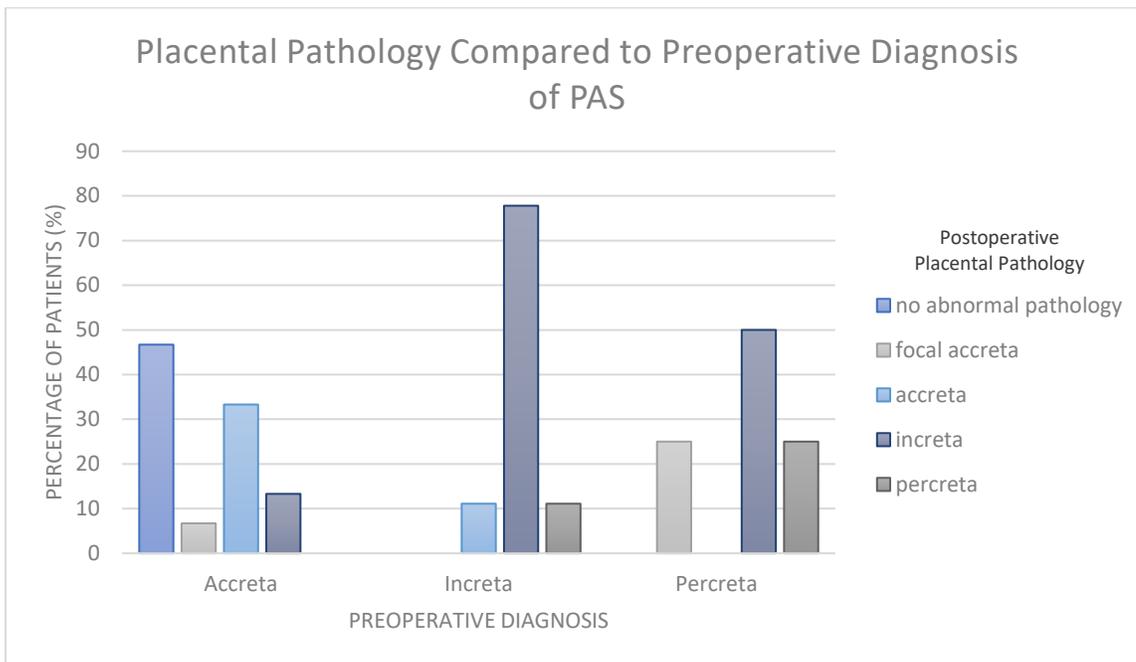
Table 1. Maternal and Imaging Characteristics and Correct Preoperative Diagnosis of PAS

Correct Preoperative Diagnosis			
	Yes	No	p-value
Age (yrs)	34.9 ± 4.7	34.9 ± 5.8	0.96
BMI (kg/m²)	33.2 ± 6.5	32.4 ± 5.8	0.63
Gravidity	4.6 ± 2.3	3.7 ± 1.8	0.11
Parity	2.5 ± 1.8	1.6 ± 1.2	0.03

Total No. prior of Cesareans	1.9 ± 1.2	1.4 ± 1.0	0.06
No. of prior LT Cesareans	1.8 ± 1.1	1.22 ± 1.0	0.03
Time from last Cesarean (yrs)	5.5 ± 1.1	5.2 ± 1.2	0.31
No. of prior D&C	0.5 ± 0.9	0.5 ± 1.0	0.89
Any maternal co-morbidity	18 (72.0)	22 (52.4)	0.13
Specific Ultrasound Findings			
Lacunar spaces	6 (27.3)	4 (22.2)	0.71
Loss of interface	6 (27.3)	8 (44.4)	0.33
Vascular invasion	2 (9.1)	1 (5.6)	1.00
Other	11 (50)	7 (38.9)	0.48
Specific MRI Findings (n=29)			
Intraplental bands	4 (16.0)	6 (14.3)	1.00
Heterogeneity of signal	6 (24.0)	3 (7.1)	0.07
Uterine bulging	10 (40.0)	3 (7.1)	0.003
Other	9 (36.0)	7 (16.7)	0.09

*Data representing as n(%) or mean ± SD

Figure 1. Placental Pathology Compared to Preoperative Diagnosis of PAS



17. Title: Hypertension and Postoperative Complications Following Arthroscopic Rotator Cuff Repair

Authors: Rachel A. Loyst, B.S.^a; Kenny Ling B.S.^a; Steven H. Liu B.S.^a; Justice U. Achonu^b; Frederick Hance^b; David E. Komatsu, PhD^b; Edward D. Wang, MD^b

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Presenting author Category: Medical Student

ABSTRACT

Introduction: Arthroscopic rotator cuff repair (aRCR) is a common procedure to repair partial- or full-thickness rotator cuff tears in patients experiencing pain or discomfort. Rotator cuff tears have been on the rise due to the aging population, with approximately 50% of patients over age 65 presenting with tears. Consequently, the incidence of aRCR has increased. Given the well-known complications of hypertension following other orthopedic surgical procedures, the purpose of this study was to investigate the relationship between hypertension and postoperative complications following aRCR.

Methods: The American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database was surveyed for all patients who underwent aRCR between 2015 and 2021. Patient demographics, comorbidities, and 30-day postoperative complication data were analyzed. Multivariate logistic regression was used to identify postoperative complications associated with hypertension.

Results: A total of 46,562 patients were included in the analysis: 20,999 (45.1%) patients were included in the hypertension cohort and 25,563 (54.9%) in the no hypertension cohort. Patient demographics and comorbidities that were significantly associated with hypertension were age ≥ 65 years ($p < 0.001$), BMI > 30 ($p < 0.001$), male gender ($p < 0.001$), dependent functional status ($p < 0.001$), ASA classification ≥ 3 ($p < 0.001$), smoking status ($p < 0.001$), diabetes status ($p < 0.001$), COPD ($p < 0.001$), and bleeding disorders ($p < 0.001$). The postoperative complications that were significantly associated with hypertension included pneumonia ($p = 0.012$), reintubation ($p = 0.009$), urinary tract infection ($p = 0.002$), stroke ($p = 0.044$), myocardial infarction ($p = 0.004$), ventilator > 48 hours ($p = 0.017$), readmission ($p < 0.001$), nonhome discharge ($p < 0.001$), and mortality within 30 days ($p = 0.020$). After adjusting for the patient variables significantly associated with hypertension, multivariate logistic regression identified readmission (OR 1.41; 95% CI 1.13-1.75; $p = 0.002$) as the only postoperative complication independently associated with hypertension.

Conclusions/clinical relevance: Hypertension was identified as a risk factor for pneumonia, reintubation, urinary tract infection, stroke, myocardial infarction, ventilator > 48 hours, readmission, nonhome discharge, and mortality within 30 days. After controlling for significantly associated patient demographics and comorbidities, hypertension was classified as an independent predictor for readmission following aRCR. This study emphasizes the importance of pre-operative screening specifically addressing hypertension to help improve perioperative risk stratification and help to minimize adverse outcomes in aRCR. Patients with hypertension may require more extensive preoperative screening to help to reduce adverse outcomes.

Funding source(s): No funding.

Date/number of Committee on Research Involving Human Subjects (CORIHS) approval: N/A to this study

Financial disclosures: All of the included authors and any research foundation with which they are affiliated did not receive any financial payments or other benefits from any commercial entity related to the subject of this article.

18. Title: Long-Term Immunosuppressant Use is Associated with 30-Day Postoperative Complications following Open Reduction Internal Fixation of Distal Radius Fracture

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ABSTRACT

Introduction: Distal radius fractures (DRF) account for up to 17.5% of fractures in adults and are one of the most common orthopedic injuries treated in the medical setting. The pain and inflammation associated with DRF is often managed by glucocorticoid therapy. Given the well-known postoperative complications as a result of chronic corticosteroid usage in other procedures, the purpose of this study was to investigate the association between preoperative chronic steroid use and 30-day postoperative complications following distal radius fracture open reduction internal fixation (DRF ORIF).

Methods: The American College of Surgeons National Surgical Quality Improvement database was queried for all patients who underwent DRF ORIF between 2015-2021. 30-day postoperative complications following DRF ORIF were collected. Multivariate logistic regression analysis was conducted to investigate the relationship between preoperative chronic steroid use and postoperative complications.

Results: A total of 29,675 patients were included in the analysis: 29,012 patients in the nonsteroid cohort and 663 patients in the chronic steroid use cohort. The postoperative complications associated with the steroid cohort were major complications ($p < 0.001$), minor complications ($p < 0.001$), overall complications ($p < 0.001$), pneumonia ($p < 0.001$), stroke ($p = 0.048$), myocardial infarction ($p = 0.019$), bleeding transfusions ($p < 0.001$), deep vein thrombosis (DVT) ($p < 0.001$), pulmonary embolism ($p < 0.001$), readmission ($p < 0.001$), nonhome discharge ($p < 0.001$), and mortality ($p = 0.040$). Chronic steroid use was found to be independently associated with major complications (odds ratio [OR] 1.73, 95% confidence interval [CI] 1.17-2.55; $p = 0.006$), minor complications (OR 1.81, 95% CI 1.09-3.00; $p = 0.021$), overall complications (OR 1.72, 95% CI 1.23-2.42; $p = 0.002$), DVT (OR 4.41, 95% CI 1.12-17.30; $p = 0.034$), and readmission (OR 1.79, 95% CI 1.19-2.70; $p = 0.005$).

Conclusions: Preoperative chronic steroid use was associated with an increasing rate of postoperative complications following DRF ORIF. As the prevalence of ORIF of DRF increases, these results necessitate careful consideration of preoperative risks to better select surgical candidates and reduce the chance of postoperative adverse events.

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19.* Title: Predilection of Patellofemoral Arthritis in Patients with Posterior Medial Meniscal Root Lesions

Authors: Rachel A. Loyst B.S.^a, Guilherme Palhares, M.D.^b, Paige Hinkley, B.A.^b, Morgan Rizy, B.S.^b, Alissa J. Burge, MD^b, Andreas H. Gomoll, MD^b, Sabrina M. Strickland, MD^b

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Presenting author Category: Medical Student

ABSTRACT

Introduction: The menisci have a vital role in shock absorption, load distribution, and supporting knee stability. Posterior root tears of the medial meniscus can lead to rapidly progressive osteoarthritis. While much of the research has focused on the clinical consequences of a root lesion, risk factors predisposing to a root lesion have started to gain more attention. The present study aims to compare the presence and severity of patellofemoral osteoarthritis between patients undergoing medial meniscectomy and medial meniscal root repair. We hypothesized that patients who undergo root repair procedures would have higher rates of patellofemoral osteoarthritis compared to patients undergoing meniscectomy when analyzing pre-operative MRIs.

Methods: The root repair cohort was matched to a meniscectomy cohort based on sex, BMI, and age at the time of surgery. Radiographic evaluation with Outerbridge scoring of MRI of the knee was performed to determine the severity of degeneration of the knee joint pre-operatively. Kolmogorov-Smirnov test was used to normalize the continuous variables. Mann-Whitney and Independent t-tests were used to compare the groups.

Results: One hundred and two patients were included in this study (51 root repair and 51 meniscectomy). The root repair group had statistically greater Outerbridge patella scores ($M= 2.45\pm 1.12$) when compared to the meniscectomy patients ($M= 1.78\pm 1.30$) ($p = 0.006$) and trochlear scores ($M= 2.27\pm 1.37$) when compared to the meniscectomy patients ($M= 1.55\pm 1.40$) ($p = 0.010$). When analyzing using a new patellofemoral scale for grading patellofemoral arthritis, the root repair group had statistically greater scores ($M= 8.33\pm 3.38$) when compared to the meniscectomy patients ($M= 5.67\pm 3.07$) ($p < 0.001$).

Conclusion: Patients undergoing a posteromedial meniscus root repair had a greater degree of patellofemoral arthritis than patients undergoing a meniscectomy. The presence of arthrosis preoperatively in root lesion patients has presented the question of whether repair is worthwhile or if one should delay surgery until arthroplasty is indicated. Future research should be placed on outcomes of root repair surgery in patients with patellofemoral arthrosis, in addition to considering the patient's age, activity level, and other risk factors.

Funding source(s): No funding.

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20. Title: Factors Associated with Stage at Diagnosis of Colorectal Cancer Patients at Stony Brook University Hospital

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Abstract

Introduction: Colorectal cancer (CRC) is the second leading cause of cancer death in the U.S. Stage at diagnosis is one of the most important factors that determine a patient's survival in CRC. Previous literature has demonstrated that African American patients are more likely to present at a later stage of CRC when compared to White patients. A higher likelihood of late stage CRC has also been reported in areas with socioeconomic disadvantage compared to affluent areas. The purpose of this investigation was to determine if racial differences and/or community affluence were associated with a later stage of CRC among patients diagnosed at Stony Brook University Hospital.

Methods: This retrospective study included 963 patients diagnosed with CRC from January 2010 through December 2020, with data from the Stony Brook Cancer Registry. Distressed Communities Index (DCI), a proxy for socioeconomic status based on geographic location and data from the U.S. Census, was paired with patient zip codes to investigate the impact of affluence on stage at diagnosis. Chi-squared tests, Independent Samples t-Tests, and One-way ANOVA were used for univariate analyses. Multiple linear regression was used to evaluate which variables were predictive of stage at diagnosis.

Results: Patients who identified as Black or Other race were more likely to have Medicaid or be uninsured ($p < .001$), and to live in a more distressed community ($p < .001$) when compared to White patients, however distribution of stage at diagnosis did not significantly differ between racial groups. 14% of patients were diagnosed before 50 years old. Age over 65 years ($p = .044$) and Medicaid insurance coverage ($p = .032$) were found to be significant predictors of later stage at diagnosis, while $DCI \geq 20$ was found to be a marginally significant ($p = 0.069$) factor in the model.

Conclusions: In our study, race was not associated with stage at diagnosis of CRC, while those with Medicaid insurance and those living in less prosperous communities tended to have a higher likelihood of a late stage diagnosis. These findings suggest that social determinants of health rather than race may have a larger impact on stage of CRC diagnosis.

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21. Title: Telemedicine in orthopaedics: An evaluation of patient experiences

Authors: Christina Melian, MS¹, Christopher Frampton, BSc (Hons), PhD², Michael Charles Wyatt, FRACS², David Kieser, MBChB, PhD, FRACS, FNZOA², Diana Patterson, MD¹

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Abstract

Introduction: The use of telemedicine in orthopaedic surgery has gained great interest, especially during the COVID-19 pandemic. By allowing remote communication, patients and physicians are able to maintain relationships in a convenient and timely manner. The purpose of this study was to evaluate patient preference for and satisfaction with telemedicine visits (i.e., teleconsultations) when compared to traditional in-person visits.

Methods: This was a prospective observational cohort study of 853 patients receiving orthopaedic care at a private outpatient clinic in Christchurch, New Zealand. Patients were randomly divided into two groups: (1) patients receiving telephone consultation remotely; and (2) patients receiving in-person office consultations at the outpatient clinic. All patients received telephone consultations for four weeks during the mandated COVID-19 lockdown, followed by four weeks of telephone or in-person consultation. Patient preference, satisfaction, and duration of visit were recorded. Comparisons of patient preference between groups, visit type, sex, and location were performed using Chi-square tests; similarly, satisfaction scores and visit durations were compared using a general linear model.

Results: We report that 91% of patients in the telephone group preferred teleconsultation over in-person office visits during the COVID-19 lockdown ($P<.001$). A combined-group analysis shows that 55.3% of all patients preferred teleconsultation compared to 31.2% who preferred in-person office visits ($P<.001$). Patients in the telephone group reported significantly higher satisfaction scores (9.95 +/- 0.04, 95% CI [9.87-10.03]) compared to patients in the in-person group (9.53 +/- 0.04, 95% CI [9.45-9.62]; $P<.001$). Additionally, in-person consultations were significantly longer in duration compared to telephone consultations, with a mean visit time of 6.70 min +/-0.18, 95% CI [6.32-7.02] compared to 5.10 min +/-0.17, 95% CI [4.73-5.42], respectively ($P<.001$).

Conclusions: In the setting of COVID-19, patients who utilized telemedicine were more likely to prefer it over traditional, in-person visits. This increased preference, coupled with higher patient satisfaction scores and shorter duration of visits, suggests a potential role for telemedicine in orthopaedic surgery, which may even extend beyond the COVID-19 pandemic.

Funding source: No funding sources to declare

Financial disclosures: No financial disclosures to declare.

22. Title: Impact of Mental Illness Diagnoses on Transcatheter Aortic Valve Replacement Risk-Adjusted Outcomes

Authors: Natalie K. Kolba, BA^a, Jennifer M. Morrone^a, BS, Julia Dokko^a, Samantha Novotny^a, Jie Yang, PhD^b, Vineet Tummala^a, Sohaib Agha^c, Ashutosh Yaligar^c, Puja B. Parikh, MD, MPH^d, Aurora D. Pryor, MD^c, Henry J. Tannous, MD^c, A. Laurie Shroyer, PhD^{c*}, and Thomas V. Bilfinger, MD, ScD^{c*}

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Presenting author: Jennifer Morrone, Jennifer.morrone@stonybrookmedicine.edu

Presenting author' category: Medical Student

Main body of Abstract:

Introduction:

The influence of mental illness diagnoses upon first-time transthoracic aortic valve replacement (TAVR) patients' outcomes have not been previously evaluated. The purpose of this retrospective cohort study was to examine the impact of pre-TAVR mental illness-related diagnoses upon risk-adjusted outcomes for two Food and Drug Administration (FDA) Agency's regulatory periods: 1) the early FDA approval of "high risk"-only TAVR patients (January 2012-December 2015); and 2) the later FDA approval including "intermediate risk" TAVR patients (January 2016-December 2018).

Methods:

The New York Statewide Planning and Research Cooperative System (SPARCS) database was used to create multivariable logistic models; the calculated risk-adjusted post-TAVR outcomes were compared between patients with versus without a preoperative mental illness diagnosis. Mental illness diagnoses included depression-related disorders, post-traumatic stress-related disorders, generalized anxiety-related disorders, alcohol-induced mental disorders, obsessive-compulsive disorder, bipolar disorder, schizophrenia, mild cognitive impairment, and dementia. Study outcomes included postoperative atrial fibrillation (POAF), a mortality and morbidity composite (MM), and 30-day readmission (READMIT).

Results:

Pre-2016, 7.48% (n = 325/4,346) TAVR patients had a mental illness diagnosis versus 15.59% (n = 1,485/9,524) post-2016. For both early and latter periods, no mental illness impact was identified for risk-adjusted POAF, 30-day readmission, or MM composite endpoints.

Conclusions:

Across both regulatory periods, no mental illness impact was identified for risk adjusted short-term TAVR clinical outcomes or resource utilization. Given this population's small size, the generalizability of these findings is unknown; thus, national and regional database analyses appear warranted to reconfirm these New York-based findings.

Funding: This project was supported in part by Division of Cardiothoracic surgery General T.F. Cheng endowment led by Dr. Henry J. Tannous and the Stony Brook Renaissance University School of Medicine Cancer Center.

Disclosures: None

23. Title: Predictive Value of Esophageal Findings on Emergency Department Coronary Computed Tomography

Angiography for Esophageal Pathology

Authors: Samantha Novotny, BS¹, George-Abraam Tawfik, BS¹, Akshitha Adhiyman, BS¹, Joseph Pizzuti, BS¹, Kunal Shah, BS¹, Henry Thode, PhD², Edward Sun, MD³, Brian McMahon, MD²

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Presenting Author Category: Medical Student

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Conflicts of Interest: The authors declare no conflicts of interest related to the subject of this research and the publication of this manuscript.

IRB Approval: IRB2022-00013 was approved on 2/25/2022 by the Stony Brook Office of Research Compliance.

Abstract:

Introduction: Coronary computed tomography angiography (CCTA) is routinely performed to evaluate chest pain in the emergency department. Incidental esophageal CCTA findings are common, but their significance is unknown. This study evaluated the predictive value of esophageal findings on CCTA.

Methods: A chart review was conducted for patients undergoing CCTA in 2020 at a university hospital emergency department. Patients with CCTA esophageal abnormalities were reviewed for gastroenterology follow-up and endoscopy within the subsequent 1-year period.

Results: Of 786 CCTAs, 123 (16%) had esophageal findings, including dilation (75/123, 61%) and wall thickening (59/123, 48%). While 35/123 (28%) radiology reports recommended endoscopy, 26/123 (21%) of patients received gastroenterology follow-up and 15/123 (12%) underwent endoscopy. Gastroenterology consultation reported 11 diagnoses of gastroesophageal reflux disease and 5 diagnoses of hiatal hernia, while 14 patients who saw a gastroenterologist were not diagnosed at time of evaluation. On endoscopy, there were 4 cases with esophagitis, 4 with hiatal hernia, 1 with a gastroesophageal junction polyp, 1 with a distal esophageal ulcer, and 1 with possible achalasia. Of 6 patients who had biopsies, 3 demonstrated esophagitis. No patients were diagnosed with malignancy.

Conclusion: Patients with abnormal esophageal findings on CCTA underwent endoscopy at higher rates than the general population but had low diagnostic yield. Gastroenterology follow-up should be reserved for patients with severe symptoms or risk factors that raise suspicion for esophageal malignancy. For patients without severe symptoms or risk factors, trialing a proton pump inhibitor and primary care follow-up may be sufficient.

24. Title: Social Prescribing: Recommending Community Engagement to Patients in Order to Enhance Treatments and Outcomes in Medical Care

Authors: Nidhi Patel¹ and Stephen G. Post² PhD

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Presenting author: Nidhi Patel (email: nidhi.patel12@stonybrookmedicine.edu)

Presenting author' Category: Medical Student

Abstract

Introduction: In the last decade in the UK, there is a new well-funded movement within the NHS called “social prescribing.” Patients are encouraged with the assistance of “link workers” in primary care clinics to involve themselves in social interventions including helping behaviors, community, and group activities (involving art, nature, movement, conversation, support) to improve their social situation and wellbeing. Currently, there are efforts to launch such programs in Canada and Australia. We investigated the physical and mental health benefits of established social prescribing programs to encourage their implementation in clinical settings across US.

Question: How does social prescribing benefit socially isolated populations using pro-social behaviors and how can we implement it?

Methods: Literature was collected from four databases using key terms, screened using inclusion and exclusion criteria, and reviewed, yielding 54 articles. Data extraction and analysis was done using Rayyan software and Excel.

Results: Four components of social prescribing for the socially isolated were commonly discussed in the articles reviewed: a) patient experience, b) patient’s health and wellbeing outcomes, c) physician experience and d) healthcare usage outcomes. Quantitatively, one study reported 38.1% decrease in lack-of-companionship, 61.9% less social isolation, 71.4% decreased UCLA Loneliness Scale ratings. Two more studies portrayed 70% less loneliness after receiving social support, and a 26% increase in Wellbeing scores. Economically, social prescribing pays for itself: articles showed a 70% reduction in paramedic service calls and 24% reduction in primary care appointments which were based on loneliness or social factors, reducing physician workload and stress. Virtually all articles showed increased participant self-esteem and mental wellbeing, reduced loneliness, and lower health service usage after engagement in group activities. Physical outcomes included reduced weight, BMI, cholesterol, blood pressure, anxiety, and depression. Economically and practically, social prescribing decreased high physician burnout and stress by reducing workload while meeting patients’ needs.

Conclusions/clinical relevance: Social prescribing programs provide significant improvement in the mental and physical health, and thus lives, of individuals who would otherwise be suffering without companionship or meaning. Participants are empowered to take their health into their own hands. On a practical standpoint, England and US healthcare systems are limited by lack of staff, resources, time, and capacity and formal training to effectively engage with community groups for patients with mental health problems. This contributes to increased physician stress and burnout. Thus, social prescribing link workers may bridge the gap between doctors and the community, increase morale and physician retention.

Funding source(s): None

Disclosures: No human subjects are included in this study, and there are no financial disclosures to be noted.

25. Title: Assessing Attitudes Towards Telehealth in an Underserved, Uninsured Patient Population

Authors: Ashna Raiker, B.S.*¹, Meenu Johnkutty, B.S.*¹, Dr. Jedan Phillips, M.D.², Melissa J. Earle, Ph.D., LCSW³

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Telehealth has the untapped potential to improve healthcare for underserved communities. However, the COVID-19 pandemic revealed a striking disparity in which patient demographics face barriers to using this modality. Without addressing them, telehealth will remain underutilized and healthcare inequities will persist in these communities. This pilot study was conducted at Stony Brook HOME, Renaissance School of Medicine's student-run free clinic in Suffolk County, NY. It aims to investigate barriers to telehealth in this underserved, uninsured population.

Surveys were administered bimonthly (n=56) in English (48.2%) or Spanish (51.8%). Most patients were Hispanic/Latino (58.9%), female (53.6%), and 40-60 years old (57.1%). In general, there was both a lack of telehealth awareness (28.6%) and utilization (16.1%). Most Spanish-speakers came from zip codes with high social vulnerability indices. English-speakers were more likely to have reliable internet access (1.5x), own a smartphone (1.7x), computer (3.9x) and tablet (5.9x). English-speakers were also more comfortable using smartphones or tablets than Spanish-speakers (\bar{x} =4.4 vs. 3.3, Likert scale). Both groups, however, believed that telehealth was not an appropriate equivalent to an in-person visit (\bar{x} =2.7 vs. 2.5, Likert scale).

Results demonstrate a lack of telehealth awareness, utilization and buy-in for its ability to replace in-person visits. This was compounded by barriers disproportionately felt by Spanish-speakers, including smartphone ownership, reliable internet access and technological comfort. Addressing telehealth barriers through survey-directed interventions may improve continuity of care and patient outcomes.

Funding Source: Scholarly Concentrations Program, Stony Brook Medicine

Financial disclosures: No financial disclosures to report

26. Title: Blunt Bowel and Mesenteric Injury: Accuracy of CT- Based Scoring Systems

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Presenting Author: Ila Sethi

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Introduction:

Assessing the need for surgical management of bowel and mesenteric injury (BBMI) following blunt trauma remains a major clinical challenge. Multiple imaging-based scoring systems, including the Faget and Bowel Injury Predictive Score (BIPS) scores, have been suggested to help identify operative BBMI. This study evaluated the efficacy of Faget and BIPS scoring systems in identifying operative BBMI and determined senior radiology resident accuracy in identifying BBMI.

Methods:

This was a retrospective study conducted at an ACS Level I trauma center between 1/2009 and 08/2019. Adult BBMI patients with available index CT imaging at home institution within 24 hours of injury were included. For each patient, a Faget score and BIPS score was calculated. The Faget score predicts need for surgery based on a weighted CT-scoring system (Score \geq 5=surgical BBMI). BIPS scoring includes 1 point each for ED abdominal tenderness, WBC count \geq 17, and grade \geq 4 mesenteric injury on CT (mesenteric contusion or hematoma with bowel wall thickening or adjacent interloop fluid collection OR active vascular/ oral contrast extravasation OR bowel transection OR pneumoperitoneum; Score \geq 2=surgical BBMI). CT scores were derived per index CT report. Independently, senior resident radiologist reviewed blinded CT images (1BBMI:2 matched controls) and a radiology attending audited image scoring.

Results:

14,897 blunt trauma patients were identified. 91 had BBMI and 59 met inclusion criteria. Faget scores were successful in predicting 17/45 patients who required surgery and 12/14 patients who did not require surgery, for a sensitivity of 37.8% and specificity of 85.7%. PPV of the Faget score was 89.5% and NPV was 30%. The BIPS score was successful in predicting 21/45 patients who required surgery and 10/14 of patients with non-operative BBMI, for a sensitivity of 46.7% and specificity of 71.4%. PPV of the BIPS scoring was 84% and NPV was 29.41%. The senior resident radiologist was able to correctly identify 75% of patients with BBMI.

Conclusion:

Existing scoring systems are inadequate for predicting operative necessity in BBMI patients. The detail oriented Faget scoring was more accurate, suggesting that although more complex, the granularity in scoring criteria may be beneficial. Overall accuracy may be improved by requesting radiology reads specific to scoring systems, similar to AAST organ injury scoring. Finally, resident reads have moderate accuracy in identifying BBMI, indicating continued need for collaborative work with attending physicians. Further research is needed to characterize imaging predictive of operative BBMI.

Funding sources: no funding sources

Financial disclosures: nothing to disclose

27. Title: Abnormal Preoperative Leukocyte Counts and Postoperative Complications Following Total Shoulder Arthroplasty

Authors: Emma Smolev BA, Kenny Ling BS, Matthew Kim BA, Edward D. Wang MD

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Presenting author: Emma Smolev, emma.smolev@stonybrookmedicine.edu, Medical Student

Introduction: Total shoulder arthroplasty (TSA) has become the mainstay of treatment for degenerative glenohumeral arthritis, proximal humerus fracture, and rotator cuff arthropathy. Expanding indications for reverse TSA have increased overall demand for TSA. With increasing demand, this necessitates higher quality preoperative testing and risk stratification. Further, the association between abnormal preoperative white blood cell counts and postoperative complications has not been extensively studied. The purpose of this study was to investigate the association between abnormal preoperative leukocyte counts and 30-day postoperative complications following TSA.

Methods: The American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database was queried for all patients who underwent TSA between 2015-2020. Patient demographics, comorbidities, surgical characteristics, and 30-day postoperative complication data were collected. Multivariate logistic regression was used to identify postoperative complications associated with preoperative leukopenia and leukocytosis. The level of statistical significance was set at $p < 0.05$. Odds ratios were reported with 95% confidence interval. All statistical analyses were conducted using SPSS Software version 26.0.

Results: 23,341 patients were included in this study, with 1,307 (5.6%) in the leukopenia cohort and 1,243 (5.3%) in the leukocytosis cohort. Preoperative leukopenia was associated with higher rates of bleeding transfusions ($p=0.011$), deep vein thrombosis ($p=0.037$), and non-home discharge ($p=0.041$). After controlling for patient variables, preoperative leukopenia was independently associated with higher rates of bleeding transfusions (OR:1.55, 95% CI:1.08-2.23; $p=0.017$) and deep vein thrombosis (OR:2.26, 95% CI:1.07-4.78; $p=0.033$). Preoperative leukocytosis was associated with higher rates of pneumonia ($p<0.001$), pulmonary embolism ($p=0.004$), bleeding transfusions ($p<0.001$), sepsis ($p=0.007$), septic shock ($p<0.001$), readmission ($p<0.001$), and non-home discharge ($p<0.001$). After controlling for patient variables, preoperative leukocytosis was independently associated with higher rates of pneumonia (OR:2.20, 95% CI:1.30-3.75; $p=0.004$), pulmonary embolism (OR:2.43, 95% CI:1.17-5.04; $p=0.017$), bleeding transfusions (OR:2.00, 95% CI:1.46-2.72; $p<0.001$), sepsis (OR:2.95, 95% CI:1.20-7.25; $p=0.018$), septic shock (OR:4.91, 95% CI:1.38-17.53; $p=0.014$), readmission (OR:1.36, 95% CI:1.03-1.79; $p=0.030$), and non-home discharge (OR:1.61, 95% CI:1.35-1.92; $p<0.001$).

Conclusion/Clinical Relevance: Within 30 days following TSA, preoperative leukopenia is independently associated with higher rates of bleeding transfusion and deep venous thrombosis, and preoperative leukocytosis is independently associated with higher rates of pneumonia, pulmonary embolism, bleeding transfusion, sepsis, septic shock, readmission, and non-home discharge. Given increasing demand for TSA, perioperative risk stratification is becoming increasingly important to optimize patient outcomes. Understanding the predictive value of abnormal preoperative lab values will aid in perioperative risk stratification and minimizing postoperative complications.

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Table 1:

Multivariate analysis of 30-day postoperative complications in patients with preoperative leukopenia and preoperative leukocytosis, adjusted for significantly associated patient demographics/comorbidities. Bold P-values indicate statistical significance with $P < 0.05$.

Complication	Leukopenia			Leukocytosis		
	OR	95% CI	P-value	OR	95% CI	P-value
Pneumonia	0.68	0.25-1.87	0.455	2.20	1.30-3.75	0.004
Pulmonary embolism	0.63	0.15-2.60	0.520	2.43	1.17-5.04	0.017
Bleeding transfusions	1.55	1.08-2.23	0.017	2.00	1.46-2.72	<0.001
Deep vein thrombosis	2.26	1.07-4.78	0.033	0.69	0.21-2.26	0.542
Sepsis	0.62	0.08-4.59	0.641	2.95	1.20-7.25	0.018
Septic shock	--	--	--	4.91	1.38-17.53	0.014
Readmission	1.02	0.72-1.44	0.922	1.36	1.03-1.79	0.030
Non-home discharge	0.88	0.70-1.11	0.268	1.61	1.35-1.92	<0.001

OR, odds ratio; CI, confidence interval

28. Title: EFFECT OF GENDER DISCORDANCE ON SURGICAL OUTCOMES IN PREDOMINANTLY FEMALE PATIENT SURGERIES IN NYS

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Introduction: Preliminary evidence demonstrates female surgeons often have improved post-operative outcomes compared to their male colleagues, especially with female patients, despite being underrepresented in surgical specialties. This study aimed to identify the effect of patient-surgeon gender discordance on surgical outcomes in three surgical specialties with high female patient populations: bariatric, foregut, and colorectal surgery. **Methods and Procedures:** This is a retrospective database study using the New York State (NYS) SPARCS database and the first study evaluating outcomes based on surgeon/patient concordance in NYS. Bariatric, foregut, and colorectal surgery cases from 2013-2017 were identified. Logistic regression models and generalized linear regression models were used to compare outcome factors among four cohorts: gender concordance/female patient (CC/FP), gender discordance/female patient (DC/FP), gender concordance/male patient (CC/MP), gender discordance/male patient (DC/MP). Gender discordance is defined as patient/surgeon with opposite genders. Gender concordance is defined as patient/surgeon with same gender. **Results:** BARIATRIC: FP and MP had significantly different 30-day readmission (p-value=0.0494) and in-hospital complications (p-value<.0001) based on gender concordance or discordance. CC/FP had significant lower risk of 30-day readmission (OR=0.78, 95%CI 0.68-0.90) but significant higher risk of developing complications (OR=1.33, 95%CI 1.24-1.43) compared with DC/FP. CC/MP had non-significant higher risk of 30-day readmission (OR=1.07, 95%CI 0.81-1.41) but significant lower risk of developing complications (OR=0.77, 95%CI 0.66-0.90) compared with DC/MP. FOREGUT: Difference between gender concordance and discordance was significant between FP and MP on LOS (p-value=0.0030), 30-day readmission (p-value=0.0081), and 30-day ED visit (p-value=0.0075). CC/FP had significant less LOS (ratio=0.94, 95%CI 0.91-0.97), lower risk of 30-day readmission (OR=0.75, 95%CI 0.60-0.94), and lower risk of 30-day ED visit (OR=0.76, 95%CI 0.65-0.88) compared to DC/FP. MP had the opposite trend in risk, although non-significant. COLORECTAL: The difference between gender concordance and discordance was non-significant within FP or MP group as to any outcomes. FP and MP had significantly different 30-day readmissions based on patient-surgeon gender concordance (OR 0.91vs1.10, p-value=0.0379). **Conclusion(s):** Overall, female bariatric patients show benefit with gender concordance with their surgeon in certain parameters, but also show benefits with male surgeons. Female foregut patients benefit from gender concordance with their surgeon. Although non-significant, male foregut patients benefit from the gender discordance (i.e, having female surgeon). Female colorectal patients show benefit from gender concordance. This emphasizes the need for surgeons to be conscious of care provided to opposite gender patients and underscores the necessity for more female representation amongst surgeons in high female patient population fields.

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29. Title: Clinical Presentation, Outcomes and Trends of Accidental Cannabis Ingestion in Young Children – A Retrospective Observational Study

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Presenting Author Category: Medical Student

Introduction: Marijuana is the most used federally illicit drug in the United States (1). As of April 2022, medical marijuana is legal in 37 states and recreational use in 18 states. Following legalization, edible cannabis products have been mass produced in packaging attractive to children, and some studies have shown increasing frequency and severity of cannabis ingestions (2). In New York, cannabis was legalized in 2016 for medicinal use and 2021 for recreational use. This study aims to trend local accidental pediatric cannabis ingestions before and after legalization.

Methods: A retrospective observational electronic medical record review was conducted at a tertiary-level pediatric emergency department in New York. TriNetX database was used to identify a cohort of children <11 years old with cannabis ingestions between 1/2010 and 5/31/2022. 106 patients were identified in the search, of which 78 patients were excluded for prescribed cannabis use, incorrect age at admission, ingestion of other substance or no mention of ingestion in the chart. 28 patients were included in the cohort and results were analyzed using SPSS.

Results: 67.9% of cases occurred in 2021 and 2022, after legalization. 95.6% of cases that reported type of edible were kid-friendly products (Figure 1). 67.9% of ingestions occurred in households with parental/grandparental consumption. Ingestions presented with a range of symptoms, most commonly drowsiness/lethargy (Table 1). No cases were identified by TriNetX prior to legalization for medical use in 2016. The incidence of ingestions significantly increased after recreational use was legalized in NY state (Figure 2). Unnecessary medical interventions included antibiotics (10.7%), CT Head (21.4%) and LP (3.6%).

Conclusions: There has been an increase in frequency of ingestions since legalization of cannabis in New York. All children treated for ingestions at our institution had unfortunate access to kid-friendly edible products. Young children tend to have severe ingestions and more associated unnecessary medical interventions. The frequency of cases increased after New York’s decriminalization thus this remains a significant public health concern.

Figure 1: Type of Edibles Ingested

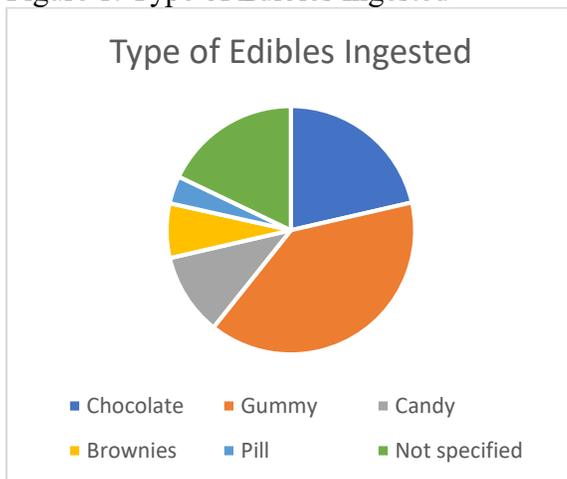
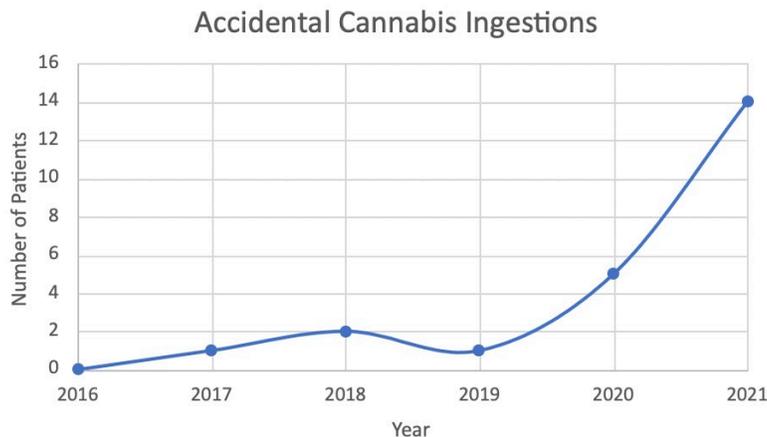


Table 1: Associated Symptoms of Patients with Cannabis Intoxication

	# (n=28)	%
Hyperglycemia	7	25
Hypotonia	3	10.7
Unresponsive/GCS<8	7	25
Agitation	2	7.1
Ataxia	2	7.1
Convulsions	1	3.6
Drowsiness/Lethargy	22	78.6
HTN (>95% for age) *	5	17.9
Tachycardia *	8	28.6
Hypotension	1	3.6
Mydriasis	8	28.6
Conjunctival Hyperemia	4	14.3
Hypoventilation *	3	10.7

*Harriet Lane Normal Values by Age 2022

Figure 2: Accidental Cannabis Ingestions per Year



*Five cases from 1/2022 – 5/31/2022 were not included as this was not a complete year of data

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30. Title: Body Mass Index as a Predictor for Postoperative Complications Following Carpometacarpal Arthroplasty

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ABSTRACT

Introduction: Carpometacarpal (CMC) arthroplasty is an effective surgical treatment to relieve pain and improve function for osteoarthritis of the CMC joint. The association between BMI and postoperative complications has been studied for other orthopedic procedures, including total knee arthroplasty, total hip arthroplasty, and total shoulder arthroplasty. However, BMI has not been studied as a risk factor for postoperative complications following CMC arthroplasty. The purpose of this study was to determine the postoperative complications associated with different categories of BMI following CMC arthroplasty. We hypothesized that increasing BMI is associated with more severe complications.

Methods: The American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database was queried for all patients who underwent carpometacarpal (CMC) arthroplasty between 2015 and 2020. Patient demographics, comorbidities, surgical characteristics, and 30-day postoperative complication data were collected. Patients were stratified into cohorts based on BMI: underweight (BMI < 18.5), normal/reference (18.5 ≤ BMI < 30.0), obese (30.0 ≤ BMI < 35.0), severely obese (35.0 ≤ BMI < 40.0), morbidly obese (BMI ≥ 40.0). Multivariate logistic regression was used to identify postoperative complications associated with each cohort.

Results: 6,432 patients were included in this study: 3,622 (56.3%) patients were included in the normal/reference cohort, 77 (1.2%) patients were included in the underweight cohort, 1,479 (23.0%) patients were included in the obese cohort, 718 (11.2%) patients were included in the severely obese cohort, and 536 (8.3%) patients were included in the morbidly obese cohort. The obese cohort was independently associated with a higher rate of superficial incisional SSI (OR 2.11, 95% CI 1.00-4.44; p = 0.050). The morbidly obese cohort was independently associated with readmission (OR 3.35, 95% CI 1.15-9.74; p = 0.026) and reoperation (OR 3.40, 95% CI 1.04-1.11; p = 0.043).

Conclusion: Morbid obesity is a clinically significant predictor for readmission and reoperation within 30 days following CMC arthroplasty. Obesity is a clinically significant predictor for superficial incisional SSI within 30 days following CMC arthroplasty. A better understanding of BMI as a risk factor for postoperative complications may allow surgeons to improve preoperative risk stratification and patient counseling.

Level of Evidence: Level III; Retrospective Cohort Comparison; Prognosis Study

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31. Title: Same- and Next-day Discharge Following Shoulder Arthroplasty are Associated with Decreased Risk of Postoperative Complications

Authors: Katherine Wang BA¹, Matthew Kim BA¹, Kenny Ling BS¹, Ryan Tantone MD², Samer Al-Humadi MD², David E. Komatsu PhD², Edward D. Wang MD²

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Presenting author's category: Medical Student

INTRODUCTION: Total shoulder arthroplasty (TSA) is an increasingly popular treatment for degenerative conditions of the shoulder. Improvements in surgical technique and perioperative management have allowed for shorter postoperative hospital stays, which increase patient satisfaction and decrease health care costs. While the average postoperative in-hospital LOS following TSA is 2 days, outpatient TSA with same-day discharge (LOS of 0) is gaining popularity. Given limited samples in previous studies, this study sought to investigate the association between in-hospital length of stay (LOS) and postoperative complications for patients undergoing TSA.

METHODS: All patients receiving anatomic or reverse TSA between 2015 and 2019 were queried from the American College of Surgeons National Surgical Quality Improvement (NSQIP) database. Patients were stratified based on LOS: LOS 0 (same-day discharge), LOS 1 (next-day discharge), LOS 2-3 (traditional LOS, 2-3 days). Patients with LOS of 4+ days were excluded, as those patients have established higher complication rates. Demographic and 30-day postoperative complication data were collected. Multivariate logistic regression analysis investigated the association between postoperative LOS and postoperative complications.

RESULTS: 21,315 patients were included in the study. 1639 (7.7%) had a LOS of 0, 12,930 (60.7%) LOS of 1, and 6,746 (31.6%) LOS of 2-3. Compared to the LOS 0 cohort, LOS 2-3 had a greater likelihood of developing overall complications (OR, 2.598; P= <0.001), major complication (OR, 1.885; P= <0.001), minor complication (OR, 3.939; P= <0.001), respiratory complication (OR, 12.979; P= 0.011), postoperative anemia requiring transfusion (OR, 23.338; P= <0.001), nonhome discharge (OR, 10.430; P= <0.001), and hospital readmission (OR, 1.700; P= 0.012). In comparison to the LOS 1 cohort, LOS 2-3 had a greater likelihood of developing overall complications (OR, 2.111; P= <0.001), major complication (OR, 1.423; P= <0.001), minor complication (OR, 3.626; P= <0.001), respiratory complication (OR, 2.057; P= <0.001), postoperative anemia requiring transfusion (OR, 10.792; P= <0.001), nonhome discharge (OR, 10.179; P= <0.001), hospital readmission (OR, 1.395; P= <0.001), and operating room return (OR, 1.394; P= 0.014). There was no significant difference in postoperative complication risk between LOS 0 and LOS 1.

DISCUSSION: Patients with same- and next-day discharge following TSA had lower complication risk compared to those with traditional LOS (2-3 days). With surgical improvements and careful patient selection, shorter lengths of stay are becoming more feasible. Investigation into postoperative complications and LOS may allow surgeons to determine if health care costs related to discharge can be decreased without compromising patient outcomes.

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32. Title: Calciphylaxis recurrence at a single institution over a twelve-year timespan

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Abstract:

Introduction

Calciphylaxis (CPX) is a thrombotic vasculopathy with high morbidity and mortality whose potential to recur is unknown.¹⁻⁶

Methods

Cases diagnosed at a single institution between 2006 and 2018 were screened for recurrence, defined as new CPX lesions diagnosed by a provider following complete resolution of prior. Differences between demographics, comorbidities, exposures, and laboratory values between recurrent (R) and non-recurrent (NR) cases, and episode 1 (E1) and episode 2 (E2) of CPX in R patients were characterized with appropriate univariate testing including t-tests, two sample Wilcoxon tests, chi-square tests, and Fisher's exact tests. Multivariate logistic regression with backward elimination was conducted for R/NR cases. 4 cases with incomplete data were excluded.

Results

22/161 (13.7%) of patients experienced recurrence; only one case was non-nephrogenic and was excluded due to incomplete data.

R patients were younger (mean yrs 55.6 vs 62.3, $p=0.05$), had higher median PTH (pg/ml 240 vs 135, $p=0.05$), and longer median interval to new lesion formation (days: 268 vs 40, $p=0.03$). R patients more frequently had hypercoagulable conditions (27.8% vs 9.8%, $p=0.04$) and NC disease (100% vs 80%, $p=0.04$). R cases survived longer after initial diagnosis (mean months diagnosis to death: 57.9 vs 14.9, $p<0.01$; mean months diagnosis to present: 112.5 vs 76.0, $p=0.03$). No differences were seen in preceding procalcifying exposures. On multivariate analysis, hospitalization for CPX was a predictor of recurrence (OR 4.4, 95% CI [1.6, 12.2], $p<0.01$).

Across E1/E2, mean time to diagnosis was lower at E2 (days: 128 vs 38.7, $p=0.03$). 27.8% had local recurrence of E1 lesions. 2.04 mean years passed from E1 to E2 with 22.2% mortality after E2, compared to historic 1-year CPX mortality of 44.1%. Preceding warfarin exposure was decreased at E2 (55.6% vs 22.2%, $p=0.04$).

Conclusions

CPX recurrence is uncommon and seen almost exclusively in NC cases. Possible risk factors include hypercoagulability, younger age and higher PTH. R cases were more likely to require hospitalization in E1 and were diagnosed sooner at E2. R cases carry lower mortality compared to historic rates. This data may help counsel patients on long-term prognosis and identify those most at risk.

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33. Title: Factors which predict the need for multiple courses of isotretinoin

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Abstract:

Introduction:

Rates of acne relapse following isotretinoin have been reported ranging from 14-52%,¹ with need for retreatment at 7-20%.² Known risks for relapse include low cumulative dose, male sex, young age, acne severity, and insufficient treatment duration.³ We investigate patient factors correlated with repeat courses of isotretinoin.

Methods

Retrospective chart review was conducted for patients treated with isotretinoin at a single institution between 1/1/2019-8/8/2021. Demographics, medical history, clinical presentation, and acne treatment were recorded. Patients requiring multiple courses (R) were identified and compared to non-repeaters (NR). Appropriate univariate testing including t-tests, two sample Wilcoxon tests, chi-square tests, and Fisher's exact tests, as well as multivariate logistic regression with backward elimination were conducted.

Results

Of 397 patients who received isotretinoin, 75 (18.9%) were identified as R patients and data from their first courses were considered. Family history of isotretinoin use (OR 2.987 [95% CI 1.505, 5.929], p<0.01) and prior use of oral antibiotics (OR 2.837 [95% CI 1.263, 6.372], p=0.01) were identified as positive predictors of a repeat course, while prior use of spironolactone (OR 0.245 [95% CI 0.073, 0.827], p=0.02) was identified as a negative predictor. R patients were more likely to be younger at initiation (years: 20.05±7.62 R vs 22.40±8.85 NR, p=0.02), male (53.33% R vs 40.88% NR, p=0.05), and to have family history of acne (36% R vs 21.74% NR, p=0.01). No differences were seen for duration of treatment, or goal dose range used.

Conclusion

Clinicians should consider family history of isotretinoin use and prior treatment with oral antibiotics as negative indicators when counseling patients on likelihood of isotretinoin success. Future studies may investigate underlying genetic variation influencing acne severity and resistance to treatment, and the efficacy of alternate dosing protocols in this population. Decreases in androgens as a result of isotretinoin use may preferentially impact efficacy of therapy for hormonal acne patients on spironolactone.

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34. Title: Inpatient cellulitis: Predictors of osteomyelitis on magnetic resonance imaging

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Abstract:

Introduction

Osteomyelitis (Os) may be seen in up to 43.9% of complicated cellulitis cases.¹ Bone biopsy is the diagnostic gold standard, but alternative modalities used in practice include x-ray for initial evaluation given high specificity but low sensitivity, particularly in the acute phase,² and MRI for both high sensitivity and specificity.² Inappropriate imaging has been associated with excess costs and adverse outcomes.³ We investigate factors predicting MRI diagnosis of Os in patients hospitalized for cellulitis.

Methods

Retrospective record review of adult cellulitis inpatients between 2013-2018 who received MRI as part of evaluation was conducted. Demographics, risk factors, clinical presentation, diagnosis, laboratory, and imaging data were recorded. Those with Os diagnosed on MRI were compared to those without. 6 cases with multiple MRIs were excluded. Appropriate univariate testing including t-tests, two sample Wilcoxon tests, chi-square tests, and Fisher's exact tests, as well as multivariate logistic regression with backward elimination were conducted.

Results

Of 788 cellulitis patients, 97 had a single MRI performed, with 28 of those diagnostic of Os. Older age was a positive predictor for Os (OR 1.05 [95% CI 1.01, 1.09], p=0.009), with cellulitis overlying a chronic wound approaching significance as a positive predictor (OR 3.12 [95% CI 0.99, 9.88], p=0.053). Patients with Os were more likely to have diabetes (67.9% vs 33.3%, p=0.002) and higher glucose and ESR at presentation (glucose, mg/dl: 218.9±129.3 vs 154.5±132.4, p=0.011) (ESR, mm/h: 63.8±40.9 vs 46.2±39.6, p=0.037), though these were insignificant on multivariate analysis. Assessing 66 subjects with prior x-ray yielded sensitivity, specificity, positive, and negative predictive values of 40.0%, 93.0%, 79.9%, and 72.7%, respectively, relative to MRI.

Conclusion

28.9% of MRIs evaluating for Os resulted in a positive finding, underscoring the need for improved identification of high-risk patients for imaging. Consideration of immediate MRI in patients with certain risk factors, such as increased age and cellulitis over a chronic wound, may be warranted.

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MGH IRB: 2018P000098, 1/30/2018

Financial disclosures: None



POSTDOCTORAL ASSOCIATES



1. Title: Metabolic biomarker Discovery to Predict Upstaging in Patients Diagnosed with Ductal Carcinoma in Situ of the Breast

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Presenting author' Category: Post-doctoral Associate

Abstract

Introduction

Ductal carcinomas in situ (DCIS) of the breast are a heterogeneous group of neoplastic lesions confined to the lumens of breast ducts. It is a nonobligate precursor of invasive cancer, and its detection, diagnosis, and management are controversial. Reducing the overtreatment associated with (DCIS) requires biomarkers that can accurately predict the risk of progression to invasive disease. Although the genetic and epigenetic alterations associated with breast carcinogenesis are well investigated, the impact of the microenvironmental conditions on phenotypic plasticity and patterns of genetic variation is still less appreciated.

In this work, we investigated the potential of three metabolic markers as a predictive biomarker for upstaging of DCIS. carbonic anhydrase IX (CAIX), as a marker for hypoxia, glucose transporter 1 (GLUT1) as a marker for nutrient deprivation, and lysosome-associated membrane protein-2 (LAMP2b) deprivation as a marker for acid adaptation.

Methods

We conducted a retrospective analysis on 84 patients with DCIS. Of those 17 patients were upstaged to invasive cancer and 67 patients were indolent. For every patient, sequential cuts of the same DCIS tissue sample were used. One section for every patient was stained via Hematoxylin and Eosin stain. In addition, Immunohistochemistry was used to assess CAIX, GLUT1 and LAMP2b expression. All slides were scanned and analyzed using the QuPath digital image analysis. In all scanned images, all representative ducts showing DCIS were annotated manually and divided into oxidative layer, the outer layer which measures about 100-125 um in thickness, and the remaining tissue in the center of the duct: hypoxic layer. The morphological features of all cells in the annotated H&E sections were extracted from Qupath and investigated with statistical analysis using GraphPad Prism 9. were scored quantitatively and semi- quantitatively. Then, the correlation between the expression of CAIX, GLUT1 and LAMP2 markers and the risk of DCIS upstaging was investigated.

Results

The spatial analysis of CAIX, GLUT1 and LAMP2 produced more significant results. The expression of these metabolic markers showed significant increase in oxidative layers of upstaged DCIS.

Conclusions/clinical relevance

CAIX, GLUT1 and LAMP2 may be useful biomarkers that could predict the upgrade of ductal carcinoma in situ (DCIS). This may aid in risk stratification for the management of patients with DCIS.

Funding source(s): This work is partly supported by NCT grants: R01CA249016-01 and U01CA261841-01

Financial disclosures: The authors have no conflicts of interest to declare.

2. Title: Sonic Hedgehog and WNT signaling regulate a positive feedback loop between intestinal epithelial and stromal cells to promote epithelial regeneration

Title: Emilia J. Orzechowska-Licari*, Agnieszka B. Bialkowska, Vincent W. Yang

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INTRODUCTION:

Upon injury, reserve intestinal stem cells (rISCs) marked among others by B-cell-specific Moloney murine leukemia virus integration site 1 (BMI1) exit from the quiescent state and regenerate the epithelium. We previously showed that RNA-binding protein MUSASHI1 (MSI1) is important for proliferative activity of *Bmi1-CreER* rISCs (BMI1⁺) cells but the mechanism of *Msi1* expression induction remains unclear. Therefore, the aim of this project is to elucidate the mechanism regulating the induction of *Msi1* expression in BMI1⁺ following γ radiation-induced injury.

METHODS:

Bmi1CreER; *Rosa26eYFP* mice were treated with tamoxifen to initiate lineage tracing of BMI1⁺ cells and subsequently exposed to 12 Gy of total body γ irradiation (TBI) or 0 Gy TBI (sham-treated). Proximal small intestines were collected for analysis.

RESULTS:

QRT-PCR analysis of BMI1⁺ cells showed that increased expression of *Msi1* was accompanied by increased expression of *Axin2*, a WNT signaling activity marker. We performed luciferase assay using *Msi1* promoter and overexpression of *Tcf4/Cttnb1*, as well as ChIP-PCR analysis, and showed that *Msi1* is a WNT target gene. In order to find a source of WNT ligands, we performed immunofluorescence staining of Porcupine, an enzyme critical for WNT ligands' secretion. Upon injury, we observed a significant increase of Porcupine expression in stromal cells. Therefore, we performed an organoids regeneration assay and we showed that co-culture of BMI1⁺-derived organoids with stromal cells isolated from irradiated mice stimulated organoids' regeneration more efficiently as compared to stromal cells isolated from sham-treated mice. We further confirmed that upon injury stromal cells increased the expression of WNT ligands: *Wnt2b*, *Wnt4*, *Wnt5a*, and *Rspo3*.

To explain how stromal cells are activated upon injury, we investigated signaling pathway that is known to orchestrate an interaction between stromal and epithelial cells, Sonic Hedgehog (SHH). We found that SHH expression in epithelial cells is induced upon injury, and its effector, N-terminal SHH is found in stromal cells. Additionally, we observed increased expression of the SHH effector, *Gli1* in the subpopulation of stromal cells.

Finally, we inhibited SHH pathway prior to injury and confirmed that block of SHH signaling prevents stromal cells' activation, *Msi1* expression in BMI1⁺ cells and overall intestinal epithelium regeneration.

CONCLUSION:

A positive feedback loop between intestinal epithelial and stromal cells promotes regeneration upon radiation-induced injury through SHH and WNT signaling.

FOUNDING & FINANCIAL DISCLOSURES:

This work is supported by grants from the National Institutes of Health awarded to V.W.Y. (DK052230 and CA084197) and Pilot Project Grant 2021 awarded to A.B.B. The authors declare no financial disclosures.

3. Title: The Impact of the Covid-19 Infection on Cognitive Function of WTC First Responders

Authors: Zennur Sekendiz¹, Sean Clouston², Ashley Fontana¹, Melissa Carr¹, Nikhil Mehta¹, Alina Ali¹, Benjamin Luft¹

¹Department of Medicine-World Trade Center Health Program,

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Introduction

There is growing evidence that COVID-19 infection is related to abnormalities in executive function and visuospatial processing at both acute and post-acute stages of the infection, but it remains unclear whether these changes emerge coincident with COVID or reflect differences in pre-COVID functioning and might therefore indicate increased vulnerability to more severe COVID. In this study, we examined longitudinal data to determine whether there decline in cognition 1) coincided with COVID-19 infection, and 2) were more severe among individuals with more severe acute or post-acute COVID-19 in a study of essential workers whose age placed them at reduced risk for severe COVID.

Methods

This study included participants (N=323) who participated in a longitudinal occupation-based study of cognitive aging at midlife that predated and continued after the COVID-19 pandemic. Diagnoses of acute COVID-19 were collected and validated with records of a positive SARS-CoV-2 polymerase chain reaction test, had a positive antigen test, or IgG-positive antibody testing and either self-reported symptoms or were deemed asymptomatic. Standard criteria were used to define post-acute COVID, to determine post-acute COVID symptoms, and to assess probable COVID-19 variant. Cognition was measured using the ultra-sensitive Cogstate Brief Battery across six domain-specific measures of attention, response speed, processing speed, throughput, visual working memory, intra-individual variability. Generalized linear longitudinal mixed models were used to examine cognitive decline and change following acute COVID-19 infection. Secondarily, we moderated trajectories by the presence of post-acute-COVID and by probable COVID-19 variant.

Results

The mean age of participants was 55.2 (\pm 6.9) years, 36.3% had evidence of at least mild post-acute-COVID, and most (78.0%) had some college. Longitudinal models identified a decline in response speed (standardized regression coefficient: β =-0.211, p <0.001), processing speed (β =-0.187, p <0.001), and throughput (β =-0.175, p <0.001) following COVID-19 infection after adjusting for pre-COVID functioning, demographics, and medical factors. Effect sizes were large, with changes in response speed consistent with a loss in cognitive performance consistent with 15.3 years of normal aging in this cohort. The degree of cognitive decline was worsened by COVID-19-severity and was concentrated in those reporting symptoms of post-acute-COVID-19.

Conclusion

Since participants with post-acute-COVID-19 had more evidence of cognitive decline, it may be salient to monitor people with post-acute-COVID-19 for declines in domains of processing speed and visual working memory. Insofar as acute and post-acute-COVID-19 caused cognitive decline, it may be important to determine the long-term prognosis of this decline.

Funding Statement

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Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki and approved by the Office of Research Compliance/Ethics Review Board of Stony Brook University (protocol code IRB2021-0039, 17 August 2021). All participants in this study provided signed written informed consent.

Conflict of interest Statement: The authors declare no conflict of interest

4. Title: The Impact of Obesogenic Medications on the Success of Weight Loss and the Weight Regain after the Bariatric Surgery

Authors: Zennur Sekendiz¹, Aurora Pryor² MD, Konstantinos Spaniolas³ MD, Silvana Obici³ MD

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Abstract

Background

Bariatric surgery (BS) is the most effective treatment of obesity and its comorbidities. However, some patients fail to achieve meaningful weight loss. The prescription of obesogenic medications (OM) may affect the outcomes of BS. We looked at the effect of OM on postsurgical weight loss and regain

Methods

This is a retrospective study of 756 patients aged 18 to 75 who underwent BS at the Bariatric and Metabolic Weight Loss Center in Stony Brook University between January 2015 to January 2020. The effect of the postsurgical OM on the Percentage Weight Loss(%TWL) in two years was analyzed using linear mixed modeling and the percentage of weight regain (%WR) was evaluated using logistic regression. OM included beta-blockers, anti-hyperglycemic agents, anti-histamines, antidepressants, neuroleptics, anticonvulsants, steroids and some contraceptives.

Results

443(58.60%) of 756 in the first year and 236 (59.9%) of 394 participants in the second year after BS were exposed to OM. The medication group lost significantly less weight than control (Beta coefficient = -0.6526 p=0.0363, n=756) and %WR was also significantly higher among the OM (odds ratio 2.631; 95% CI 1.313-5.272; p=0.0064) after adjusting for covariates (age, race, gender, surgery type, comorbidities and use of weight loss medications). While older age, depression, diabetes, female gender and sleeve gastrectomy had a negative impact on weight loss, younger age, sleeve gastrectomy and nonalcoholic fatty liver disease were significant predictors of %WR.

Conclusion

The use of obesogenic medications in bariatric surgery attenuates the extent of weight loss and increases the likelihood of weight regain. Replacing the weight promoting medication with weight loss or neutral medication should be considered before and post up period to maximize the benefit.

Funding Statement

No Funding provided for this research.

Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki and approved by the Office of Research Compliance/Ethics Review boards of Stony Brook University (protocol code IRB2022-00063, 2/22/2022).

Conflict of Interest: The Authors declare no conflict of interest.

5. Title: Host-pathogen interactions are affected by replicative aged-*Cryptococcus neoformans*

Authors: Sungyun Susanne Min¹, Bettina C. Fries^{1,2,3} and Vanessa K.A. Silva¹ ¹Division of Infectious Diseases, Department of Medicine, Stony Brook University

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Cryptococcus neoformans (*Cn*) is part of the critical priority fungal group recently listed by the World Health Organization. The arsenal of virulence factors employed by this yeast includes the presence of a polysaccharide capsule and the secretion of enzymes, such as urease. In addition, *Cn* is a facultative intracellular pathogen that has adapted to reside within the acidic phagosome and to escape phagocytic host cells via a non-lytic process, named vomocytosis. The ability of *Cn* to progress through its lifespan leads to the accumulation of important pathogenic-related characteristics, such as resistance to phagocytic killing. In response to infection, macrophages produce itaconate, an anti-inflammatory metabolite mediated by the *ACOD1* expression, however, its participation in fungal pathogenesis has not been explored yet. Here we have investigated the dynamical interactions between replicative-aged *Cn* cells and murine macrophages, as well as important associated factors for fungal intracellular survival. First, old *Cn* was isolated using a magnetic field system, and cells that were previously labeled to biotin and conjugated to streptavidin microbeads. Then, we used live cell video microscopy and a pH-sensitive molecular marker to analyze the phagosome acidity in response to *Cn* infection. Since, *Cn* also releases metabolites that affect the phagolysosome pH, the production of urease and capsule were also measured by colorimetric assay and flow cytometry, respectively. To finish, we analyzed polarization and itaconate regulation of infected macrophages via qPCR. Statistical analyses were performed using unpaired t-test with Welch's correction. The primary behavior for macrophages ingested with young cells was phagosomes that were never acidified (61%), whereas the main behavior for macrophages infected with old cells was phagosomes that remained acidified (55%). Vomocytosis events for macrophages infected with old *Cn* were slightly reduced (5%) in comparison to young (8%). Although urease production only trend-up for old *Cn*, the capsule staining was remarkably increased in old generation cells. Macrophages infected with both young and old *Cn* polarized towards M1, however for macrophages stimulated with old cells presented increased levels of iNOS and TNF- α expression in comparison to young cells (0.30 vs. 2.11-fold change; and 3.82 vs. 5.63-fold change, respectively). Lastly, the *ACOD1* gene was upregulated in macrophages infected with old *Cn* (11.7-fold change). Taken together, our data demonstrate the impact that the longevity of *Cn* cells has during intracellular pathogenic mechanisms. Advances in understanding the interactions between fungi and macrophages are fundamental for uncovering novel strategies for the improving management of fungal infections.

Funding sources:

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6.* Title: IL-22 promotes mucin type O-glycosylation and MATH1+ cell mediated intestinal epithelial cell regeneration to ameliorate intestinal inflammation

Authors: Ankita Singh,¹ Michael Beaupre,¹ Cecilia V. Novoa,² Yuli Wang,¹ Kiyoshi Shiomitsu,¹ Stephen J. Gaudino,¹ Suzanne Twach,¹ Ruhee Damle,¹ Cody Kempen,¹ Nancy Allbritton,² Pawan Kumar,¹
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Presenting Author' Category: Post-doctoral fellow

Abstract:

Introduction: IL-22 is a dual edge sword, which promotes both pro and anti-inflammatory response in a context dependent manner in inflammatory bowel disease. IL-22 on intestinal epithelia cell (IEC) promotes gut barrier integrity. To identify IEC type targeted by IL-22 to mediate beneficial effect, we have studied chemical induced colitis development in various genetic mice models.

Method: By using various intestinal cell specific IL-22Ra1 knockout genetic mice models such as entire IEC (*IL-22Ra1^{IEC}*), Paneth (*IL-22Ra1^{Paneth}*), tamoxifen inducible Lgr5+ intestinal stem cell (*IL-22Ra1^{ISC}*) and RU486 inducible secretory cell (*IL-22Ra1^{Math1-PGR}*), we tried to identify specific cell target of IL-22 in intestine. To induce colitis, mice were given dextran sulphate sodium (DSS, 2%) in drinking water for 8 days followed by 2 days of normal water. *IL-22Ra1 Δ Math1-PGR* mice were i.p. injected with RU486 200 μ g/mouse for 5 days prior to start of DSS and later at 2 days interval. We measured weight loss, histopathological changes in colon tissue and colon length and expression of inflammatory cytokines in colon by qPCR. Goblet cell (GC) number was determined by Alcian blue staining. Analysed type-O glycan profile of colon mucin by MALDI-TOF. The data was analysed using Mann Whitney test and 2-way ANOVA.

Result: We observed *IL-22Ra1^{IEC}* mice on DSS treatment show defect in cell proliferation, B3galt5 expression, Paneth cell number. Results obtained from DSS administered *IL-22Ra1^{Paneth}* and *IL-22Ra1^{ISC}* mice revealed their dispensable in IL-22-mediated protection on colon inflammation. Mass spectrometry results revealed a defect in mucin type-O core 2 elongation. IL-22-dependent regulation of B3galt5 was independent of microbiota as evidenced by primary organoid culture and evaluation of *MyD88^{IEC}* mice tissues. Adenovirus mediated over expression of B3galt5 rescued inflammatory phenotype of DSS administered *IL-22Ra1^{IEC}* mice. Since B3galt5 is expressed by both enterocyte and goblet cell. We generated *IL-22Ra1^{Math1-PGR}* mice where IL-22Ra1 signaling is compromised in matured and progenitor secretory cells. When subjected to DSS, *IL-22Ra1^{Math1-PGR}* mice were more susceptible to inflammation as compared to control mice. Finally, IL-22 induced B3galt5 expression in human goblet cell line and rapid cell proliferation in a trans-well culture of primary human colon epithelium.

Conclusion: Collectively, our data show IL-22-dependent STAT3-B3galt5 axis and induction of cell proliferation response in Math1+ cells conferred a protective role in intestine.

Funding: Startup fund by Stony Brook University.

Financial disclosures: No financial disclosures to be made.



RESIDENTS



1. **Title:** Social Determinants and Delays in Brain Tumor Diagnosis

Authors: Dr Rina Meyer, MD. Clinical Assistant Professor, The Renaissance School of Medicine at Stony Brook University, Sharnam Ahmed, PGY 2 Pediatrics

Presenting Author: Sharnam Ahmed, Resident, PGY 2 Pediatrics

We have no financial disclosures or funding from any sources for this research project.

Delays in diagnosis of central nervous system (CNS) tumors in children significantly increase morbidity.¹ Patients who have delayed diagnosis often require more aggressive chemotherapy and radiation, with their inherent side effects. Additionally, patients who have delayed diagnosis are more likely to have persistent neurologic deficits. Untreated brain tumors can lead to neurocognitive changes and psychological sequelae even in the absence of chemotherapy and radiation. Data demonstrates that the delay from symptom onset to definitive diagnosis can range from 30 days to over 6 months². This is more pronounced in children younger than 4 years, those with low grade tumors and those with nonspecific symptoms (such as headache, fatigue, or vomiting). Children usually have multiple emergency departments, pediatrician, and specialist visits before diagnosis.³

The role of social determinants as a factor in delay to CNS tumor diagnosis has not been extensively studied in pediatrics. Racial and ethnic differences, socioeconomic disparities and language barriers have been shown to influence delays in diagnosis and therapy abandonment in other illnesses⁴. It has been shown that outcomes of pediatric CNS tumors in low-income countries are worse than those of middle-income countries⁵. Research shows that survival rates are lower for Latino and Black patients compared to Caucasian counterparts.⁶

We plan to perform a retrospective chart review of patients 0-21 years of age, diagnosed with central nervous tumors at Stony Brook Children's Hospital from 2011-2022. Our analysis will include presenting symptoms, number of visits prior to diagnosis, number of tests prior to diagnosis, medical and psychosocial comorbidities, socioeconomic status, racial/ethnic identification, and immigration status.

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² Chen J, Mullen CA. Patterns of Diagnosis and Misdiagnosis in Pediatric Cancer and Relationship to Survival. *Journal of pediatric hematology/oncology*. 2017;39(3):e110-e115. doi:10.1097/MPH.0000000000000688

³ Coven SL, Stanek JR, Hollingsworth E, Finlay JL. Delays in diagnosis for children with newly diagnosed central nervous system tumors. *Neurooncol Pract*. 2018 Nov;5(4):227-233. doi: 10.1093/nop/npy002. Epub 2018 Mar 9. PMID: 31386013; PMCID: PMC6655489.

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⁶ Haizel-Cobbina J, Spector LG, Moertel C, Parsons HM. Racial and ethnic disparities in survival of children with brain and central nervous tumors in the United States. *Pediatric blood & cancer*. 2021;68(1). doi:10.1002/pbc.28738

2. Title: Implementation of Resident Run Virtual Multidisciplinary ASCVD Prevention Program in the Veterans Health Administration

Authors: Irina Arkhipova-Jenkins, MD, MBA¹ and Samantha Williams, MD, MPH¹

- 1 Department of Family, Population and Preventive Medicine, Division of Preventive Medicine and Population Health, Stony Brook University Renaissance School of Medicine

Presenting Authors: Both authors are presenting.

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Author Category: Residents, General Preventive Medicine and Public Health Residency

ABSTRACT

Introduction: Atherosclerotic Cardiovascular Disease (ASCVD) is the leading cause of death in the United States. The United States Preventive Services Task Force (USPSTF) recommends lifestyle modifications to lower ASCVD risk in adults with cardiovascular risk factors, however little is known about strategies for effective implementation of these interventions in the Veterans Health Administration. This project describes the implementation of a telehealth delivered ASCVD prevention program at the Northport VA Medical Center.

Methods: The 8-week virtual Heart Health Clinic (HHC) was initially designed as a part of the VHA/DoD Joint Incentive Fund ASCVD Prevention Program. Two preventive medicine residents enrolled veterans with ASCVD risk factors, conducted health behavioral assessments using a validated Hypertension Self-Care Activity Level Effects (H-SCALE) questionnaire, screened for social risks using the Assessing Circumstances & Offering Resources for Needs (ACORN) tool and arranged for social work referrals to address needs. HHC sessions were facilitated by a multidisciplinary clinical team consisting of nutritionists, pharmacists, psychologists, exercise therapists and preventive medicine residents who also coordinated ongoing patient monitoring and follow-up. Exit questionnaire data collected from participants and staff were analyzed to explore satisfaction, barriers and facilitators to HHC implementation, and areas for improvement.

Results: Nine of the 10 participants and eight facilitators completed exit questionnaires. Most patients (88%) and all staff expressed strong satisfaction with the program. Favorable attitudes among clinicians and program alignment with organizational academic mission were both conducive to adopting HHC. Among participants, having established health goals at enrollment, preference for interactive group-based format, and being referred by PCP were associated with greater engagement. Barriers to patient participation included difficulties using teleconferencing technology, inconvenient session timing, and the need for one-on-one coaching. Among clinicians, inadequate staffing, EHR burdens, and competing work demands were the key barriers to program implementation.

Conclusion: Implementation of ASCVD prevention programs at the VA is influenced by a variety of patient, clinician, and organizational factors. Encouraging health goal setting, integrating PCP referrals, and addressing staffing, workflow, and EHR challenges are needed for successful implementation of these programs.

Clinical Relevance: Optimizing ASCVD prevention programming at the VA requires a pragmatic approach that considers multilevel factors.

Funding Source: VA/DoD Joint Incentive Fund Cardiovascular Disease Prevention Grant

Financial Disclosures: Both authors have no financial conflicts of interest to disclose.

IRB Approval: The December 6, 2022 approval letter by the Northport VA Medical Center

3. Title: Risk of bronchopulmonary dysplasia (BPD) in extremely low birth weight (ELBW) infants (<1250g) exposed to single (soy) vs multiple component (SMOF) emulsions in preterm infants

Authors: Allison Beattie, DO, Pediatrics – Resident, PGY-3 and Shanthy Shridhar, MD, Pediatrics - Neonatology

Presenting author: Allison Beattie, DO, Resident, PGY-3 – Allison.beattie@stonybrookmedicine.edu

Background

Smoflipid (SMOF) is a 20% lipid emulsion comprised of four different oil sources, soybean oil, medium chain triglycerides, olive oil, and fish oil. It is intended to provide an optimal balance of fatty acids to maximize the nutritional benefits and while reducing the propensity for inflammation caused by pro-inflammatory markers found in traditionally used soybean oil-based emulsions.

Objective

To determine whether multiple component (SMOF) lipid emulsion had lower risk of bronchopulmonary dysplasia (BPD), when compared to infants of similar birth weight who received traditional single (soy) lipid emulsion.

Study Design and Methodology

Retrospective chart review of infants admitted to the Neonatal Intensive Care unit at Stony Brook between January 2015 and December 2020. The study was approved by the Institutional Review Board. Infants with birth weight (BW) <1250 g, and gestational age (GA) 23-30 weeks, and those who received TPN (n = 87) were included. The control group included infants who received soy lipid emulsion (n= 67) and the intervention group included infants who received SMOF (n= 20). Infants born with congenital or chromosomal abnormalities were excluded. Risk of BPD was calculated using NICHD Neonatal BPD Outcome Estimator (2011 version). Secondary outcomes included comparison of growth parameters at post-gestational age of 36 weeks, infant comorbidities, lipid tolerance, and maternal comorbidities. Statistical analysis was performed using T-test and chi square test, odds ratio with confidence interval was also calculated.

Results

Eighty-seven patients were enrolled, sixty-seven in Soy group and twenty in SMOF lipid group. Mean GA in the Soy Lipid group was (28.1±1.7wks) compared to 27.4±2.1 wks) in the SMOF group. There was a trend seen in calculated BPD risk in the SMOF group at DOL 14 (p<0.01) and 21 (p<0.03) compared to risk at birth with a decline at day 28 (figure 1). Infants exposed to SMOF had a statistical significance in late onset sepsis. Infants in SMOF had a significantly improved weight and head circumference at discharge compared to the Soy Lipid group (Table1). There was no difference in Fatty Acid profile nor derivatives in the SMOF group when comparing with and without BPD (Figure 2).

Conclusion

SMOF lipids are well tolerated in our ELBW population with improved weight and head circumference at discharge. SMOF exposure may predispose infants to late onset sepsis. Further prospective randomized controlled trial is warranted to study long term outcomes.

Figure-1

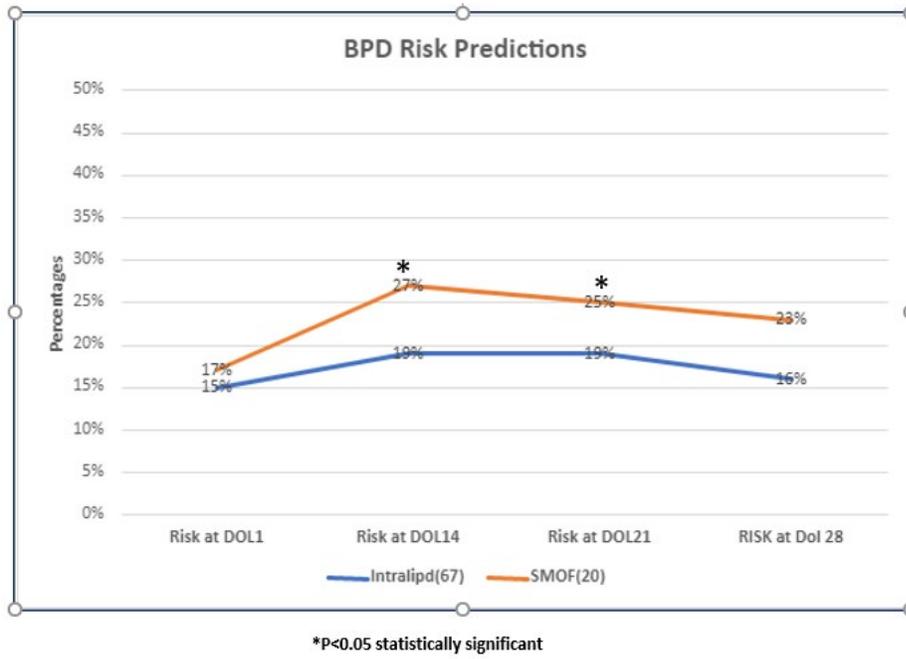


Figure-2 (Orange is patients with BPD (N-4), Blue is patients without BPD (N-2))

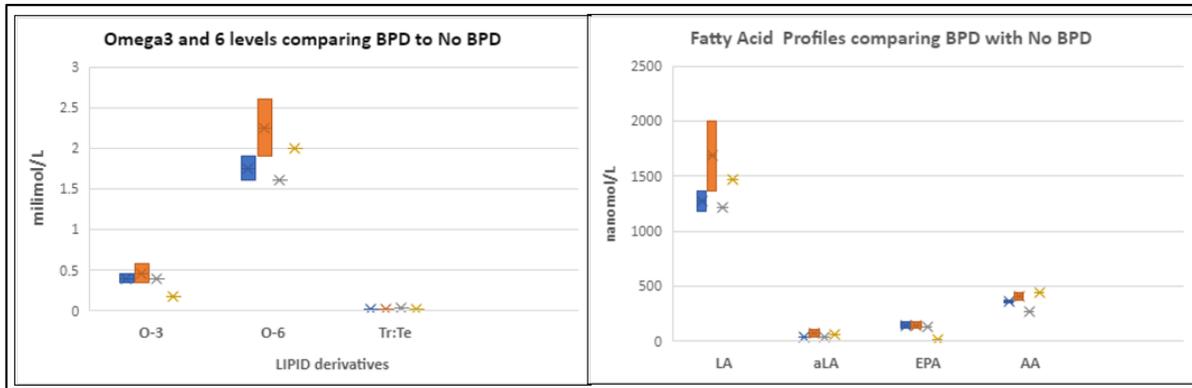


Table-1

Growth Outcomes	Intralipid-(N-67) Mean+/- SD	SMOF(N-20) Mean+/- SD	pValue
Weight (gms) at birth	1038±154	940±196	0.01*
Weight GV at DC	166.4±34	172.9±25.4	0.43
Weight -Z score at DC	-0.80±1.9	0.8±0.9	0.49
Weight at DC	2706±556	3147±999	0.01*
HCM at birth	25.4±3.4	24.3±2.4	0.01*
HCM at DC	33±4.4	34.2±4	0.01*
HCM-GV at DC	0.22±1.2	0.7±0.16	0.29
HCM-Z at DC	-0.8	0.22±0.76	0.49

*P<0.05 indicates statistical significance

4.* Title: Retrospective evaluation of doxycycline for the treatment of Lyme disease among young children

Authors: Katie Brown, MD; Andrew Handel, MD

Presenting Author: Katie Brown, MD, katie.brown@stonybrookmedicine.edu

Presenting Author's Category: Resident

Introduction:

Lyme disease is the most common pediatric tickborne infection. Due to largely disproven concerns of doxycycline-related dental staining among patients <8 years old, no prospective data exist on efficacy and adverse effects in young children with Lyme disease. Based on emerging data, our institution has used doxycycline during the past decade when alternatives cannot be given. Our study aims to describe short-term adverse effects and treatment failures among young children receiving oral doxycycline for Lyme disease.

Methods:

Retrospective chart review of patients < 8 years old within the Stony Brook Medicine system from 2010-2020. Patients were identified by ICD-9/-10 codes for Lyme disease prescribed doxycycline at the same visit. We excluded those lacking an objective finding of Lyme disease, including single or multiple erythema migrans (EM), facial nerve palsy, carditis, meningitis (headache with pleocytosis >5 WBC/ μ L), and/or arthritis, those with an alternative diagnosis, and those receiving post-tick exposure prophylactic doxycycline. Data collected included demographics, symptoms, laboratory results, treatments, and outcomes. Descriptive statistics were calculated.

Results:

32 charts were included. Average age was 5.1 years. 66% were male. The majority of the patients presented with a single EM (Table for presenting symptoms). Initial antibiotics were doxycycline (63%) or a beta-lactam (37%). Rationale for doxycycline included beta-lactam allergy or intolerance (47%), required for treatment of clinical syndrome (such as neurologic disease) (28%), concern for alternative tickborne infection (3%), and no reason given (22%). There were no severe adverse reactions to doxycycline; 2 patients stopped due to nausea/vomiting and 1 due to refusal of oral medications. Among the 29 patients who completed doxycycline, there were no known Lyme disease treatment failures.

Conclusions:

In this small cohort of young children with Lyme disease, doxycycline was generally well-tolerated, without severe short-term adverse effects, and resulted in no treatment failures. As there is no prospective data evaluating doxycycline in this population and future randomized trials are unlikely, the data presented provides reassurance that doxycycline is effective and safe for this indication.

Funding Source: N/A

No financial disclosures.

5. Title: Embolism to Transverse Sinus in a 5-day Post-Partum Patient Later Determined to Have May Thurner Syndrome

Authors: Lorie-Ann Foster, MD¹, Kaitlyn Ruffing, MD², Scott Nettboy, DO¹

¹Department of Internal Medicine
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Presenting Author: Lorie-Ann Foster, MD, PGY-1 Resident, lorie-ann.foster@stonybrookmedicine.edu

Abstract Body:

Introduction:

May Thurner syndrome (MTS) is an anatomic variant in which the right common iliac artery overlies the left common iliac vein compressing it against the lumbar spine; blood flow is disrupted, resulting in venous stasis which increases the risk of DVT formation. MTS accounts for 2-5% of all DVTs. Cadaveric studies estimate the prevalence of this abnormality at 20-34% [1]. No population-based studies exist to evaluate the prevalence or incidence of MTS [3]. We present a patient 5-day post-partum (PPM) presenting with DVT and PE, who developed CVA; ultimately diagnosed with MTS. MTS is generally an underappreciated contributor to DVT and often overlooked. This case highlights the potential morbidity of MTS in the vulnerable post-partum period and encourages physicians to consider MTS in the differential for a PPM patient with DVT.

Case Report Summary:

A 33-year-old female G3P3 (IVF x3) with past medical history of obesity s/p gastric bypass presenting 5d postpartum with LLE pain and swelling for 2 days. She denied recent travel, trauma or prolonged immobility. Vitals initially significant for tachycardia and US of the LLE extremity revealed extensive thrombosis in the external iliac continuous to the soleal vein. CTA revealed a RLL subsegmental pulmonary embolism. Lovenox was initiated with pending LLE thrombectomy-by vascular surgery.

She subsequently developed blurry vision and headache. CTA and MRI/MRV indicated "short segment tubular filling defect in the distal right transverse sinus." Patient was taken to the OR where an extensive LLE DVT including CIV to soleal vein was discovered. Intraoperative IVUS performed showing compression along the left iliac axis suggestive of May-Thurner syndrome. Mechanical aspiration thrombectomy removed ~500 cc clot with placement of stent in left iliac axis and balloon venoplasty.

Conclusions/Clinical Relevance:

We present an interesting case of MTS complicated by CVA in the postpartum period. Physicians should consider MTS in the post-partum patient presenting with signs of DVT. Perhaps the pelvic organ changes during birth could contribute to the development of complications from MTS, as a case series of 6 women with MTS syndrome each had a history of 2 or greater pregnancies and births [1]. Hypervolemia, a physiological change of pregnancy may worsen the anatomical anomaly resulting in symptomatic vessel compression [4]. While initial work-up may reveal DVT by duplex ultrasound, physicians must lend consideration to MTS and remain vigilant in monitoring for development of sequelae.

No funding sources or financial disclosures.

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6. Title: Assessing Pain in Non-Verbal Patients: Dementia, Delirium, End-of-life, Sedation/Intubation

Authors: Suha Na Javeed MD, Margaret Fischer NP, Grace LaTorre MD

Presenting author: Suha Na Javeed, suha.najaveed@stonybrookmedicine.edu, Resident

Abstract

Introduction

Unlike the assessment of pain in verbal patients, the assessment of pain in non-verbal patient populations, including patients who have dementia, are delirious, are at end-of-life, or are sedated, can be quite challenging and in turn negatively impact these patients by developing worsening pain and requiring higher potency medications. This is likely multi-factorial and may range from unfamiliarity of which assessment tools should be used depending on the patient, lack of exposure on how to use the assessment tools, or the effects of clinician's own perception and interpretation of pain. The inability of a patient to report pain does not indicate the absence of pain.¹ Current literature offers a variety of tools to use for pain assessment in non-verbal patients, including the numeric pain rating scale, Critical Care Pain Observation Tool (CPOT), Face, Legs, Activity, Cry, Consolability (FLACC) Behavioral Pain Scale, and Pain Assessment in Advanced Dementia (PAIN-AD) scale.² ³ Appropriate pain assessment allows clinicians to tailor care to each patient's need and thus must be examined.⁴

Methods

Internal medicine residents, hospitalist attendings, nurses, and other health care workers were given an anonymous, electronic survey via e-mail assessing their role in health care, comfort level in assessing pain in general, history of receiving any education on assessing pain in non-verbal patients, ability to assess pain in non-verbal patients (including patients with dementia, at end-of-life, delirious, or sedated/intubated), familiarity with different pain scales including the numeric pain rating scale, CPOT, FLACC, and PAIN-AD.

Results

39 electronic surveys were collected from residents, hospitalist attendings, nurses, and others, with approximately 26 (66%) coming from residents. When asked about comfort level in assessing pain overall compared to the comfort level in assessing pain in non-verbal patients, 30 (76.99%) answered either "somewhat comfortable" or "extremely comfortable" and only 22 (55.41%) answered either "somewhat comfortable" or "extremely comfortable." Of the four different pain scales including numeric pain, CPOT, FLACC, and PAIN-AD, by far numeric pain rating scale was the most well-known with 38 (97%) of the survey participants stating their familiarity with the scale, and others FLACC (62%), CPOT (13%), and PAIN-AD (5%) following in order of decreasing familiarity. There was an overwhelming majority of health care workers, with 35 or 95% of the participants, choosing "agree" or "strongly agree" when asked whether further education on assessing pain on non-verbal patients would be beneficial.

Conclusions/clinical relevance

Residents, attendings, nurses, and others alike agree that they can benefit from further education on assessing pain in non-verbal patients. Future actions should include development of didactic courses, including modules and in-person training, on assessing pain in non-verbal patients, re-assessment of comfort levels among clinicians, and re-evaluating the effects of didactics on clinicians' ability to assess pain in non-verbal patients.

Funding source - none

CORIHS approval - none

Financial disclosures - none

7. Title: Comparing Learning Experiences for Virtual Reality and Manikin Simulation for Advanced Cardiac Life Support (ACLS) Education in 1st & 2nd year Medical Students

Authors: Masooma Kazmi, MD; Richard Niyazov, MD; Jia Jian Li, MD; James Mantas, MD; Rachel Kelly, MD; Lauren Maloney, MD, FAEMS, NRP, FP-C, CIC, NCEE; Samita M. Heslin, MD, MBA, MPH, MA, MS
Department: Emergency Medicine

Presenting Author: Masooma Kazmi, masooma.kazmi@stonybrookmedicine.edu

Category: Resident

Funding Sources: Halla·Newcastle PBL Education and Research Center Grant

CORIHS approval date/number: IRB2021-00367: Comparing Virtual Reality and High-Fidelity Simulation for Advanced Cardiac Life Support (ACLS) Education - 6/29/2021

Introduction:

Advanced Cardiac Life Support (ACLS) teaches management of cardiovascular emergencies and involves mock resuscitation codes using manikins. Virtual Reality (VR) has been suggested as alternative to in-person simulations. Our objective was to introduce ACLS concepts through VR or manikin simulation to medical students, many without ACLS training previously, and to gauge their learning experience.

Methods:

Medical students who were in their first or second year were randomly assigned to one of two groups: VR Oculus ACLS or manikin ACLS education. Participants completed an anonymous survey immediately after the learning experience and 2-3 weeks later.

Results:

The results show that participants in both VR and manikin groups agreed they enjoyed the activity, learned from the activity, felt they accomplished the task goal, and weren't frustrated by the activity. The VR group, unlike the manikin group, stated their activity required significant mental demand. In the follow-up survey, both groups agreed they remembered the concepts taught. However, the VR group was more likely to recommend the VR simulation.

Conclusion:

This study demonstrated that both VR and manikin simulations provide favorable learning experiences. Although participants in the VR group felt as though the VR learning experience required more significant mental demand, they were likely to recommend ACLS education through VR.

Financial Disclosures: None

8. Title: EVALUATION OF ARGATROBAN USE AT STONY BROOK UNIVERSITY HOSPITAL

Authors: Laraib Khan, PharmD

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Presenting author category: Pharmacy Resident

Introduction: Argatroban is a direct thrombin inhibitor indicated for heparin-induced thrombocytopenia and is monitored using activated partial thromboplastin clotting time (aPTT). At Stony Brook University Hospital (SBUH), patients with normal hepatic function receive an initial dose of 2 mcg/kg/min using a standardized argatroban protocol. The purpose of this medication use evaluation was to evaluate if 2 mcg/kg/min of argatroban is the ideal starting dose to attain adequate anticoagulation, as defined as having 2 consecutive therapeutic aPTT results. The primary objective was to analyze what dose of argatroban results in therapeutic aPTT levels.

Methods: A retrospective chart review was conducted for 17 patients that were ≥ 18 years and received argatroban at SBUH from August 9th, 2022 to December 26th, 2022 who had 2 consecutive therapeutic aPTT results. The rate of the argatroban infusion when the patient had 2 consecutive therapeutic aPTT results was used to backwardly calculate this in mcg/kg/min based on documented body weight. Descriptive statistics were used to evaluate patient demographics and study results.

Results: There were 14/17 (82%) patients that received the standard argatroban protocol. In these 14 patients, the mode and the median therapeutic argatroban doses were both 2 mcg/kg/min and the mean was 1.89 mcg/kg/min using actual body weight. Of note, two of these patients weighed greater than 140 kg.

Conclusions: Dosing argatroban based on actual body weight and using an initial dose of 2 mcg/kg/min in patients with normal hepatic function is most likely to result in therapeutic aPTT levels in the majority of patients.

Additional evaluation of dosing patients weighing greater than 140 kg is needed.

Funding sources: None

Financial disclosures: Nothing to disclose

This project was submitted to the SBUH Chief Quality Officer as quality improvement.

9. Title: Arteriovenous Malformation in the Setting of a Possible Cesarean Scar Pregnancy Managed Surgically: A Case Report and Literature Review

Authors: Julia Kim (OBGYN), Joseph Bacchi III (OBGYN)

Presenting author: Julia Kim – juliak1117@gmail.com

Presenting author' Category: Resident

Introduction Uterine arteriovenous malformation (AVM) is a rare gynecologic condition involving abnormal communication between myometrial arteries and veins. AVMs can be congenital or acquired, acquired AVMs often being a result of uterine instrumentation. Other causes of acquired AVMs include Complications of prior pregnancies, cesarean scar pregnancy, uterine infection, gestational trophoblastic disease (GTN) or gynecological malignancies. Patients with uterine AVMs typically present with episodes of sudden heavy bleeding and can often lead to life-threatening hemorrhage. Moreover, the associated vaginal bleeding is often refractory to standard therapy. Therefore, proper diagnosis and treatment is critical. Diagnosis is centered around imaging modalities such as computed tomography (CT), magnetic resonance imaging (MRI), ultrasound, and angiography. As transvaginal ultrasound is the imaging modality of choice in gynecology, diagnosis is often based on ultrasonographic evidence of hypoechoic areas in the myometrium with vascular flow. Features may be similar to other differentials including retained products of conception (POCs), GTN and hemangioma. Angiography can further be used to assess size and identify feeding vessels while a CT or MRI can help evaluate for adjacent organ involvement. Treatment depends on hemodynamic stability of the patient and, more recently, desired future fertility. There have been case reports of successful treatment with conservative or medical management, uterine artery embolization (UAE), or laparoscopic coagulation for those desiring fertility preservation. Otherwise, hysterectomy is recommended. This case describes the progression of a patient with persistent vaginal bleeding in the setting of a missed abortion, possibly a cesarean scar pregnancy, after failed medical then surgical intervention, found to have a delayed diagnosis of acquired uterine AVM. The purpose of this case report is to highlight the importance of considering the differential of AVMs based on ultrasonographic evidence leading to proper diagnosis, management, and overall patient care. **Results/Case description** Patient is a 31-year-old parity 1, with prior cesarean section 1 year ago, who was diagnosed by a private gynecologist with a missed abortion measuring 8 weeks by crown rump length. She opted for expectant management as she endorsed spotting at that time. At her follow up, she was given misoprostol and mifepristone for failed expectant management. Two weeks after, she only had spotting and ultrasound revealed “irregular collection of retained product with collapsing debris”. Patient desired to avoid surgery, so she was given repeat medical management. Patient represented in 2 weeks with passage of large blood clots and ultrasound revealed irregular sac measuring 4.6x5.0x5.6cm. She opted for expectant management. One week later, patient presented to an emergency department with a septic abortion. She underwent a dilation and curettage (D&C) revealing chorionic villi and was given antibiotics. Two weeks following surgery, the patient continued to have vaginal spotting with episodes of intermittent heavy bleeding. On ultrasound, there was concern for a “heterogenous vascular region in the anterior myometrium” and she was told she likely has a degenerating fibroid and expectant management, and pain control was recommended. Now 3 months after initial presentation, patient presented to our practice for a second opinion given continued vaginal bleeding. Patient had a beta-human chorionic gonadotropin (beta-hCG) of 19 and ultrasound revealed a large anterior lower uterine mass with a transversing dilated vessel (1.7cm) concerning for a large vascular malformation. An MRI revealed an “aneurysmal expansion of the lower uterine segment with extremely thin myometrium likely reflecting expanded cesarean scar with dilated arteriovenous formation with a diameter of 1.1cm”. Patient underwent bilateral UAE by interventional radiology with interval improvement of vaginal bleeding. Outpatient follow up revealed a negative beta-hCG and ultrasound revealing decrease in both the size and the vascularity of the AVM. **Conclusions/clinical relevance** The differential diagnosis includes retained products of conception, cesarean scar pregnancy, uterine perforation, AVM, degenerating fibroid, or GTN. Patient history, clinical presentation and imaging guided diagnosis of uterine AVM with likely prior cesarean scar pregnancy and allowed for proper treatment in this patient. This case highlights many important learning points. First, in cases with persistent heavy vaginal bleeding suggesting failed standard therapy, uterine AVM should be considered on the differential early. This is especially true with visualization of a vascular structure in the

myometrium in the setting of recent instrumentation. As presented in this case, delayed diagnosis can impact patient care and safety. Second, it is critical to rule out a cesarean scar pregnancy prior to treatment as this would affect management. In the case presented, it is unclear if the presenting diagnosis was truly a missed abortion or a possibly cesarean scar pregnancy due to the location of the AVM and retained products of conception. As cesarean scar pregnancies, infection, and D&C can precede the formation of an AVM, it is difficult to determine which one or combination of inciting events contributed to the acquired AVM. It is important to note that if a cesarean scar pregnancy was diagnosed at her initial visit, the patient would have undergone a very different treatment course, including methotrexate or surgical wedge resection. Lastly, this case supports the use of UAE as a treatment for uterine AVMs in patients desiring fertility sparing management. Optimal treatment for AVM formation secondary to cesarean scar pregnancy is still unclear. Hysterectomy is still the recommended treatment for postmenopausal patients or patients with life-threatening hemorrhage requiring emergent treatment. Continued exploration of alternative treatment for women desiring future fertility and their success or postoperative risks and complications is necessary for proper treatment of this complex disease.

Funding source(s) – none

Financial disclosures – none

10. Title: COVID-19 Pandemic and Neonatal and Infant Outcomes

Authors: Julia Kim MD (OBGYN), Bijal Parikh MD (OBGYN/MFM), Lama Nouredine MD (OBGYN/MFM), David Garry MD (OBGYN/MFM), Kimberly Herrera MD (OBGYN/MFM), Cassandra Heiselman MD (OBGYN/MFM)

Presenting author: Julia Kim – juliak1117@gmail.com

Presenting author' Category: Resident

Main body of the abstract:

Introduction

During the COVID-19 pandemic, there were increasing rates of opioid use disorder (OUD), and pregnant women are particularly vulnerable to worse outcomes. This study aimed to examine neonatal and infant outcomes in pregnancies complicated by OUD before and during the COVID-19 pandemic.

Methods

An IRB-approved retrospective cohort study was conducted to identify pregnancies complicated by OUD using maternal, neonatal, and infant data from 2017-2022. Two cohorts were created based on timing of the pandemic in March 2020. The primary outcomes were infant developmental delay through 6 months postpartum and neonatal abstinence syndrome (NAS).

Results

Maternal age, BMI, insurance type, active drug use, admission for withdrawal, gestational age at delivery, PTB, mode of delivery, birth weight, and NICU admission were similar between patients who delivered before the pandemic (n=256) and during the pandemic (n=140). The rates of NAS were lower during the pandemic (29% vs 6%, $p < 0.001$), however those neonates with NAS required more pharmacologic treatment (36.2% vs 58.2%, $p < 0.001$). In women on medication-assisted treatment (MAT, n=282), NAS (97.9% vs 73.3%) and pharmacologic treatment for NAS (61.1% vs 39.2%) was more common during the pandemic ($p < 0.001$). There was a significant difference between any developmental delay at 6 months (n = 182, 1.7% vs 16.1%, $p < 0.001$) but no difference at 2 months or 4 months.

Conclusions/clinical relevance

Necessity of pharmacologic treatment and developmental delay at 6 months was found to be increased during the COVID-19 pandemic. Effects of the pandemic on neonatal outcomes were more profound in women who were on MAT.

Funding source(s) – none

Financial disclosures – none

11. Title: Isolated Fetal Pleural Effusion with Progression to Non-Immune Hydrops Fetalis: A case report and literature review

Authors: Julia Kim (OBGYN), Omar Abuzeid (OBGYN/MFM), Cassandra Heiselman (OBGYN/MFM), David Garry (OBGYN/MFM), Kimberly Herrera (OBGYN/MFM)

Presenting author: Julia Kim – juliak1117@gmail.com

Presenting author' Category: Resident

Main body of the abstract:

Introduction Fetal pleural effusions are fluid collections in the chest cavity of a developing fetus. Pleural effusions can be characterized into primary and secondary etiologies. Primary pleural effusions usually result from lymphatic malformation and are unilateral and isolated findings. Primary pleural effusions are more common in males to females with a 2 to 1 ratio. Secondary pleural effusions are usually associated with structural or infectious etiologies and sonographic, genetic, and infection work up is necessary as primary pleural effusion is a diagnosis of exclusion. Most often small pleural effusions will regress spontaneously or stabilize, allowing for conservative surveillance and management of such patients. Some may progress to the contralateral side and eventually involve development of ascites and hydrops fetalis, a serious obstetrical complication diagnosed by the presence of two or more abnormal fluid collections in the fetus, including ascites, pleural effusions, pericardial effusion, and or skin edema. The most common cause is cardiovascular in origin however it is often a multifactorial and can involve thoracic obstruction, arrhythmias, infections, hepatic venous congestion and/or anemia. The development of hydrops is dependent on etiology, but usually has a poor prognosis with risk of intrauterine fetal demise (IUID). The purpose of this case report is to describe the diagnosis and evolution of a patient with fetal pleural effusion with eventual progression to non-immune hydrops fetalis (NIHF) with a good perinatal outcome. **Results/Case description** A 26-year-old primigravid female at 28.4 weeks gestation with history of LEEP and resolved COVID-19 infection from 2 months prior presented to our high-risk clinic as a consult for concern of fetal ascites on ultrasound. Prior ultrasounds revealed a normal anatomy at 20 weeks and an estimated fetal growth of 343 grams (75%tile). Prenatal records revealed maternal blood type B, Rh positive, HIV, RPR nonreactive, Varicella, Rubella, Parvovirus immune and cell free DNA screening that was low risk and consistent with a male. On our ultrasound, the fetus had an isolated moderate size (4.3x1.3x1.0cm 3) right pleural effusion with otherwise normal anatomy. Fetal echocardiogram revealed moderate to large right pleural effusion again with normal cardiac anatomy, rhythm and function. Weekly ultrasound surveillance found progressive polyhydramnios (AFI 26.2cm to 46.1cm) but stable pleural effusion (7.2x5.7x2.4cm 3). Skin edema developed at 31 weeks and betamethasone was administered given the progression to NIHF. A genetics consult was placed, and an amniocentesis was offered, which she elected not to pursue. The patient presented to Labor and Delivery after spontaneous premature preterm rupture of membranes at 32.4 weeks and was found to be 1.5cm dilated. Latency antibiotics were started. She continued to make cervical change, and a male fetus was delivered at 32.6 weeks via primary cesarean delivery with Apgars 4/6/8 and birth weight 2450 grams. The baby was intubated and transferred to NICU. Postnatal chromosome analysis revealed a normal male karyotype. He tested negative for COVID-19. The infant is now extubated, and status post an octreotide drip and chest tubes with no further pleural fluid accumulation. He had video-assisted thoracoscopic surgery and pleurodesis with lung biopsy revealing acute/subacute lung injury and acute fibrinous pleuritis. At 5 weeks old, the current diagnosis is congenital chylothorax versus lymphangiectasia, as initial fluid analysis from pleural effusion revealed 100% lymphocytes. **Conclusions/clinical relevance** Isolated fluid collections can be challenging, especially given the unpredictability of diagnosis and progression. In the case presented, the progression of disease from unilateral pleural effusion to polyhydramnios and skin edema (hydrops) suggests a secondary cause. Antenatal etiology was unclear with negative workup for chromosomal, infectious or structural causes. Drainage of large pleural effusions prior to delivery is recommended for both therapeutic and diagnostic reasons. The finding of lymphocyte predominant pleural fluid may have aided in earlier diagnosis of chylothorax. The survival and good prognosis of this case can be attributed to a few factors. First, the lack of fetal chromosomal or obvious structural anomalies on ultrasound has been associated with better outcomes. Second, late onset of hydrops is a good prognostic factor. McCoy et al. found that fetuses diagnosed with hydrops before 24 weeks' gestation were more likely to have

abnormal karyotypes and have a perinatal mortality of 95%. Third, NIHF with polyhydramnios has been shown to have a lower risk of IUFD but a higher risk of preterm birth. The increased risk of preterm labor that is conferred with polyhydramnios allude to the possible benefit for earlier delivery for patients with NIHF. Further investigation on timing from diagnosis to fetal morbidity and mortality can help guide delivery timing to balance prematurity and risk of IUFD. There is also limited data on fetal long-term outcomes and should be explored to guide treatment and patient counseling. It is also important to note the patient's COVID-19 infection shortly prior to diagnosis of fetal pleural effusion. There have been cases of newborns developing pleural effusions secondary to COVID-19 myocarditis or pneumonia. Continuing to understand the effects of COVID-19 in-utero can help elucidate what role this infection may have in fetal pleural effusions and ultimately NIHF.

Funding source(s) – none

Financial disclosures – none

12. Title: Pre-operative planning for placenta accreta spectrum and delivery outcomes

Authors: Korgaonkar-Cherala C, Parikh B, Kohli H, Gorman M, Bernasko J, Garretto D, Garry D, Heiselman C, Herrera K.

Presenting Author: Chaitali Korgaonkar-Cherala (Chaitali.korgaonkar-cherala@stonybrookmedicine.edu)

Presenting Author Category: Resident

Institution/Department: Renaissance School of Medicine at Stony Brook University, Stony Brook University Hospital, Department of Maternal-Fetal Medicine

Introduction

At our institution, pre-operatively identified placenta accreta spectrum (PAS) cases are discussed in a multidisciplinary meeting (MDM) to optimize surgical planning. We sought to determine if our MDM approach improves clinical outcomes of women with PAS.

Methods

Retrospective cohort study at a single institution from January 2013 to December 2021. Patients diagnosed (antenatal or postnatal) with PAS were identified through record review (placental pathology, cesarean hysterectomy, and Accreta Center records) and divided into groups based on if they had a MDM. Our primary outcomes were total blood products transfused and intraoperative complications. Data regarding maternal demographics, length of hospital stay, delivery admission and post-discharge complications were collected. Statistical analysis was performed using Chi square tests, student T-tests, and logistic regression modeling, with statistical significance defined as $p < 0.05$.

Results

There were 40 patients with a preoperative PAS diagnosis: 21 had a MDM and 19 did not have a MDM. MDM was not significantly associated with any of the studied outcomes (Figure 1). Planned (35.7%) versus unplanned (3.3%) hysterectomy was associated with statistically significant increased risk of post-discharge complications ($p=0.009$). Planned hysterectomy was associated with a longer length of stay, 6.86 days versus 2.43 days ($p=0.002$). Planned hysterectomy did not have significant correlation with intraoperative or delivery admission complications, number of blood products transfused, or ICU admission. Peri-operative complications did not differ between groups (Table 1). There were no instances of ureteral injury, uterine rupture, stroke, MI, PNA, SBO, ileus, fever, acute respiratory failure, DIC, and post-discharge VTE.

Conclusions

Pre-operative MDM did not improve clinical outcomes of women affected with PAS. Planned hysterectomy was associated with longer length of stay and more post-discharge complications, however women with a planned hysterectomy may represent a cohort of women with more complicated cases at risk for increased complications.

Funding Sources: Not applicable

Financial Disclosures: None

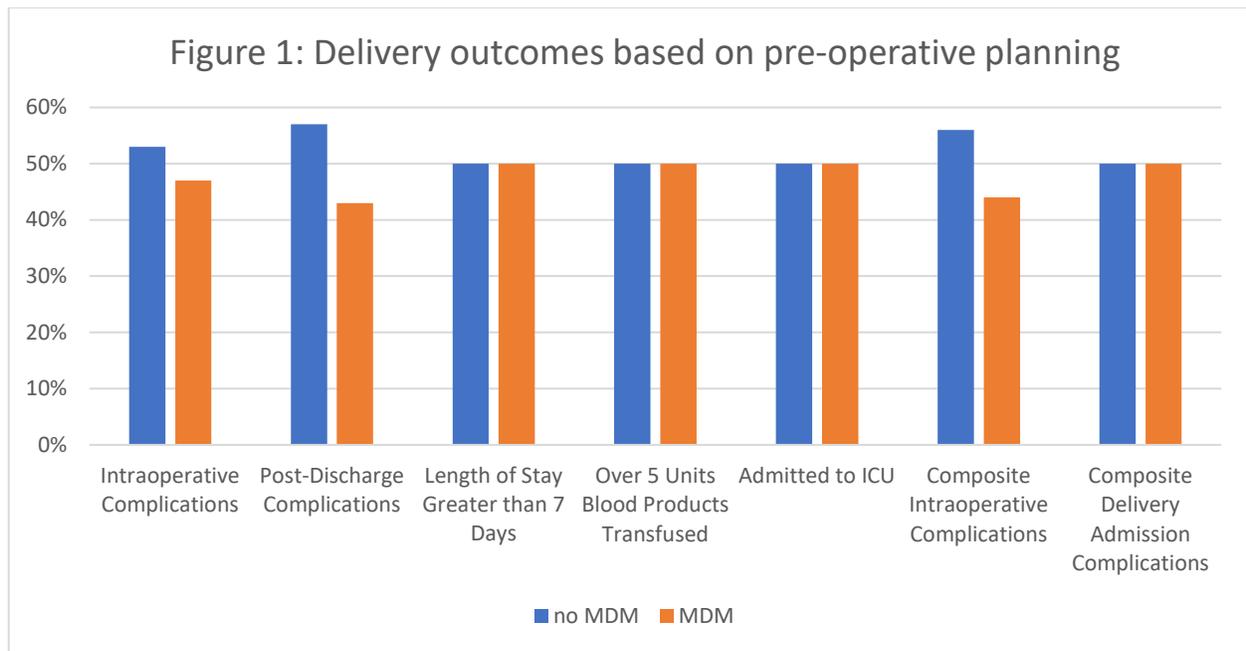


Table 1: Perioperative Complications based on Preoperative Planning

Complication	Multidisciplinary Meeting		p-value
	Yes	No	
Intraoperative	15 (78.9%)	17 (81.0%)	1.000
Hemorrhage	14 (73.7%)	17 (81.0%)	0.712
Cystotomy	1 (5.3%)	2 (9.5%)	1.000
Delivery Admission	2 (10.5%)	1 (4.8%)	0.596
Venous thromboembolis	0	1 (4.8%)	1.000
Reoperation	2 (10.5%)	0	0.219
Post-discharge	3 (15.8%)	4 (19%)	1.000
Readmission	1 (5.3%)	1 (4.8%)	1.000
Infection	2 (10.5%)	1 (4.8%)	0.596
Other	0	3 (14.3%)	0.233

Data represented as N (%)

13. Title: Knockdown MET and EGFR pathway RNAs via western blot and inhibition comparison of pErk/pMAPK signaling by crizotinib/erlotinib combinations with next generation MET inhibitors

Authors: B. Elizabeth Lee¹, DO, Nicolas Coant², PhD, Jason Linzer³, Zach Phelps³, John Haley², PhD

¹SBUH, ²Experimental Pathology SBUH, ³SBU

Presenting Author: B. Elizabeth Lee, DO Boyoung.lee@stonybrookmedicine.edu, Resident Pathology PGY2

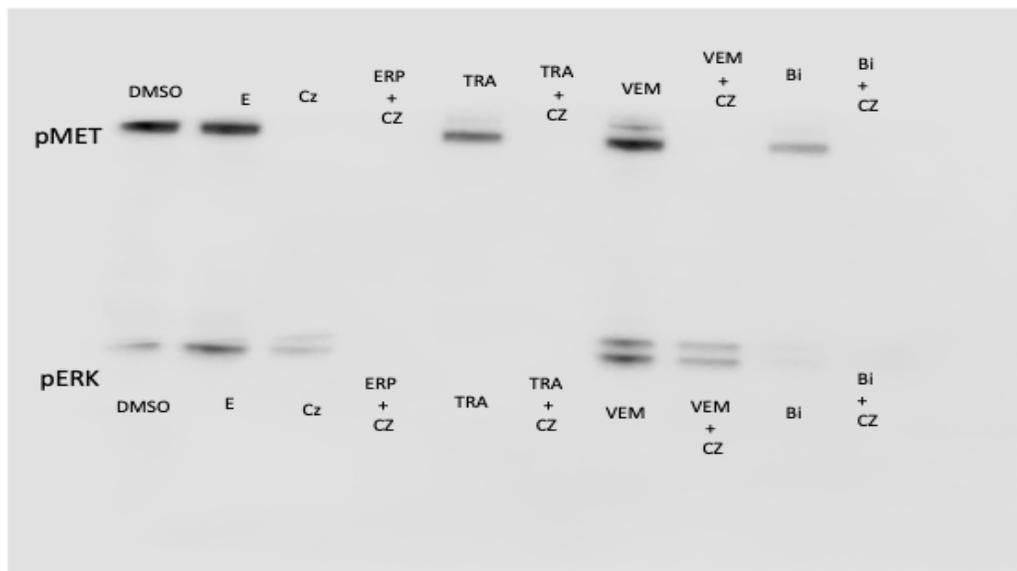
Abstract: Multiple signal transduction pathways can be concurrently active within a single cell, and extensive crosstalk can occur between RTKs. Understanding pathway crosstalk is vital to guide the rational combination of approved and experimental anti-cancer agents. Both MET and EGFR are proto-oncogenic receptor protein tyrosine kinases (RTK), activated by extracellular HGF and EGF family growth factors. Both RTKs can be mutated and promote NSCLC development and progression. This project examines MET amplification in NSCLC using MET inhibitor sensitive H1993 cells. Interestingly, apoptosis is observed when an EGFR inhibitor is included, though the EGFR inhibitor has no single agent activity. Combined MET and EGFR inhibitors were required for inhibition of the ERK/MAPK pathway. Both Crizotinib and Savolitinib (MET inhibitors) or Erlotinib and Osimertinib (EGFR inhibitors) showed comparable results. A time course of MET and EGFR inhibition reveal that MET inhibition only can transiently inhibit Erk/MAPK activity, while dual MET-EGFR inhibition maintains Erk inhibition. To identify gene knockdowns that, in combination a MET inhibitor, fully inhibit Erk/MAPK and cause apoptosis an siRNA screen was performed. siRNA gene knockdown targets were identified through previous phospho-proteomic, proteomic and RNAseq experiments. siRNA studies are being performed to identify the signaling feedback loops responsible for EGFR's combination activity. MET amplified H1993 cells were grown in RPMI 1640 media with 10% FBS. RNAMax transfection reagent was used for transfection. The experiment used siRNAs to knockdown specific target RNAs in the presence and absence of MET inhibitors. After 72 hours, cell lysates were prepared, and pErk and pMET was measured using SDS-PAGE, Western immunoblots, ECL chemiluminescent detection, and cooled CCD imaging. The data were analyzed and plotted using Excel. Initial data identify multiple gene knockdowns which impact Erk signaling (as measured by phospho-Erk immunoblots) only in the context of MET inhibition. These included knockdown of JNK. Gene knockdowns also were identified which impact activation of MET (measured by phospho-MET immunoblots). In parallel small molecule inhibitors of RAF, MET, Erk/MAPK, AKT and related pathways were used. The RAF inhibitor Vemurafenib and the RSK inhibitor D1870, PAK1 (AZ13705339) reduced pErk in the presence of MET inhibitor. Latest results will be discussed. Phosphorylated ERK (pERK), a marker of cell proliferation was used to screen siRNA knockdowns of candidate genes in H1993 cells

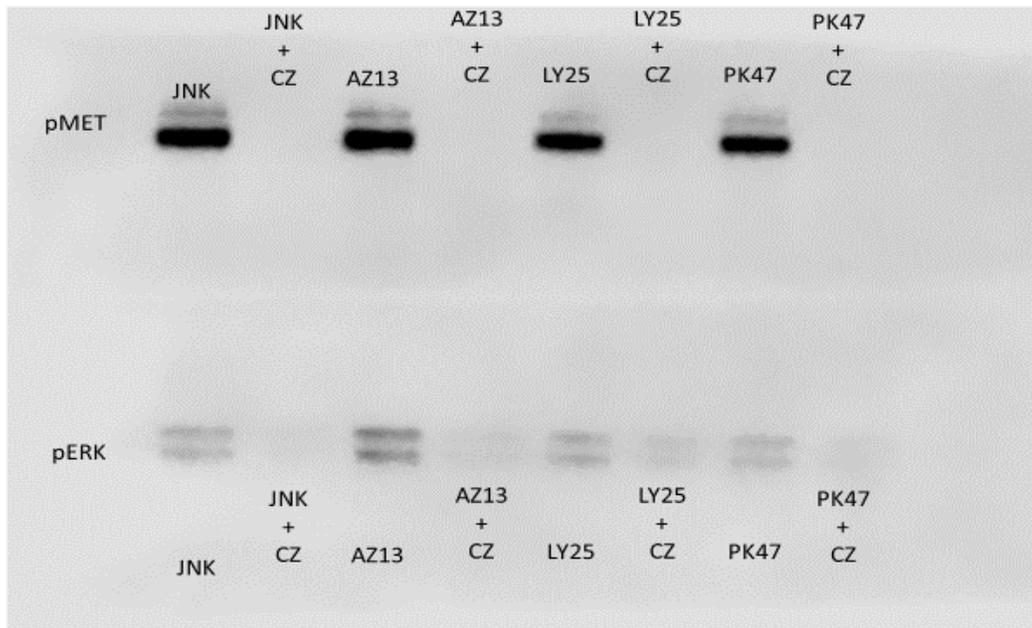
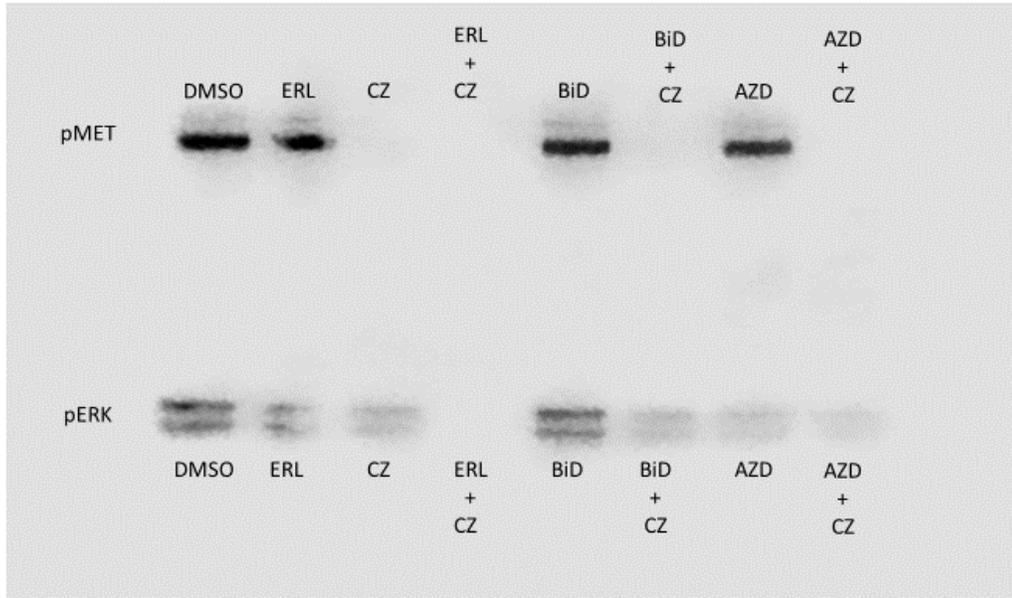
Methods: H1993 cells were grown in RPMI 1640 media with 10% FBS. The experiment used siRNAs to knockdown specific target RNAs in the presence and absence of MET inhibitors. RNAMax transfection reagent was used for transfection. After 72 hours, cell lysates were prepared, and pErk and pMET was measured using SDS-PAGE, Western immunoblots, ECL chemiluminescent detection, and cooled CCD imaging. The data will be analyzed and plotted using Excel.

Drug compound name and targets:

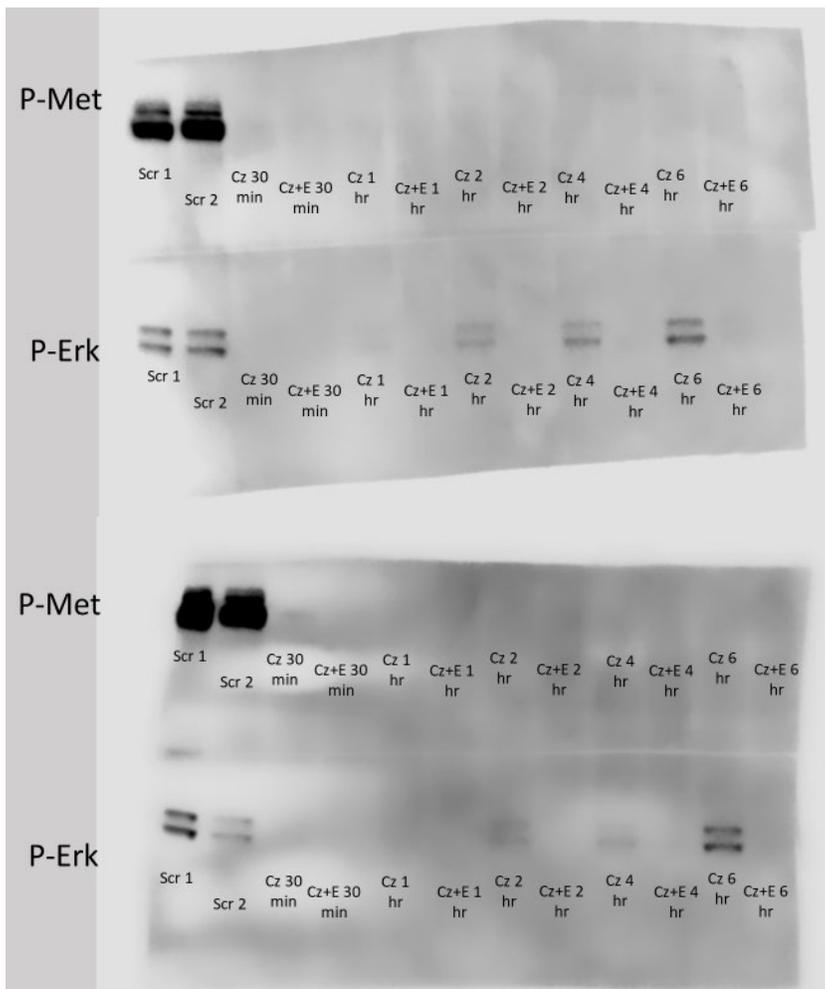
New Compounds	Target/Alias
osimertinib	mt-EGFR
savolitinib/AZD-6094	MET
Trametinib	MEK
Vemurafenib	BRAF
BI-3406	SOS1 inhibitor
BI-D1870	pan-RSK
AZD7624	p38 inhaled (p38a/MAPK14, p38b/MAPK11, p39g/MAPK12, p38d/MAPK13) MEKK
JNK-IN-8	JNK1,2,3 low nM
AZ13705339	PAK1
LY-2584702 tosylate	p70S6K
PK-4708671	p70S6K

Results: Excel analysis pending – Preliminary blots attached





Time Course:



Conclusion/Clinical relevance: EGFR inhibitors that are used as monotherapy can become troublesome as many cases of NSCLC become resistant to treatment via MET gene amplification pathways. Various small molecule inhibitors can help identify and help further characterize the MET-EGFR pathway, which could become useful in designing therapeutics with less resistance and negative side effect profiles.

Citations:

EGFR Signaling Networks in Cancer Therapy / Edited by John D. Haley, William John Gullick - Cancer Drug Discovery and Development – pp1-395, Springer Verlag/Humana (2008) <https://doi.org/10.1007/978-1-59745-356-1>.

Quantitative measurements of EGFR signaling networks: The identification of pathways and biomarkers predictive of treatment outcome - Thomson et al. Cancer Res 15 April 2006; 66 (8_Supplement): 352.

MET inhibitors for targeted therapy of EGFR TKI-resistant lung cancer – Qiming Wang, Sen Yang, Kai Wang, Shi-yong Sun – *J Hematol Oncol* **12**, 63 (2019). <https://doi.org/10.1186/s13045-019-0759-9>

Funding Sources: SBUH Pathology Department

Financial Disclosures: No known conflicts

14. Title: Association of Early Surgery and Post-Operative Complications for Patients with Infective Endocarditis: A Systematic Review and Meta-Analysis

Authors: Poornima Manikantan MD, Michael Tao MD, Tahmid Rahman MD, Puja Parikh MD, Noelle Mann MD, Robert Pyo MD
Stony Brook University Hospital, Department of Cardiology

Presenting Author: Poornima Manikantan

Presenting Author's Category: Internal Medicine Resident

Main Body:

Introduction: Infective endocarditis (IE) is a disease associated with high risk of morbidity and mortality. Recent literature suggests that surgery during index hospitalization may be performed safely without increased risk of mortality. However, the risk of post-operative complications remains unclear. The purpose of this meta-analysis is to assess the association of early surgery with post-operative complications as compared to delayed surgery in patients with IE.

Methods:

We performed a literature search for studies reporting an association between early surgery and study endpoints. The primary endpoint was post-operative neurological complications. The secondary endpoints were post-operative systemic embolic events, recurrence of IE, and need for reoperation. Early surgery was defined as surgery within 14 days of admission. The search included the following databases: Ovid MEDLINE, EMBASE, Web of Science, and Google Scholar. The search was not restricted to time or publication status.

Results: A total of 11 studies with 1857 participants (634 with early surgery vs 1223 with delayed surgery) were included. The mean duration of follow-up was 39 months (ranging between 6 to 66 months). Early surgery compared to delayed surgery was not associated with increased risk of post-operative neurological complications (OR 1.01, 95% CI 0.55, 1.85; P=0.98). Heterogeneity was low: $\text{Chi}^2 = 2.93$, $I^2 = 0\%$. Early surgery compared to delayed surgery was not associated with increased risk for post-operative systemic embolic events, recurrence of IE, or need for reoperation (OR 0.98, 95% CI 0.6, 1.61; p=0.94; OR 1.66, 95% CI 0.83, 3.33; p=0.15; OR 2.18, 95% CI 0.41, 11.69; p=0.36).

Conclusion: Early surgery performed within 14 days of initial hospitalization is not associated with increased risk of post-operative complications compared to delayed surgery.

Funding sources: None

Financial disclosures: None

15. Title: Association of Early Surgery and Mortality for Patients with Native or Prosthetic Valve Endocarditis: A Systematic Review and Meta-Analysis

Authors: Poornima Manikantan MD, Michael Tao MD, Tahmid Rahman MD, Puja Parikh MD, Noelle Mann MD, Robert Pyo MD

Stony Brook University Hospital, Department of Cardiology

Presenting Author: Poornima Manikantan

Presenting Author's Category: Internal Medicine Resident

Main Body:

Introduction: Infective endocarditis (IE) is a disease associated with high risk of morbidity and mortality. Recent studies suggests that surgery during index hospitalization may be performed without increased risk of mortality. However, differences in this association in patients with native valve IE and prosthetic valve IE remain unclear.

Methods: We performed a literature search for studies reporting an association between early surgery and study endpoints in patients with either native valve IE or prosthetic valve IE. The primary endpoint was in-hospital mortality. The secondary endpoints was long-term mortality. The search included the following databases: Ovid MEDLINE, EMBASE, Web of Science, and Google Scholar. The search was not restricted to time or publication status. Studies reporting mixed native and prosthetic valve populations were excluded.

Results: A total of 10 studies with 5493 participants (2505 with early surgery vs 2988 with conventional therapy) were included. The mean duration of follow-up was 55 months (ranging between 12 to 120 months). Early surgery in patients with native valve IE was associated with lower risk of in-hospital mortality (OR 0.48, 95% CI 0.28, 0.83; $p < 0.01$). Early surgery in patients with native valve IE was associated with lower risk of long-term mortality, however this effect was primarily driven by a single study (OR 0.26, 95% CI 0.08, 0.83; $p = 0.02$). Early surgery in patients with prosthetic valve IE was not significantly associated with risk of in-hospital mortality, however there is a trend toward lower risk (OR 0.77, 95% CI 0.58, 1.02; $p = 0.07$). There was not enough studies reporting long-term outcomes to assess the association between early surgery and long-term mortality in patients with prosthetic valve IE

Conclusion: Early surgery is associated with lower risk of in-hospital mortality in patients with native valve IE and is not associated with increased risk of mortality in patients with prosthetic valve IE. Further high-quality studies are needed to elucidate the association between early surgery and long-term outcomes in both patients with native valve IE and prosthetic valve IE.

Funding sources: None

Financial disclosures: None

16. Title: Timing of Surgery for Patients with Infective Endocarditis: A Systematic Review and Meta-Analysis

Authors: Poornima Manikantan MD, Michael Tao MD, Tahmid Rahman MD, Puja Parikh MD, Noelle Mann MD, Robert Pyo MD

Stony Brook University Hospital, Department of Cardiology

Presenting Author: Poornima Manikantan

Presenting Author's Category: Internal Medicine Resident

Main Body:

Introduction: Infective endocarditis (IE) is a disease associated with high risk of morbidity and mortality. Recent literature suggests that surgery during index hospitalization may be performed safely without increased risk of adverse clinical outcomes. However, risk associated with specific surgical timing during index hospitalization remains unclear. The purpose of this meta-analysis is to assess the association of early surgery with mortality in patients with IE.

Methods: We performed a literature search for studies reporting an association between early surgery and study endpoints. The primary endpoint was in-hospital mortality. The secondary endpoint was long-term mortality. Early surgery was defined as surgery within 14 days of admission. The search included the following databases: Ovid MEDLINE, EMBASE, Web of Science, and Google Scholar. The search was not restricted to time or publication status.

Results: A total of 15 studies with 2491 participants (900 with early surgery vs 1591 with delayed surgery) were included. The mean duration of follow-up was 33 months (ranging between 6 to 66 months). Early surgery was not associated with increased risk of in-hospital or long-term mortality compared to delayed surgery (OR 1.08, 95% CI 0.80, 1.46; P=0.63; OR 1.12, 95% CI 0.68, 1.86; P=0.65). Heterogeneity was low: $\text{Chi}^2 = 7.85$, $I^2 = 0\%$. Subgroup analysis by time to surgery demonstrated that early surgery was not associated with increased risk of in-hospital mortality for surgeries performed within 2 days, 7 days, or 14 days of hospitalization (OR 0.87, 95% CI 0.58, 1.32; P=0.51; OR 1.06, 95% CI 0.78, 1.43; P=0.72; OR 0.51, 95% CI 0.21, 1.23; P=0.13). Heterogeneity was low: $\text{Chi}^2 = 4.84$, $I^2 = 0\%$.

Conclusion: Early surgery performed within 14 days of initial hospitalization is not associated with increased risk of in-hospital mortality or long-term mortality compared to delayed surgery.

Funding sources: None

Financial disclosures: None

17. Title: Timing of Surgery for Patients with Infective Endocarditis Complicated By Stroke: A Systematic Review and Meta-Analysis

Authors: Poornima Manikantan MD, Michael Tao MD, Tahmid Rahman MD, Puja Parikh MD, Noelle Mann MD, Robert Pyo MD

Stony Brook University Hospital, Department of Cardiology

Presenting Author: Poornima Manikantan

Presenting Author's Category: Internal Medicine Resident

Main Body:

Introduction: Infective endocarditis (IE) is a disease associated with high risk of morbidity and mortality. Recent literature suggests that early surgery may be performed without increased risk of mortality, however this association in patients with IE complicated by cerebral infarction (CI) remains unclear. The purpose of this meta-analysis is to assess the association between early surgery after CI and mortality in patients with IE complicated by CI.

Methods: We performed a literature search for studies reporting an association between early surgery and study endpoints. The primary endpoint was in-hospital mortality. The secondary endpoint was long-term mortality. Early surgery was defined as surgery within 14 days of CI event. Conventional therapy was defined as surgery after 14 days of CI event. The search included the following databases: Ovid MEDLINE, EMBASE, Web of Science, and Google Scholar. The search was not restricted to time or publication status.

Results: A total of 6 studies with 747 participants (318 with early surgery vs 429 with conventional therapy) were included. The mean duration of follow-up was 36 months (ranging between 12 to 62 months). Early surgery was not associated with increased risk of in-hospital or long-term mortality compared to conventional therapy (OR 1.21, 95% CI 0.59, 2.49; P=0.6; OR 0.65, 95% CI 0.06, 7.22; P=0.72). Heterogeneity was moderate: $\text{Chi}^2 = 7.26$, $\text{I}^2 = 45\%$.

Conclusion: Early surgery within 14 days of CI is not associated with increased risk of in-hospital or long-term mortality in patients with IE complicated by CI.

Funding sources: None

Financial disclosures: None

18. Title: Characteristics of Funding for Maternal-Fetal Medicine Investigators in Obstetrics

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Presenting author' Category: Resident

Introduction To evaluate the difference in funding by the National Institutes of Health (NIH) related to obstetrics between maternal-fetal medicine (MFM) specialists and non-MFM principal investigators (PIs).

Methods This is a cross-sectional analysis performed in April 2022 examining all projects on the NIH-RePORTER website carrying the following tags: “obstetrics,” “maternal-fetal medicine,” and “perinatology.” Projects with all activity codes were included in the analysis. Variables relating to NIH funding were collected from the NIH Reporter Website. Demographic and academic productivity for PIs were abstracted from institutional websites, LinkedIn profiles, and the SCOPUS database. Statistical analysis included Chi-squared and independent t-tests with a significance value of $p < 0.05$.

Results Amongst a total of 609 studies, 39 (6.4%) of PIs were MFM physicians. Non-MFM PIs included physicians from other specialties, midwives, nurses, PIs holding PhD, and masters degrees in science. MFM PIs had significantly lower average of current active NIH funding than their PIs from other specialties (\$1,040,750 vs \$4,812,368 $p=0.03$) as well as cumulative career-long funding (\$22,499,894 vs \$7,784,877 $p=0.01$). In addition, MFM PIs had on average a lower H-index than their non-MFM counterparts, however the difference was not statistically significant (23 vs 29 $p=0.06$). When examining time since training, MFM PIs were more likely to have a shorter time since the end of training than PIs from other training backgrounds (11 vs 18 years $p < 0.01$).

Conclusions/clinical relevance When examining NIH funding, MFMs are a minority of all PIs. MFMs are awarded smaller amounts of funding within the field of obstetrical research than non-MFM PIs. MFM physicians primarily hold a clinical role, leaving less protected research time, which could be a possible cause of this difference. Despite this, differences in publications and productivity were not noted. As the field of academic MFM grows, it is important to investigate ways to increase funding of obstetrical research performed by MFM providers.

Funding source(s) NONE

Subjects (CORIHS) approval NONE

Financial disclosures NONE

19. Title: Gender Differences in Obstetrics NIH Funding

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Presenting author: Lama Nouredine, MD, lama.nouredine@stonybrookmedicine.edu

Presenting author' Category: Resident

Introduction The objective is to evaluate the distribution across genders of current National Institutes of Health (NIH)-funded studies pertaining to maternal fetal medicine (MFM).

Methods This is a cross sectional study in April 2022 that examines projects on the NIH RePORTER website, including “Active Projects” using the keywords "Maternal-Fetal Medicine," “Obstetrics,” and “Perinatology” with all activity codes. The principal investigators (PIs) were further examined for demographic and academic variables from university websites, LinkedIn, and SCOPUS. Data was analyzed using Chi-square and Kruskal-Wallis tests with an $\alpha < 0.05$.

Results Out of 609 studies, 368 (60.4%) PIs identified as women, 239 (39.2%) as men, and 2 (0.33%) as they. There was no significant difference between women and men PIs holding R01 grants (40.8% versus 44.8% respectively, $p=0.51$). However, there was a significant difference between genders holding K grants (men 13.4% vs women 23.6%, $p=0.018$). Men had higher average funding amounts across their career (men: \$34,479,470 vs. women: \$13,763,198; $p < 0.001$) and higher H-indices (men: 34.3 vs. women: 24.9; $p < 0.001$). On average, women PIs had less time since ending training (16.0 vs 19.25 years, $p=0.03$). Of the 39 (6.4%) MFM PIs, there were no significant differences between men and women in regards to R01 grants (45.4% vs. 32.1%, $p=0.89$), K grants (27.3% vs. 39.2%, $p=0.403$), cumulative career NIH funding (\$21,767,182 vs. \$13,764,264, $p=0.094$), or average time since training (11.8 vs. 10.8 years, $p=0.97$). Men MFM PIs had higher average H-indices than women MFMs (37.2 vs. 18.2, $p=0.047$). Nationally, 8 academic institutions host the majority (53.4%) of all MFM PIs with an active NIH project with the studied keywords

Conclusions/clinical relevance While women have more NIH-funded studies than men, they have lower average cumulative funding and H-indices. The disparities seen among all PIs were not seen within MFM physicians, except in regards to H-indices. Gender disparities in funding and publications continue to exist in NIH-funded studies in obstetrics.

Funding source(s) NONE

Subjects (CORIHS) approval NONE

Financial disclosures NONE

20. Title: Association of Revascularization with Mortality in Ischemic Left Ventricular Dysfunction

Authors: Archanna Radakrishnan MD, Michael Tao MD, Yang Liu MD, Tahmid Rahman MD, John P Reilly MD, Robert Pyo MD

Presenting Author: Archanna Radakrishnan, archanna.radakrishnan@stonybrookmedicine.edu

Presenting author category: Resident

Abstract:

Background: Revascularization in patients with left ventricular (LV) dysfunction has been a subject of ongoing uncertainty and conflicting results. This is further complicated by factors including viability, severity of LV dysfunction, and method of revascularization using percutaneous coronary intervention (PCI) versus coronary-artery bypass grafting (CABG). The purpose of this meta-analysis is to evaluate the association of coronary revascularization with mortality in patients with ischemic LV dysfunction.

Methods: A literature search was conducted for studies reporting on all-cause mortality after revascularization with PCI or CABG compared to optimal medical therapy (OMT) in patients with ischemic LV dysfunction. The search included the following databases: Ovid MEDLINE, EMBASE, Web of Science, and Google Scholar. The search was not restricted to time or publication status.

Results: A total of 21 studies with 6062 participants (2838 revascularized, 3224 on OMT) met inclusion criteria. Mean follow-up was 37 months (11-68 months), mean LV ejection fraction (EF) was 29%, mean age was 61, 85% of patients were male.

Revascularization was significantly associated with lower all-cause mortality compared to patients on OMT (OR 0.57, 95% CI 0.46-0.71; $p<0.01$). The association was statistically significant regardless of severity of LV dysfunction or method of revascularization. Heterogeneity between subgroups was low and test for subgroup difference was not statistically significant by EF cutoff of 35% or by revascularization method ($p=0.43$, $I^2=0\%$; $p=0.12$, $I^2=59.7\%$).

Subgroup analysis by viability demonstrated that revascularization was significantly associated with lower all-cause mortality compared to OMT for patients with viability and mixed cohorts with or without viability, but not patients without viability (OR 0.47, 95% CI 0.33-0.66; $p<0.01$; OR 0.57, 95% CI 0.38-0.84; $p<0.01$; OR 0.73, 95% CI 0.51-1.02; $p=0.07$). The effect size was larger in the subgroup with viable myocardium compared to mixed patients with viable or non-viable myocardium ($Z=4.33$ vs 2.79).

Conclusions: Revascularization in patients with ischemic LV dysfunction is associated with lower risk of all-cause mortality independent of severity of LV dysfunction or method of revascularization. Revascularization is not associated with lower risk of all-cause mortality in patients without evidence of viable myocardium.

21. Title: Association of Revascularization with Cardiovascular Outcomes in Ischemic Left Ventricular Dysfunction

Authors: Archanna Radakrishnan MD, Michael Tao MD, Yang Liu MD, Tahmid Rahman MD, John P Reilly MD, Robert Pyo MD

Presenting Author: Archanna Radakrishnan, archanna.radakrishnan@stonybrookmedicine.edu

Presenting author category: Resident

Abstract:

Background: The utility of revascularization in patients with left ventricular (LV) dysfunction has been called into question with currently literature revealing conflicting results. The purpose of this meta-analysis is to evaluate the association of revascularization with percutaneous coronary intervention (PCI) or coronary-artery bypass grafting (CABG) and cardiovascular outcomes in patients with ischemic LV dysfunction.

Methods: A literature search was conducted for studies reporting on clinical endpoints after revascularization with PCI or CABG compared to optimal medical therapy (OMT) in patients with ischemic LV dysfunction. The primary endpoint was cardiovascular (CV) mortality. Secondary endpoints include heart failure (HF) hospitalization and acute myocardial infarction (AMI). The search included the following databases: Ovid MEDLINE, EMBASE, Web of Science, and Google Scholar. The search was not restricted to time or publication status.

Results: A total of 16 studies with 3379 patients (1693 revascularized, 1686 on OMT) met inclusion criteria. Mean follow-up was 38 months (11-68 months), mean LV ejection fraction (EF) was 28%, mean age was 61, 86% of patients were male.

Revascularization was associated with significantly lower risk of CV mortality compared to OMT (OR 0.54, 95% CI 0.40, 0.74; $p < 0.01$). This association was significant on subgroup analysis regardless of severity of LV dysfunction. Subgroup analysis by viability showed revascularization to be associated with lower risk of CV mortality in patients with viable myocardium but not in patients with non-viable myocardium (OR 0.42, 95% CI 0.22, 0.80; $p < 0.01$; OR 1.08, 95% CI 0.52, 2.26; $p = 0.83$). Revascularization was not associated with a significant difference in risk of HF hospitalization or AMI compared to OMT (OR 0.9, 95% CI 0.71, 1.14; $p = 0.38$; OR 0.95, 95% CI 0.62, 1.45; $p = 0.81$).

Conclusions: Revascularization by PCI or CABG compared to OMT in patients with ischemic LV dysfunction is associated with lower risk of CV mortality independent of severity of LV dysfunction. Revascularization is not associated with lower risk of CV mortality in patients with non-viable myocardium and is not associated with lower risk of AMI or HF hospitalization. Additional high quality prospective studies are required to further assess the utility of revascularization in patients with ischemic LV dysfunction.

22. Title: Prognostic Value of Myocardial Strain on Cardiac Magnetic Resonance Imaging in Patients with ischemic Cardiomyopathy

Authors: Archanna Radakrishnan MD, Michael Tao MD, Edlira Tam MD, Neda Dianati-Maleki MD, Marc Goldschmidt MD, Noelle Mann MD

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Abstract:

Background: Myocardial strain measurements using feature tracking imaging (FTI) on cardiac magnetic resonance (CMR) has emerged as a reliable method for evaluating myocardial function. However, the prognostic value of left ventricular strain measurements on CMR remains unclear in patients with nonischemic cardiomyopathy (NICM). The purpose of this meta-analysis is to evaluate the association of myocardial strain measurements with adverse outcomes in patients with NICM.

Methods: A literature search was conducted for studies reporting on the association of left ventricular global longitudinal strain (LVGLS), left ventricular global circumferential strain (LVGCS), and left ventricular global radial strain (LVGRS) using FTI on CMR with cardiovascular outcomes on long term follow-up in patients with NICM. The primary endpoint was major adverse cardiac events (MACE). The search included the following databases: Ovid MEDLINE, EMBASE, Web of Science, and Google Scholar. The search was not restricted to time or publication status.

Results: A total of 6 studies with 1004 participants (251 with MACE and 753 without MACE) met inclusion criteria. Mean follow-up duration was 39 months. Mean ejection fraction was 27%. Baseline LVGLS, LVGCS, and LVGRS were significantly lower in NICM patients who subsequently experienced MACE on follow-up compared to patients without MACE (SMD -0.58, 95% CI -1.01, -0.15; $p < 0.01$; SMD -0.58, 95% CI -0.96, -0.21; $p < 0.01$; SMD -0.43, 95% CI -0.81, -0.05; $p = 0.03$).

Conclusions: Myocardial strain measurement using FTI on CMR may represent a useful clinical tool for risk stratification of NICM patients at risk for adverse cardiac events.

23. Title: Prognostic Value of Strain Echocardiography Measurements in Patients with Non-ischemic Cardiomyopathy

Authors: Archanna Radakrishnan MD, Michael Tao MD, Edlira Tam MD, Neda Dianati-Maleki MD, Marc Goldschmidt MD, Noelle Mann MD

Presenting Author: Archanna Radakrishnan, archanna.radakrishnan@stonybrookmedicine.edu

Presenting author category: Resident

Abstract:

Background: Speckle tracking echocardiography has been increasingly used in the evaluation of myocardial function. However, the association of reduced strain measurements with cardiovascular outcomes remains unclear in patients with nonischemic cardiomyopathy (NICM). The purpose of this meta-analysis is to evaluate the prognostic value of speckle tracking echocardiography in patients with NICM.

Methods: A literature search was conducted for studies reporting on the association of left ventricular global longitudinal strain (LVGLS), left ventricular global circumferential strain (LVGCS), left ventricular global radial strain (LVGRS), and right ventricular global longitudinal strain (RVGLS) on baseline echocardiography with cardiovascular outcomes on long term follow-up in patients with NICM. The primary endpoint was major adverse cardiac events (MACE). Secondary endpoints included left ventricular reverse remodeling (LVRR) and ventricular arrhythmias (VA). The search included the following databases: Ovid MEDLINE, EMBASE, Web of Science, and Google Scholar. The search was not restricted to time or publication status.

Results: A total of 17 studies with 2375 participants (640 with adverse outcomes and 1735 without adverse outcomes) met inclusion criteria. Mean follow-up duration was 33 months. Mean ejection fraction was 30%. Baseline LVGLS, LVGCS, LVGRS, and RVGLS were significantly lower in NICM patients who subsequently experienced MACE on follow-up compared to patients without MACE (SMD -0.57, 95% CI -0.82, -0.32; $p < 0.01$; SMD -0.54, 95% CI -0.75, -0.33; $p < 0.01$; SMD -0.51, 95% CI -0.7, -0.32; $p < 0.01$; SMD -0.46, 95% CI -0.75, -0.18; $p < 0.01$). Baseline LVGLS was significantly higher in patients who experienced LVRR on follow-up compared to patients without LVRR (SMD 0.36, 95% CI 0.05-0.68; $p = 0.02$). Baseline LVGLS was significantly lower in NICM patients who experienced VA on follow-up (SMD -1.19, 95% CI -2.12, -0.26, $p = 0.01$).

Conclusions: Speckle tracking echocardiography may represent a useful clinical tool for risk stratification of NICM patients at risk for adverse cardiac events and poor treatment response.

24. Title: Mental Health Disparities in the LGBTQ+ population

Authors: Namita Akolkar¹, MD, April Castillo¹, MD MPH, Allison Eliscu², MD, Melissa Schwartz¹, DO

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Presenting author's Category: Resident

Abstract

Introduction: Research has established that LGBTQ+ individuals face substantial mental health disparities compared to the general population. To better understand specific minority stressors, needs, and experiences among subpopulations of gender identities, the Long Island LGBTQ+ Community Health Needs Survey was conducted by Stony Brook Medicine in 2021. This study focuses on the rates of depression and anxiety in people who are transgender or non-binary.

Methods: The anonymous online survey, customized for the LGBTQ+ population with input from community partners and focus groups, assessed individuals' healthcare needs, experiences, behaviors, health status including mental health, and access to care. Electronic and in-person promotion and convenience snowball sampling were used to recruit participants in June-September 2021.

Results: The sample (N=1,150) consisted of many gender identity subgroups. 63.2% of transgender and/or non-binary respondents reported symptoms of anxiety disorder per PHQ-4 scoring. Compared to cisgender LGBTQ+ respondents, transgender and/or non-binary respondents had statistically significant higher rates of both anxiety and depression ($p < 0.001$ for each). Non-binary respondents, compared to transgender individuals identifying as male or female, had higher rates of anxiety ($p = 0.009$), but not of depression ($p=0.193$).

Conclusions/clinical relevance: The LGBTQ+ community is not a homogeneous population; it contains unique subgroups with different experiences, health conditions, and barriers to care. Within the transgender population studied, differences are seen between the gender identities, with those who identify as non-binary fairing worse. Understanding these differences can guide implementation of services to target subpopulations in order to improve care and reduce disparities. Further research on anxiety in the transgender population, and particularly the non-binary population is needed.

Strategies are needed to reduce mental health care disparities by educating clinicians on affirming care, establishing policy based on specific LGBTQ+ needs and experiences, responding to community needs through outreach, and improving access to care.

Funding source(s): N/A

Human Subjects: N/A

Financial disclosures: No disclosures

25. Title: Improved Post Operative Outcomes with ERAS protocol in the Pediatric Ambulatory Surgical Population

Authors and Institution: Niharika Singh MD, Jane Ahn MD, Xin Chen MD, Sherwin Park MD, Robert Moore MD, Helen Hsieh MD, PhD; Stony Brook University Hospital Department of Pediatric Surgery

Presenting author: Niharika Singh MD; Niharika.Singh@stonybrookmedicine.edu

Presenting author's category: Resident

Introduction:

Currently, there are no enhanced recovery after surgery (ERAS) protocols standardized in the pediatric population. An international study showed that children undergoing gastrointestinal surgery with ERAS protocols have improved bowel function recovery time, duration of postoperative hospital stay, and lower hospital costs.¹ Few studies exist that establish the best practices in pediatric surgery; however, some cite the use of IV acetaminophen, regional anesthesia, multidisciplinary communication, tailored post op nausea and vomiting therapy, prevention of hypothermia, and early initiation of ad libitum feeds as means of improving patient outcomes.^{2,3} The objective of the current study is to determine if implementation of an ERAS protocol would improve patient outcomes in the ambulatory pediatric urologic population.

Methods:

A retrospective analysis was performed on pediatric patients who underwent urologic procedures (circumcision, orchiopexy, hypospadias correction, and other) in the ambulatory surgical setting. Outcomes including opioid use, opioid free care, home pain control, time in recovery, need for rescue pain medications, and adverse events were compared between pediatric patients receiving standard of care (n=30) and pediatric patients receiving the ERAS protocol (n=29).

Results:

The application of the ERAS pathway led to significantly increased opioid free care (43% vs 7%, p<0.01) and increased percentage of families reporting excellent home pain control (100% vs 92%), without increased need for rescue pain medicines (13% vs 16%, p=1), increased recovery time in PACU (63.5 mins vs 66.7 mins, p=0.87), or incidence of adverse events (0% vs 0%).

Few studies exist studying ERAS protocols in the pediatric population, but this study shows that postoperative pain measures are improved in pediatric patients receiving ERAS protocol compared to those receiving standard of care, without increased risk of adverse events. Therefore, this work serves as a proof of concept that ERAS protocols can improve postoperative outcomes in the pediatric ambulatory surgical population. Further studies are needed to discern the impact of specific pathway elements on outcomes and the application of standardized ERAS protocols to other pediatric surgical subspecialties.

Funding source: none

Financial disclosures: none

References:

¹Gao R., Yang H., Li Y., et al. Enhanced recovery after surgery in pediatric gastrointestinal surgery. *Journal of International Medical Research*. 2019;47(10):4815-4826. doi:10.1177/0300060519865350

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Anesthetic Administration	Control (n = 30)	ERAS (n = 29)
Fentanyl (mg/kg)	1.7	1.1
Opioid-free	7%	43%
PACU Pain Rescue Medication	16%	13%
Pain Controlled at Home	92%	100%

26. Title: Tick-borne Cardiogenic Shock: Electrical and Mechanical Manifestations of Babesiosis

Authors: Greg Despotidis¹ MD, Ammarah Spall¹ MD, Frank Hwang¹ MD, Michael Tao² MD, On Chen² MD

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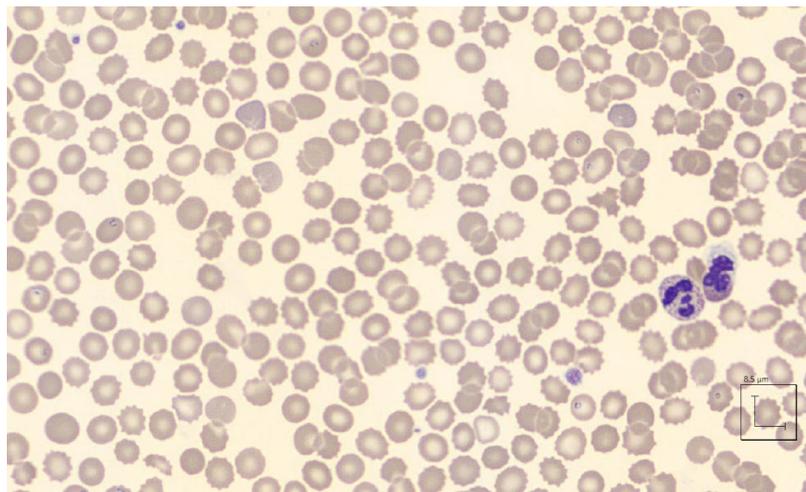
Presenting Author: Ammarah Spall MD (Ammarah.Spall@stonybrookmedicine.edu)

Presenting Author Category: Resident

Introduction: Babesiosis is a tick borne intraerythrocytic protozoan infection that can manifest as new onset heart failure through cardiac involvement. **Case Description:** A seventy-two-year old Caucasian male presented to the Emergency Room after developing worsening dyspnea, orthopnea, weakness, lethargy, anorexia, confusion, periorbital edema, and scrotal edema. Cardiovascular examination was significant for tachycardia with an irregular rhythm, elevated jugular venous pressure, anasarca, and cool extremities. The differential diagnosis for this patient's acute decompensated heart failure included tachycardia induced cardiomyopathy, acute myocardial infarction, and myocarditis. A complete echocardiogram demonstrated severely reduced LV systolic function with diffuse hypokinesis, estimated ejection fraction of 16.5%, severe swirling of contrast at the LV apex consistent with low flow state, severe diastolic dysfunction, severely reduced right ventricular systolic function, biatrial enlargement, mild-moderate mitral regurgitation, and mild tricuspid regurgitation. The patient was admitted to the Cardiac Intensive Care Unit. He underwent bedside Swan-Ganz pulmonary artery catheter placement with his hemodynamic profile suggestive of mixed cardiogenic and vasodilatory shock. He was placed on a lasix drip for his volume overload, phenylephrine and milrinone for his shock state, and digoxin for rate control of atrial flutter. Hematological blood smears demonstrated intraerythrocytic parasites, which was confirmed to babesia species and eventually speciated to *Babesia microti* (Image 1). Throughout his hospital course he was able to weaned off inotropic support and underwent transesophageal echocardiogram with electrical cardioversion to normal sinus rhythm. His parasitemia count became undetectable after eight days of Azithromycin and Atovaquone. He made a significant recovery and was discharged home with close follow up.

Clinical Relevance: Although *Babesia* has a low overall incidence, certain areas are endemic such as Long Island and Rhode Island. The symptoms of babesiosis are high grade fevers, chills, diaphoresis, weakness, and anorexia. Given the non-specific nature of these symptoms and low incidence of disease, clinicians require a high index of suspicion to test for and establish the diagnosis. For these reasons, the diagnosis of babesiosis is frequently delayed up to two weeks between the onset of symptoms and diagnosis. While most cases of babesiosis are mild, many diverse sequelae can occur in patients. We would like to share a case of severe electrical and mechanical cardiovascular complications of Babesiosis and to share the importance of rapid diagnosis in endemic regions.

Image 1



27. Title: PROMOTING SAFE GUN STORAGE AMONG VETERANS TO PREVENT AND REDUCE GUN-RELATED SUICIDE AND ACCIDENTS: A VA RESIDENT CLINIC PILOT INITIATIVE

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Category: Resident Physician, PGY-2

Introduction:

Gun locks reduce the risk of firearm related accidents and suicides. This project was developed to increase the frequency of firearm safety screening and gun lock distribution during primary care visits at a U.S. Department of Veterans Affairs (VA) resident primary care clinic in Northport, NY.

Methods:

We distributed an anonymous, electronic survey to residents in our primary care clinic to determine how frequently the subjects of firearm ownership and safety were discussed with patients, and to assess knowledge of current securement programs at the VA. We then developed an electronic gun safety reminder in the Electronic Medical Record (EMR) to encourage routine documentation of firearm ownership, firearm storage safety, and the distribution of gun locks.

Results:

Our survey was completed by 40 of 48 residents. Of the respondents, 87.5% reported never asking veteran patients about possessing firearms, 12.5% reported sometimes asking, and 0% reported always asking. Of respondents, 45% reported being not at all comfortable discussing gun ownership and safety, 50% somewhat, and 5% very comfortable. All residents surveyed were not aware of gun securement programs. Our newly created reminder has been used to screen 7414 patients. Of those screened, 5343 reported having access to firearms, with an average of 3.1 guns per veteran. Of those with access, 3234 did not safely store their firearm. Of those that did not, 193 were not interested in receiving a gun lock. We have distributed over 2000 locks to veterans so far. Prior to our initiative there were zero locks distributed.

Conclusions/Clinical Relevance:

Firearm safety and storage was not a routine part of primary care screening in our clinic. There was an overwhelming lack of knowledge on VA firearm securement programs amongst residents. Our novel EMR reminder greatly improved routine firearm safety discussion and gun lock distribution to veterans.

Funding source(s) & Financial disclosures:

The authors declare no conflicts of interest. The authors received no financial support for the research, authorship, and/or publication of this research and have no financial interests or funding sources that relate to the research described in this paper.

28. Title: COVID Pandemic Effect on Prenatal Care Utilization in Women with OUD

Authors: Lauren Stewart, MD, Chaitali Korgaonkar-Cherala MD, Bijal Parikh, MD, Eliane Shinder, BS, Cassandra Heiselman, DO, MPH, Kimberly Herrera, MD, Diana Garretto, MD, David Garry, DO. *Department of Obstetrics, Gynecology and Reproductive Medicine*

Presenting author: Lauren Stewart, lauren.stewart@stonybrookmedicine.edu,

Presenting author's Category: Resident

ABSTRACT

Introduction: The opioid epidemic and COVID-19 have significantly impacted pregnant patients. The purpose of this study is to identify changes in Medications for Opioid Use Disorder (MOUD) utilization in women with opioid use disorder before and during the COVID-19 pandemic.

Methods: This retrospective, single center, cohort study identified patients with opioid use disorder presenting for delivery from January 2017 through July 2022. Variables included type of provider (maternal opioid management support (MOMS) clinic, private provider, resident clinic, generalist clinic), timing of initial prenatal care, postpartum use of medications for opioid use disorder (MOUD) upon discharge (newly prescribed upon discharge, previously initiated, unknown), and timing of initial pediatric consultation. Statistical analysis included Chi square and student t tests.

Results: There were 396 pregnant persons included in this study. 256 (65%) delivered before COVID and 140 (35%) delivered during the pandemic. Maternal age, insurance type, GA at delivery, PTD rate, mode of delivery, birth weight, and NICU admission were similar between the groups. Prior to the COVID pandemic, prenatal care was more often initiated in the second (27.8%) or third trimester (4.8%) and occur in private (27.6%) or resident clinics (13.8%). During the COVID pandemic, more patients started initial prenatal care in the first trimester (63.3%) and were more likely to establish care in a specialized MOMS clinic (72.4%). Pediatric consultations were more often obtained prenatally (16.7%) prior to the pandemic, whereas during the pandemic pediatric consults occurred after delivery (76.4%).

Conclusions: During COVID more patients established prenatal care through a specialized prenatal clinic for people with opioid use disorder. Patients with OUD during the pandemic were more likely to initiate prenatal care in the first trimester, which is earlier than before the COVID-19 pandemic when most patients did not establish care until the second trimester.

Funding source(s): none

Financial disclosures: none

29. Title: Women’s Health Social Media Consumption: A cross-sectional survey

Authors: Lauren Stewart, MD¹, Olivia L Hanson, BS², Fatima Daoud-Yilmaz, MD¹

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Presenting author’s Category: Resident

ABSTRACT

Introduction: For better or for worse, social media plays an indisputably important role in the sharing of information, with women’s health content being no exception. Although social media has the opportunity both to fictionalize health information to a large audience, limited research has been published specifically on women’s health information and social media influence. The purpose of this project is to gain an understanding not only of the type of women’s health information women seek out, but also the credentials of those producing the content. We hypothesize that followers with medical conditions are more likely to turn to social media for information compared to those with no prior diagnoses.

Methods: This cross-sectional study was conducted via online surveys distributed on the social media posts of study team members. Viewers were invited to share the post and embedded link to the survey amongst their own social circles. Survey invitations were not individually extended or solicited in order to minimize bias. Exclusion criteria for the study included non-cisgender women who are under the age of 18 years old, non-English speaking, living outside of the United States, and who do not use social media to view content on women’s health. Statistical analysis included chi-square and t-tests as appropriate.

Results: A total of 1475 online participants engaged in this survey with 844 meeting inclusion criteria. 74.6% of participants report following accounts because they discuss issues related to their personal health issues. 72.8% report credentials of ObGyn on ≥ 1 account they follow.

94.8% of participants reported “educational videos/content,” as a reason for viewing women’s health content on social media. However, 14.5% of respondents in that same group reported not knowing the credentials for at least one account that they followed.

Conclusion: Of the surveyed participants who met inclusion criteria, the majority followed or viewed content related to their own personal health and created by ObGyn accounts. However, a large portion of participants also listed “I don’t know,” or “N/A” for accounts they followed/viewed. While this may be indicative of an unawareness of the credentials of the creators they follow, it may also be representative of an inability to recollect credentials. There is room for further investigation into whether participants' reported credentials for accounts are accurate, as well as further analysis into sub populations, including possible differences in participants with backgrounds in health care versus those without healthcare backgrounds.

Funding source: none

Financial disclosures: none

IRB2022-00452, approved October 5, 2022

30. Title: Multiple Myeloma Metastasis to the Pineal Gland: A Case Report from Long Island, New York, USA

Authors: Marielle Torres, Danielle Bazer, Agnieszka Kowalska

Department of Neurology

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Presenting Author's Category: Resident

Multiple myeloma (MM) is one of the most common bone cancers in older adults, occurring as a neoplasm that emerges from a clone of differentiated plasma cells, ultimately resulting in proliferation of a monoclonal immunoglobulin. The plasma cells accumulate in the bone marrow, often producing osseous lesions (1). Although rare, extramedullary proliferation of these plasma cells can occur (2). Extramedullary proliferation has been identified in 10-16% of MM patients, most often in the lymph nodes, spleen, liver, and kidney, but has been identified in every organ system. We present a rare case of a 71 year-old female with MM, diagnosed in 2010 and treated with several chemotherapy agents and steroids, found to have metastasis to her pineal gland after initially presenting with altered mentation. Her course was complicated by obstructive hydrocephalus requiring ventriculostomy. Metastasis was confirmed with biopsy from the pineal gland. Metastasis to the pineal gland is rare and typically secondary to primary lung cancer, but other primary lesions including breast, kidney, cervical, esophageal, gastric, colon, and skin have been identified (3,4). Literature review has only yielded two case reports of MM metastasis to the pineal gland (5,6). Though metastasis to the pineal gland is rare, and MM an unlikely primary source, patients known to have MM presenting with neurologic symptoms should be evaluated for extramedullary lesions in the brain.

- No funding sources
- No financial disclosures to report

31. Title: Detection of *Rickettsia rickettsii* Antibodies Among Children with Unlikely Rocky Mountain Spotted

Fever **Authors:** Joye Wang, DO¹; Andrew Handel, MD^{1,2}

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Presenting Author: Joye Wang, DO (joye.wang@stonybrookmedicine.edu)

Presenting Author's Category: Resident

Introduction:

Rocky Mountain spotted fever (RMSF) is a potentially devastating tickborne infection caused by *Rickettsia rickettsii*. Diagnosis is challenging due to non-specific symptoms and frequently negative antibody-based testing early in disease course. Early doxycycline administration reduces poor outcomes but is sometimes prescribed without clear exposure or suggestive symptoms. Confusion also arises from the detection of *R. rickettsii* antibodies in patients lacking symptoms suggestive of RMSF, possibly due to cross-reaction with other Rickettsial species of unknown clinical impact. Our study aims to describe RMSF antibody results and clinical presentation in a low incidence region, focusing on patients with *R.rickettsii* antibodies but lacking typical RMSF symptoms.

Methods:

Retrospective chart review of patients ≤ 21 years old tested for RMSF IgG within the Stony Brook Medicine system from 2010-2020. Patients were identified by ICD-9/-10 RMSF diagnosis code and/or IgG test results. Charts without clinical notes were excluded. Data collected included demographics, symptoms, laboratory results, treatments, and outcomes. Based on CDC case definitions (Table) presenting symptoms and serological testing results were used to classify patients as having likely acute RMSF (IgG+ and typical symptoms), unlikely acute RMSF (IgG+ and lacking typical symptoms), or RMSF negative (IgG-, regardless of symptoms). Data were recorded in Qualtrics. Descriptive statistics were calculated.

Results:

172 charts met inclusion criteria and were reviewed. The average patient age was 14 years old and 56% were male. Of RMSF case categories 7.6% had likely acute RMSF, 6.4% had unlikely acute RMSF, and 86% with negative RMSF. Among all 172 screened, 52% had fever, 41% had a rash, and 40% had headache. Of these 'classic triad' symptoms, 10% of patients tested experienced all three and 23% experienced none. Among those with unlikely RMSF, no common clinical features were identified to suggest a shared infectious source.

Conclusions:

R. rickettsia antibodies were detected in a large portion (6.4%) of children lacking clinical evidence of Rocky Mountain spotted fever. Among this subset of patients tested for RMSF, no common symptom constellation was identified. The source of *R.rickettsii* IgG in this population is unclear, but a mild infection, possibly due to a different Rickettsial species, is suspected. Limiting RMSF serological screening to those patients with at least some of the classic triad symptoms will reduce unnecessary testing, treatment, and anxiety.

Table: Rocky Mountain spotted fever (RMSF) clinical, laboratory, and case classification definitions based on the CDC case surveillance definitions.

Clinical criteria:	Fever and ≥ 1 other symptom: rash, eschar, headache, myalgia, anemia, thrombocytopenia, or hepatic transaminase elevation	
Laboratory criteria:	Confirmatory laboratory evidence	Fourfold increase in <i>R.r.</i> IgG between acute and convalescent testing (one taken in the first two weeks after illness onset and a second

		taken two to ten weeks after acute specimen collection)	
	Presumptive laboratory evidence	Elevated IgG titer $\geq 1:128$ reactive within 60 days of illness onset	
	Supportive laboratory evidence	Elevated IgG titer $< 1:128$ reactive within 60 days of illness onset	
RMSF case classifications:		Clinical classification:	Laboratory classification:
Likely acute RMSF	Confirmed	Meets clinical criteria	Confirmed
	Probable	Meets clinical criteria	Presumptive
	Suspected	Meets clinical criteria	Supportive
	Unlikely acute *	Does not meet criteria	Single IgG $\geq 1:64$
	Negative *	May meet or not meet clinical criteria	Negative ($< 1:64$) <i>R.r.</i> IgG

* RMSF case classifications not included in the CDC definitions

Funding Source: None

IRB Approval: IRB2021-00320

Financial disclosures: None

32. Title: Factors Associated with HPV Vaccine Uptake among Students at Stony Brook University

Authors: Christine Yeh, MD (Preventive Medicine Resident; Department of Family, Population and Preventive Medicine), Kathleen Scarbrough MD, MPH (Department of Family, Population and Preventive Medicine), Sana Malik, DrPH, MSW, MPH (School of Social Welfare), Wei Hou, PhD (Department of Family, Population and Preventive Medicine)

Presenting Author: Christine Yeh, MD, christine.yeh@stonybrookmedicine.edu

Presenting Author's Category: Resident

Introduction: Human Papillomavirus (HPV) is implicated in numerous cancers and diseases of the reproductive tract. Although the HPV vaccine has been shown to prevent over 90% of these cancers, vaccination rates have fallen short of the Healthy People 2030 80% HPV vaccination goal. The objective of this study is to determine factors associated with HPV vaccine uptake among college students in order to design educational messaging interventions to help increase HPV vaccine initiation and uptake.

Methods: An IRB-approved online Qualtrics survey assessing demographic information, HPV and HPV vaccine knowledge (using a validated tool), HPV vaccine status, and barriers and facilitators to vaccination was distributed via university email to all Stony Brook University students aged 18-26 in spring 2022. Analysis included descriptive statistics, Pearson chi-square, Spearman's correlation, and binary logistical regression models.

Results: Of the 797 surveys completed, 709 were analyzed using an 80% completion cut-off rate. Mean age was 21.08 (SD 2.20), 71% were female, 43% White, 41% Asian, 76% were undergraduate students, and 81% were born in the United States. The overall rate for at least one HPV vaccine was 59%, with a significant difference between males (49%) and females (62%), $p=.007$. Provider recommendation for the vaccine was reported by 72% of the students with a significant difference between males (60%) and females (77%), $p<.001$. Factors associated with HPV vaccine uptake were perceived vaccine safety (OR = 2.15; (1.57, 2.93)), provider recommendation (OR = 10.24; (4.70, 22.28)), and importance of family opinion (OR = 1.44; (1.10, 1.88)). 73.45% of respondents listed health care providers as their preferred method of receiving information about the HPV vaccine, with Internet/Google search and social media preferred by 51.84% and 35.17% of respondents, respectively.

Conclusions: Perception of vaccine safety, provider recommendation, and importance of family opinion were significantly associated with increased likelihood of having had the HPV vaccine. The majority of respondents preferred to receive information about HPV and the HPV vaccine via health care provider recommendation.

Clinical Relevance: Identification of significant predictive factors in HPV vaccination uptake and understanding how students wish to receive information can be useful in designing evidence-

based intervention strategies for Stony Brook University students to increase HPV vaccination intention and uptake.

Funding Sources: Supported by an Institutional Research Grant from the American Cancer Society and the Island Outreach Foundation

Financial Disclosures: The authors do not have any financial disclosures.



FELLOWS



1. Title: ERGONOMICS IN ENDOSCOPY: THE IMPACT OF ERGONOMICS TRAINING CURRICULUM ON KNOWLEDGE AND BEHAVIOR AMONGST GASTROENTEROLOGY FELLOWS

Authors: Aruj Choudhry, MD¹, Rashmi Advani, MD⁴, Joseph Giglio, DPT, CWS², Michele Dookram, OTR², Gagan Verma, MD³, Alana Persuad, MD⁵, Anam Rizvi, MD⁶, Farah Monzur, MD¹

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Presenting author: Aruj Choudhry, MD, Aruj.choudhry@stonybrookmedicine.edu, Fellow

Introduction: Gastroenterologists are at risk of developing musculoskeletal (MSK) injuries associated with repetitive motions and posture during endoscopy. Survey-based studies show there is a high prevalence of endoscopy-related (ER) MSK pain and injury amongst practicing endoscopists. Implementing a standardized ergonomics curriculum (EC) during training will improve ER knowledge and help develop protective ergonomic behaviors that may minimize long-term pain and disability related to endoscopy. We created a novel standardized EC that educated gastroenterology (GI) fellows about ER and then tested the impact of the implemented curriculum. **Methods:** We performed a prospective, survey-based pilot analysis at Stony Brook University (SBU). The EC consisted of 3 lecture series created in collaboration with our Physical and Occupational Therapy department. These were presented to 11 GI fellows over 3 months in 2022. Two surveys were distributed pre and post-EC: 1.)10-question survey to GI fellows evaluating their ER knowledge; 2.)6-question survey to GI faculty on the GI fellows’ observed ergonomic techniques during 2 clinical colonoscopies. Fellows were evaluated on two principles: room adjustment and personal technique modification to optimize ergonomics while performing endoscopy. (see Table 2) **Results:** A total of 22 surveys evaluating ER knowledge were completed by GI fellows (6 male vs 5 female, see Table 1) pre and post-EC. A total of 36 surveys were collected from GI faculty evaluating ergonomic behaviors implemented by GI fellows pre vs post-EC. There was significant improvement in ER knowledge amongst the GI fellows (40% vs 70%, respectively (p < 0.001). There was also significant improvement in both room adjustment pre- vs post- EC, (78% vs 98%, respectively (p = 0.005)) and in personal technique modification (2.72 vs 3.21, respectively (p = 0.031)). While the “time employing a pencil grip on colonoscope” improved overall post-EC, female trainees were noted to have less improvement compared to male trainees in a subgroup analysis (31-69% vs 56-88%, respectively). This was also noted for smaller glove sizes; glove sizes 6.5 or less, held “pencil grip” on the endoscope for less average times vs those with a glove size 7 or greater (25-50% vs 50-88%, respectively). **Conclusion:** Implementing a standardized EC is associated with improvement in ER knowledge and ergonomically favorable strategies employed, which may help mitigate future ER-injuries amongst GI fellows. Female gender and smaller glove size are associated with less employed “pencil grip”, a technique theorized to minimize excessive applied force. Larger implementation of a standardized EC should be considered in GI programs across the country.

Table 1 Demographics

	Male	Female
Number of trainees	6 (54.5%)	5 (45.5%)
Median age (years)	30-35	30-35
Median height (inches)	69	67
Median glove size	7 - 7.5	6-6.5
Level of training (PGY)	PGY4: 2 PGY5: 1 PGY6: 3	PGY4: 2 PGY5: 2 PGY6: 1
Median hours of endoscopy per week	10 to 19	10 to 19
Number reporting injury	0	0
Feedback received ‘sometimes or often’	83%	60%

Table 2 Pre vs. Post-curriculum scores

	Pre- curriculum score	Post- curriculum score	p-value
Ergonomic-related survey	Overall median: 40% Female trainees: 40% Male trainees: 40%	70% 70% 65%	p < 0.001 p = 0.003 p = 0.007
Endoscopy suite adjustment * (Changing bed height, monitor height, and monitor angle)	Overall composite: 78%	98%	p = 0.005
Personal technique modification * (Neutral body posture, pencil grip, and distance for holding scope from anorectum while torque steering)	Overall composite: 2.72	3.21	p = 0.031
'Pencil grip'	Glove size 7 or greater: Held 31-84% of the time	50-88%	-
	Glove size 6.5 or less: 17 - 41%	25-50%	-
	Female trainees: 20-65%	31-69%	-
	Male trainees: 33-79%	56-88%	-

* There was no overall difference in the endoscopy suite adjustment or personal technique scores of male and female trainees pre vs post-curriculum

Funding source: None

Financial disclosures: None

2. Title: Using Less Invasive Surfactant Administration (LISA) to reduce the rate of invasive mechanical ventilation in the first 72 hours of life by 25% from our baseline prior to July 2021.

Authors: Dionne Donald, M.D NICU, Shanthy Sridhar, M.D NICU, Surabhi Aggarwal, M.D NICU

Presenting Author: Dionne Donald, M.D., dionne.donald@stonybrookmedicine.edu

Neonatal Perinatal Fellow

Introduction

Surfactant administration remains the standard of care for infants with respiratory distress syndrome(RDS). The Intubation-Surfactant-Extubation technique reduces exposure to invasive mechanical ventilation. However, even after surfactant administration there can be a delay in the discontinuation of invasive mechanical ventilation. LISA further reduces the neonatal exposure to barotrauma and potentially reduces the severity of chronic lung disease(CLD). The objective of this study is to reduce the rate of invasive mechanical ventilation in the first 72 hours of life (HOL) by 25% using LISA.

Method

This Quality Improvement (QI) initiative was approved by SUNY IRB at Stony Brook University Hospital and performed in our level III academic Neonatal Intensive Care Unit (NICU) from July 2021–2022. The project involved literature reviews, creating methodology, simulation training on the Hobart technique with a mannequin, and implementing protocol over five PDSA cycles. (Diag-1) LISA was first introduced to our unit with this QI project. Neonates with a gestational age (GA) of 25⁰/₇ to 34⁶/₇ weeks(wks) diagnosed with RDS were included. We excluded neonates <25wks or >34⁶/₇wks GA, extramural deliveries, neonates intubated in the delivery room and with congenital anomalies. The Hobart technique was utilized for surfactant instillation into the trachea using an angiocatheter. The method adapted for educational strategies included PowerPoint presentations, simulated modules for LISA administration for our medical staff, laminated bedside protocols and development of a simulation video for review. Data was collected prospectively and reviewed monthly. The project was overseen by the NICU CLD Prevention QI Committee. Data and surfactant audits were presented at the monthly High Reliability Unit meetings.

Results

Thirty-three patients diagnosed with RDS received surfactant. LISA Mean GA30.9± 2.4wks versus control 30.5±2.4wks. LISA mean birth weight 1668± 449grams versus control 1591±528grams. 36%(12) received surfactant using LISA. 83% (10) of them remained on non-invasive ventilation at <72HOL. 17% (2) required intubation for a second dose of surfactant. There was no statistical difference in the mode of delivery, APGAR scores at 1 and 5 minutes of life and antenatal steroid exposure. BPD rate was 42% in the LISA group compared to 47% in the control. (Diag-2)

Conclusion

LISA can be safely implemented in a level III NICU as a less invasive mode for surfactant administration and reduce the need for invasive mechanical ventilation. During the LISA implementation phase 71% of patients who were intubated for surfactant were extubated by <72HOL which is an improvement from 54% in the pre-LISA phase

Funding source(s): N/A

Financial disclosures: N/A

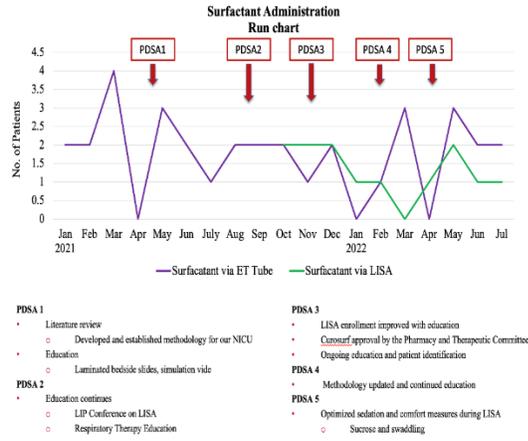
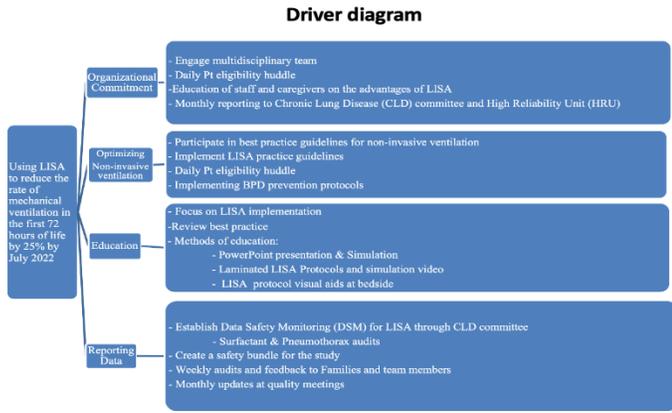
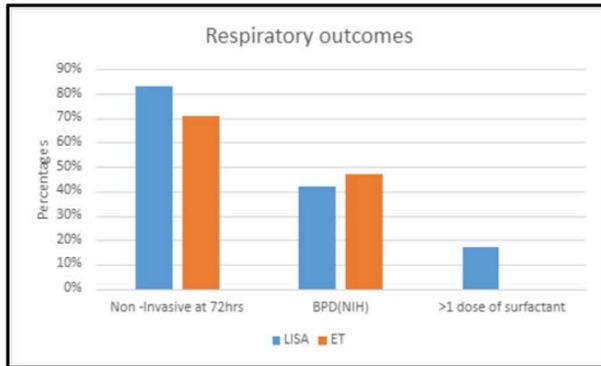


Diagram-1: Driver's Diagram and Run chart over 5 PDSA Cycles showing surfactant administration via the endotracheal tube and less invasive surfactant administration (LISA)

technique from January 2021, prior to the introduction of LISA, to July 2022 the completion of the project.

Diagram-2: Bar graph of respiratory outcomes of patients who received surfactant via less invasive surfactant administration (LISA) compared to endotracheal intubation.



Safety Data points for LISA Procedure	
NEC (Guaiac + Stool) 1st week of life	1
Gastric Perforation	0
Surfactant Reflux	0
Pneumothorax	0
Bradycardia (HR<100 requiring PPV)	0
Requirement for intubation < 72 hrs of life	2

Table with the safety data points for patients with respiratory distress syndrome who were treated with LISA.

3.* Title: Impact of Non-Invasive Mechanical Ventilation on The Developing Kidneys of Premature Infants.

Authors: Uzoamaka Ezeanya MD, Neonatal-perinatal Medicine, Jennifer Pynn MD, Neonatal-perinatal Medicine, Shanthy Sridhar MD Neonatal-perinatal Medicine,

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Corresponding Author' Category: Fellow

Funding source(s): None

Financial disclosures: I have no financial disclosure.

Introduction: Neonates born prematurely have substantial risk for morbidities including Acute Kidney Injury (AKI) during the initial days of life in the Neonatal Intensive Care Unit (NICU). Use of invasive ventilation for respiratory distress syndrome (RDS) has been shown to have increased risk of AKI. Limited data exists on the incidence of AKI in patients receiving non-invasive ventilation including Nasal Intermittent Mandatory Ventilation (NIMV) and incremental increases in Nasal Continuous Positive Airway Pressure (NCPAP). Our study investigated the incidence of AKI in patients receiving NIMV and CPAP during the first 7 days of life.

Study Design and Method: This was a retrospective observational cohort study from January 2018-January 2020 approved by Stony Brook IRB. Neonates born with a gestational age (GA) of 25 0/7 weeks to 34 6/7 weeks and admitted to the NICU receiving any respiratory support were included in this study. The Kidney Disease Improving Global Outcomes (KDIGO) definition was used within the first week of life to diagnose AKI. Statistical analyses included T-test, Chi-square, Odds Ratio and Confidence Intervals.

Results: One hundred neonates were included in this study and separated into 2 groups based upon their respiratory support: Invasive versus Non-Invasive. Sixty patients (60%) were in the Invasive group with a mean GA of 27.1 ± 2.4 weeks and mean birthweight (BW) 1043 ± 209 grams. Forty patients (40%) were in the Non-Invasive group with a mean GA 29.9 ± 1.8 weeks and mean BW 1203 ± 305 grams. Twenty-five percent of patients in the Non-Invasive group were small for gestational age (SGA) compared to 6% in the Invasive group ($p=0.02$). The Invasive group had a lower 1 minute Apgar score ($p<0.01$), with more patients exposed to prenatal magnesium (53%; $p<0.01$) and ≥ 5 days of antibiotics (54%- $P<0.01$) compared to patients in the Non-Invasive group. We found no difference in exposure to two levels of Positive End Expiratory Pressure (PEEP) in either of the groups. Additional demographic data is listed in Table-1. Six patients were diagnosed with AKI (8.3% in the Invasive group and 2.5% in the Non-Invasive group). Renal Indices including Blood Urea Nitrogen, serum creatinine, urine output, and total fluid intake were similar in both groups (Figures-1).

Conclusion: Although the overall diagnosis of AKI was low, premature neonates exposed to non-invasive ventilation had a low incidence of AKI with no impact of increasing PEEP compared to patients with invasive ventilation. A larger, prospective study is needed to further investigate this population.

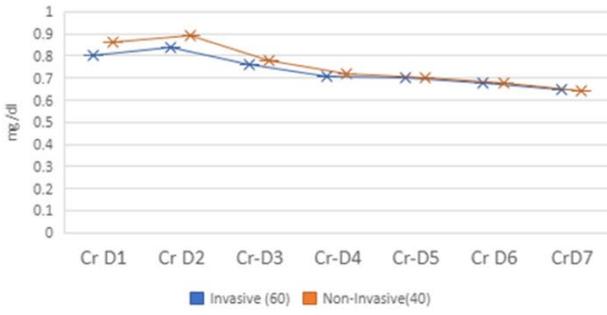
Table-1 Demographics

Demographics	Invasive (n=60)	Non-Invasive (n=40)	Odds Ratio	CI-95%	P-value
BW in grams (mean ± SD)	1040±210	1203±306		16(57.28 to 26.71)	p<0.02*
GA in weeks (mean ± SD)	27.6±2.4	29.9±1.8		0.30(0.58 to 1.18)	p>0.5
AGA	56(93%)	28(70%)	1.28	0.7 to 2.3	p=0.41
SGA	3(6%)	10(25%)	0.2	0.05 to 0.77	p=0.02*
APGAR 1 min(median)	5	7	-2	2.69 to -1.30	p=0.01*
APGAR 5 min (median)	8	8	0.2	-0.20 to 0.60	p=0.32
Gender-M	26(44%)	28(70%)	0.61	0.317to 1.20	p=0.15
Gender-F	34(56%)	12(20%)	1.88	0.87 to 4.08	p=0.10
Singleton	49(81%)	27(68%)	1.2	0.87 to 4.08	p=0.51
Multiples	11(19%)	13(32%)	0.56	0.23 to 1.38	p=0.21
Mode of Delivery-CS	42(70%)	33(83%)	0.84	0.46 to 1.55	p=0.59
Mode of Delivery-NSVD	18(30%)	7(17%)	1.71	0.65 to 4.47	p=0.27
Duration of antibiotics ≤ 2 days	34(46%)	30(75%)	0.76	0.40 to 1.42	p=0.38
Duration of antibiotics ≤ 5 days	26(54%)	3(8%)	5.7	1.63 to 20.37	p=0.01*
PEEP 4-5	100%	29(72%)	2.29	1.29 to 4.08	p=0.01*
PEEP 6-8	0%	11(28%)	0.29	0.00 to 0.50	p=0.01*
Magnesium exposure	47(68%)	7(12%)	4.5	1.83 to 10.89	p<0.01*
ANS	53(88%)	37(95%)	0.95	0.53 to 1.70	p<0.87
PROM/Chorioamnionitis	6(10%)	12(30%)	0.33	0.11 to 0.96	p<0.04*

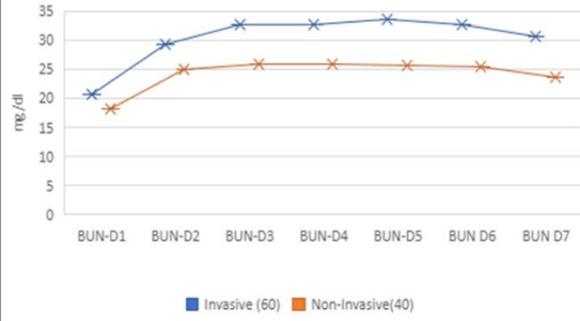
*P<0.05 indicates statistical significance

Figure-1 Renal Indices

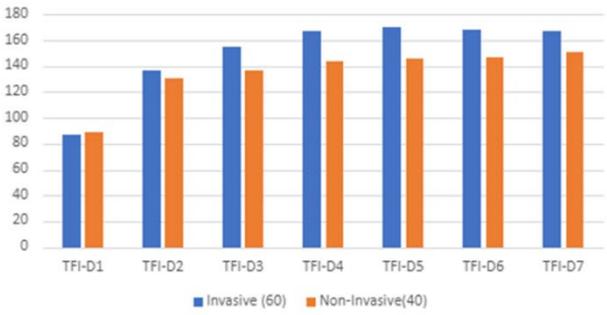
Creatinine during first week of Life



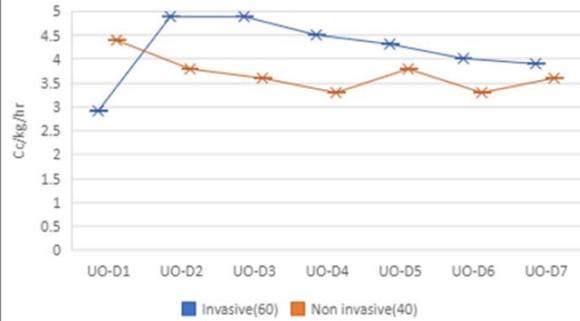
BUN During first week of life



Total Fluid Intake(TFI) during first week of Life



Urine Output during first week of life



4. Title: Utilizing CLL-1 positive leukemia stem cells as a marker of early treatment response in acute myeloid leukemia

Authors: Suhu Liu¹ MD,PhD; Christina Lee¹ MD; Hong Lin² PhD

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Background: Current methods to evaluate therapeutic response in Acute Myeloid leukemia (AML) rely primarily on morphological evaluation of leukemia blasts in bone marrow. Leukemia stem cells (LSC) has been established as source of treatment resistance and disease recurrence in AML. In this study, we aim to analyze LSC subpopulation during treatment using immunophenotypically defined markers and examine whether information gained from LSC analysis could provide additional insights into disease course and therapeutic outcome. **Methods:** We analyzed flow cytometry data from bone marrow aspirate (BMA) and/or peripheral blood (PB) in patients with AML (excluding acute promyelocytic leukemia) before and after treatment. Hematopoietic stem cells (HSCs) were defined as CD45^{dim+}CD34⁺CD38^{low/-}. Leukemic stem cells (LSC) subsets were analyzed using CD371 (CLL-1), CD366 (TIM3), and CD45RA percent of positive over HSCs. A chart review was conducted to determine correlation between LSC fractional change and clinical outcome. **Results:** Fifty AML cases with both pre- and post-treatment data in the past 3 years were included in this study. Consistent with published literature, patients with significant reduction in LSC subsets had relatively longer remission, while patients with no significant decrease in the LSC subsets demonstrated no or only a temporary remission. Intriguingly, several patients with drastic reduction in LSC after induction chemotherapy achieved complete remission, despite initial post-treatment bone marrow showing persistence of “>5% leukemia blasts” indicating possibly failed induction therapy. In contrast, in patients with persistently high or increased LSC post-treatment, overt clinical relapse occurred quickly despite “absence” or <1% of leukemia blast differential counts in bone marrow. Among the three LSC-specific markers analyzed, the changes in LSC characterized by CLL-1 expression showed the best correlation with clinical course. In addition, the LSC subsets measured by CLL-1 in the peripheral blood is highly correlated with that of the bone marrow ($R^2=0.93$, $P<0.0001$). **Conclusion:** This retrospective study explored the value and applicability of LSC detection in routine clinical practice. The change in LSC subsets provides additional information for early treatment response evaluation and refines outcome prediction. LSC fractional change determined by CLL-1 showed the best clinical correlation. Future studies will focus on prospective study to determine the thresholds of LSC fractional change which constitute potential treatment response vs failure and test the feasibility of tracking LSC subsets non-invasively in peripheral blood during treatment to predict therapeutic outcome and potentially guide treatment decisions.

No funding sources

IRB approval number: IRB2022-00101_MOD001

No financial disclosure

5. Title: DESIGNING A NEW BEHAVIORAL REPORTING TOOL FOR LONG-TERM-CARE-RESIDENTS WITH DEMENTIA

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Presenting author' Category: Post-doctoral Fellow.

Poster Category: Poster Abstract - Quality Improvement

Poster Abstract

Introduction: Behavioral symptoms of dementia (BPSD) are expected to develop in up to 90% of dementia patients. There is no gold standard for assessing BPSD in long-term care (LTC). We aimed to develop a new behavioral reporting tool for LTC residents that allows for establishing a behavioral baseline, longitudinal assessment of residents with behaviors, and assessing behavioral outcomes after interventions.

Methods: *Phase 1- Needs assessment:* Reviewed 4 months of behavioral logs of all units in the LISVH to determine the most common reasons and percentage completion. We searched PubMed and Embase for validated BPSD instruments, most commonly reported BPSD, and non-pharmacological interventions. *Phase 2 – Design.* 2.1 Reason for initiating the tool: we established new and readmission, behaviors, unit transfers, peer conflict, or psychotropic dose adjustment as reasons to start the tool based on Phase 1 findings. 2.2 Behavior and Intervention code: we included 20 behaviors and "No behavior" and 14 different interventions. 2.3 Assessment: We included the time, trigger (if noted), and frequency of BPSD during the shift, the intervention, and the response. Residents must be reassessed every shift (day, evening, night) and documented even in the absence of behaviors for up to 7days.*Phase 3 – Feedback:* We described the new tool (Tool A), Cohen-Mansfield Agitation Inventory (Tool B), and Direct Observation System (Tool C) to MDs, PAs, and RNs. We asked to complete the three tools for any patient on the unit who exhibited behaviors during that day, followed by an anonymous survey comparing the tools in different categories. We did a descriptive statistical analysis of the responses.

Results: We designed a new tool that establishes a behavior baseline and assesses BPSD and response to interventions in LTC residents. Our tool is designed to be longitudinal, with observations from different providers at different times of the day, to establish patterns and decrease the risk of recall and observation bias. A novel aspect of our tool is the inclusion of non-pharmacological measures as part of the assessment. Sixteen providers were surveyed; 62% RN, 25% MDs, and 13% PAs.

Conclusions: Our tool was preferred by MDs and RNs for documentation, establishing patterns, and addressing behaviors. However, it is less likely to be completed entirely and more challenging to learn than other tools, indicating that further improvement is required to make it more straightforward. Our report system is a promising tool for assessing BPSD and intervention response in LTC residents.

Funding sources: None.

Financial disclosures: None.

6. Title: Hemophagocytic lymphohistiocytosis-like Syndrome in Human Babesiosis

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Background: Hemophagocytic lymphohistiocytosis (HLH) is a rare potentially fatal hyperinflammatory syndrome. Many cases of HLH are in response to infectious pathogens. Although its association with tick-borne diseases is rarely reported, we hypothesize that HLH may be present in some of the tick-borne diseases which may cause significant morbidity

Methods: We reviewed the medical records of all adult Ehrlichiosis, Anaplasmosis and Babesiosis cases admitted to Stony Brook University Hospital from January 2010 to December 2021. Ehrlichia and Anaplasma diagnosis was confirmed by polymerase chain reaction in peripheral blood, whereas diagnosis of Babesia was performed by peripheral blood smear microscopy and confirmed by PCR. HLH diagnosis was based on the 2004 Histiocyte Society Criteria for HLH. Five of the following 8 criteria should be met: 1) fever $\geq 38.5^{\circ}\text{C}$; 2) splenomegaly; 3) cytopenia of two or three lines: ANC $< 1 \times 10^3/\mu\text{L}$, hemoglobin $< 9 \text{ g/dL}$, platelet count $< 100 \times 10^3/\mu\text{L}$; 4) hypertriglyceridemia $\geq 265 \text{ mg/dL}$ or hypofibrinogenemia $\leq 150 \text{ mg/dL}$; 5) hyperferritinemia $\geq 500 \mu\text{g/L}$; 6) increased soluble IL-2 receptor $\geq 2,400 \text{ U/mL}$; 7) low/absent natural killer (NK) cell activity; and 8) pathology showing hemophagocytosis (bone marrow, spleen, or lymph nodes).

Results: Overall, there were 164 cases with Babesia, 47 of Ehrlichia and 35 of Anaplasma during study period. Five patients with babesiosis met HLH criteria whereas 2 had 4 out of 5 criteria of HLH. None of the Ehrlichia or Anaplasma cases met HLH criteria. One patient died. Summary of laboratory finding in table 1. Out of 7 patients (age median=64 years; range: 45-90), 4 were female. Parasitemia median was 2%, range: 0.1%-5.2%. All patients received atovaquone and azithromycin, only one had criteria for co-infection with Lyme disease. Patient who died had several comorbidities including interstitial lung disease and on chronic steroids, the other patients did not have complications

Table 1. Summary of clinical features of HLH-like syndrome in Babesiosis

Cases	Fever	Splenomegaly	WBC	Hb	Plaletes	Ferritin	Triglycerides	Outcome
51 y/o man	Yes	Yes	4070	8.9	54,000	6056	386	Survived
90 y/o woman	Yes	Yes	7800	7.8	98,000	1414	617	Died
64 y/o woman	Yes	Yes	2610	8.3	46,000	8950	413	Survived
45 y/o man	Yes	Yes	5575	8.6	52,000	2687	434	Survived
68 y/o man	Yes	Yes	6900	9.8	128,000	3890	508	Survived
78 y/o woman	Yes	Yes	6240	9.2	124,000	3951	283	Survived
62 y/o woman	Yes	Yes	1100	5.4	69,000	5758	464	Survived

Wbc K/uL, Hb g/dL, Plt K/uL, Ferritin ng/ml, TGL mg/dL

Conclusion: Babesia infection can present like a HLH-like syndrome in endemic areas. Most cases responded well to standard-of-care antimicrobials. All these cases had a median low parasitemia, which suggest that a cytokine storm from host immune response may be responsible for this syndrome.

7. Title: A 15-year review of *Helicobacter pylori* treatment among United States Veterans

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BACKGROUND: United States military personnel deployed overseas to developing countries are at increased risk for *Helicobacter pylori* infection. *H. pylori* (HP) is associated with non-ulcer dyspepsia as well as malignancy. Updated ACG guidelines in 2017 recommended test of cure to assess successful eradication. We reviewed the HP treatment experience for the past 15 years in our facility (Northport VA medical center).

METHODS: Retrospective cohort study of US Veterans with HP infection (diagnosed by serum IgG, stool antigen (SA) or gastric histology) from 1/1/2007 to 12/21/2021 at the Northport Veterans Affairs Medical Center. We collected data on demographic features, service record, overseas deployment history, medical history, treatment/retreatment choices and outcomes

RESULTS: 311 Veterans were diagnosed with HP infection. 276 with positive IgG serology (22/276 had positive stool antigen, 35/276 had positive stain on histology), 35 with positive SA (13/35 had positive stain on histology). The median age was 61 years (23-95 years). 92% men; 50% served in the Army, 22% Navy, 14% Marines, 13% Air Force, 1% Coast Guard. 57% White, 28% Black, 12% Hispanic, 3% other. 70% of the cohort was deployed overseas: 131 to Southeast Asia, 15 Europe, 80 Middle East, 6 Africa. 247 patients were having pyrosis/abdominal pain/nausea, 72 had diabetes, 165 hypertension, 72 CAD, 151 Hyperlipidemia. Gastric histological findings: 2 atrophic gastritis, 7 severe gastritis, 38 moderate chronic gastritis, 52 mild chronic gastritis, and 1 gastric adenocarcinoma. 217 received treatment: 80% were treated with amoxicillin/clarithromycin/PPI. 15 received a second treatment, 6 and 5 patients received a 3rd and 4th treatment respectively. 66 patients had evidence of cure at end of follow up: 41 with negative SA, 10 with negative Urea Breath test, 10 with negative stain on stomach biopsy, 5 with normal appearing stomach on endoscopy. 2 had no cure despite few retreatments. No antibiotic resistance testing was available.

CONCLUSIONS: The majority of Veterans with *H.Pylori* infection were deployed overseas, a likely risk factor. Test of cure was infrequently done in our cohort, especially in the early years, but has increased since the release of the updated 2017 ACG guidelines.

8. Title: Perinatal and Neonatal Outcomes with Psychiatric Medication Exposure in Women with Opioid Use Disorder

Authors: Bijal Parikh, MD; Omar Abuzeid, MD; Cassandra Heiselman, DO; David Garry, DO; Diana Garretto, MD; Kimberly Herrera MD

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Presenting author' Category: Fellow

Introduction To evaluate the effect of psychiatric medication exposure in pregnant women with opioid use disorder (OUD) on perinatal and neonatal outcomes. **Methods** This IRB-approved retrospective, single center, cohort study identified patients with opioid use disorder (active or in remission on maintenance therapy) presenting for delivery from 01/2017 through 07/2022. The cohort was divided based on exposure to psychiatric medication during pregnancy. Pregnancy, substance use information, and newborn outcomes were obtained, including trends in maternal MOUD utilization. Statistical analysis included Chi square and student t tests with significance levels of $p < 0.05$ using SPSS. **Results** 402 pregnant women with OUD were identified with 166 (41.3%) on psychiatric medications and 236 (58.7%) without exposure. There were no differences in maternal co-morbidities, age, obesity, insurance type, active drug use, admission for withdrawal, fetal growth restriction, GA at delivery, mode of delivery, reasons for delivery, relapse postpartum or postpartum care compliance were not different across groups. Those with psychiatric medication exposure were more likely to receive MOUD from an OB (32.9% v 27.9%) and PCP (19.7% v 11.7%) prescriber, have their MOUD increased during pregnancy and be treated with Buprenorphine. (Table 1) There was an increased incidence of neonatal abstinence syndrome (NAS) ($p=0.04$), however severe NAS treated with morphine was not significant across groups (0.67) **Conclusions** Psychiatric medication exposure in women with opioid use disorder was not associated with worse maternal outcomes but was predictive of NAS.

Table 1: Perinatal and Neonatal Outcomes in Women with OUD Across Psychiatric Medication Exposure

	Psychiatric Medication Exposure		
	Yes	No	p-value
Pregnancy Induced Hypertension	23 (14%)	28 (12.1%)	0.648
Gestational Diabetes	14 (8.5%)	11 (4.8%)	0.147
Fetal Growth Restriction	4 (2.4%)	3 (1.3%)	0.454
Active Drug Use	49 (29.7%)	83 (36.1%)	0.196
Admission for Withdrawal	15 (9.2%)	17 (7.4%)	0.567
Relapse Postpartum	6 (4.3%)	12 (6.3%)	0.475
MOUD Prescriber Methadone/Pain Clinic	61 (40.1%)	109(55.3%)	0.027
MOUD Started in Pregnancy	19 (24.7%)	41 (42.3%)	0.017
MOUD increased in Pregnancy	53 (68.8%)	44 (47.8%)	0.008
Treatment with Buprenorphine	111 (66.9%)	127 (53.8%)	0.009
NAS Diagnosed	136 (84%)	171 (75.3%)	0.040
NAS treatment with Morphine	73 (44.8%)	97 (43.1%)	0.667

Funding source(s): N/A

If human subjects are included, indicate date/number of Committee on Research Involving Human Subjects (CORIHS) approval: May 13, 2022; IRB2022-00228

Financial disclosures: None

9. Title: Timing of SARS-CoV-2 infection during pregnancy and perinatal outcomes

Authors: Bijal Parikh, MD¹; Eliane Shinder, BS²; Rakasa Pattanaik, BS²; Tiffany Yang, MD¹; Cassandra Heiselman, DO¹; Diana Garretto, MD¹; David Garry, DO¹

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Presenting author' Category: Fellow

Introduction Compare perinatal outcomes of maternal SARS-CoV-2 infection in the first and second trimesters with infection in the third trimester. **Methods** IRB approved retrospective study of pregnant patients diagnosed with SARS-CoV-2 virus between 03/2020-03/2022 that received prenatal care at an academic university. Baseline demographics, vaccination status, symptoms, COVID complications, perinatal outcomes, and neonatal outcomes were collected. The three COVID waves correlated to the following variants: Wild type (3/6/20-12/31/20), Alpha/Delta (1/1/21-12/14/21), and Omicron (12/15/21-2/28/22). Statistical analysis included Chi square tests, student t-tests, and logistic regression with statistical significance defined as $p < 0.05$. **Results** There were 644 COVID positive pregnancies with 342 infected in the first/second trimester and 302 infected in the third trimester. Maternal age, insurance, number of twins, birth weight, and NICU admission were similar between groups. Hispanic ethnicity (31% v 22%; $p=0.006$) and full vaccination (83% v 92%; $p=0.007$) were higher in women with third trimester infection. Admission for COVID (2% v 6%; $p=0.001$), earlier GA at delivery (37+4.6 v 38+1.9; $p < 0.001$), cesarean birth (45% v 59%; $p < 0.001$), and fetal complications (9% v 15%; $p=0.02$) were greater in third trimester. The Omicron COVID wave was associated with a higher number of first/second trimester infections (45% v 34%, $p=0.03$). Infection in the first/second trimester was more likely to have symptomatic infections (88% v 75%; $p < 0.001$) and PTD (16% v 9%; $p=0.006$). Government assisted insurance ($p=0.03$), first/second trimester COVID ($p=0.004$), and twin gestation ($p < 0.001$) were independent predictors of preterm birth. (Table 1) **Conclusion** First/second trimester COVID infection had more maternal symptoms and increased risk for preterm birth. Third trimester COVID infection was associated with increased admission, cesarean birth, and fetal complications.

Table 1. Independent predictors of preterm birth (delivery < 37 weeks) in logistic modeling

Variable	Odds ratio	95% CI	P value
Hispanic ethnicity	1.16	0.61 to 2.17	0.65
Omicron wave	1.22	0.63 to 2.34	0.56
Government assisted insurance	1.95	1.06 to 3.62	0.03
COVID in 1 st or 2 nd trimester	2.32	1.31 to 4.10	0.004
Fully vaccinated status	0.89	0.40 to 1.98	0.78
Maternal age >35 y	1.25	0.68 to 2.31	0.46
Symptoms when COVID infected	0.62	0.32 to 1.21	0.16
Twin gestation	30.3	9.66 to 94.7	<0.001

Funding source(s): N/A

If human subjects are included, indicate date/number of Committee on Research Involving Human Subjects (CORIHS) approval: 5/12/2020; IRB2020-00311

Financial disclosures: None

10. Title: Wild type through Omicron: Maternal outcomes across COVID-19 waves

Authors: Bijal Parikh, MD¹; Eliane Shinder, BS²; Rakasa Pattanaik, BS²; Cassandra Heiselman, DO¹; Diana Garretto, MD¹; David Garry, DO¹; Kimberly Herrera, MD¹

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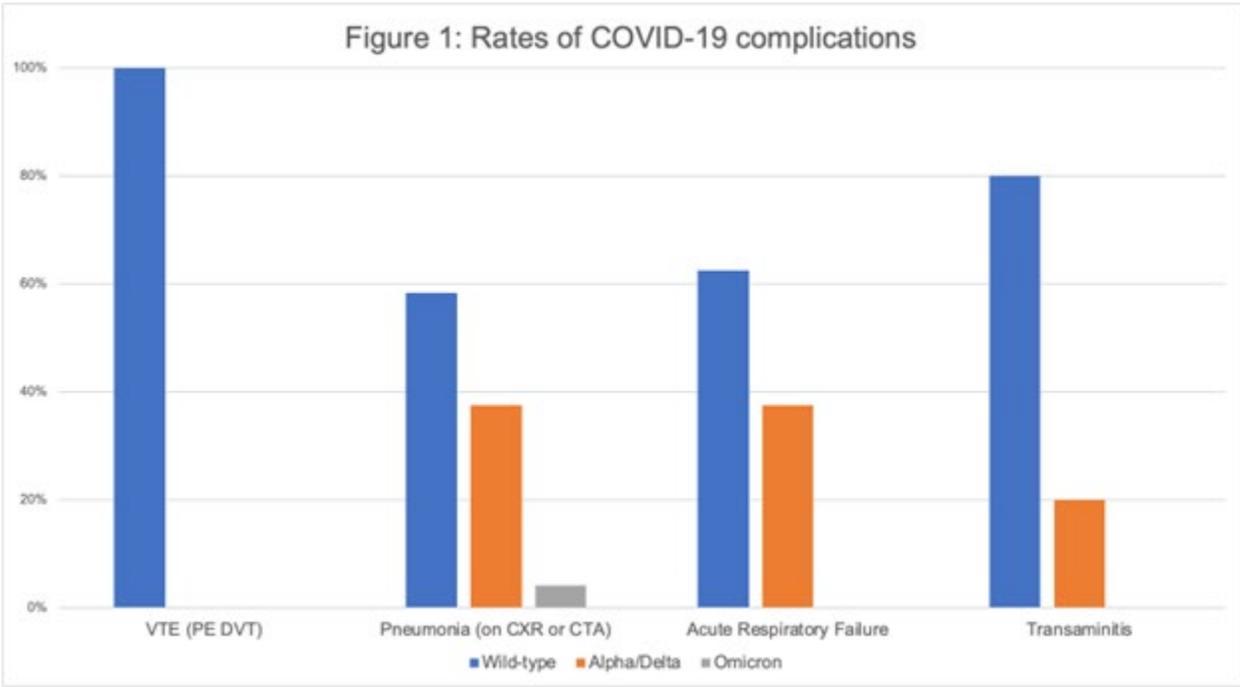
Presenting Author: Bijal Parikh, MD, bijal.parikh@stonybrookmedicine.edu

Presenting author' Category: Fellow

Introduction SARS-CoV-2 has been associated with poor maternal complications. Few studies exist that specifically compare maternal outcomes across the waves and variants of the pandemic. We sought to determine which COVID-19 wave was associated with worse maternal outcomes. **Methods** Retrospective study of pregnant patients diagnosed with SARS-CoV-2 between 3/6/20 and 2/28/22. Three distinct waves of the pandemic were identified that correlated to the following variants: Wild type (3/6/20-12/31/20), Alpha/Delta (1/1/21-12/14/21), and Omicron (12/15/21-2/28/22). Baseline demographics and clinical outcomes were collected. The primary outcome was development of maternal COVID-19 complications (venous thromboembolism, pneumonia, acute respiratory failure, stroke, myocardial infarction, acute renal or hepatic failure, and transaminitis). Statistical analysis was performed using Chi square tests, student T-tests, and logistic regression modeling, with statistical significance defined as $p < 0.05$. **Results** There were 654 patients included in the analysis with 190 (29%) patients in the wild type wave, 207 (31%) patients in the Alpha/Delta wave, and 257 (39%) patients in the Omicron wave. Baseline demographics are shown in Table 1. Those diagnosed during the wild type wave had statistically significant higher odds of maternal complications compared to Omicron wave (OR 22.9 (95% CI 2.9-177.4)). Patients in the Alpha/Delta wave had statistically significant higher odds of maternal complications compared to those in the Omicron wave (OR 10.6 (95% CI 1.3-85.1)). The incidence of pneumonia was 7.4% during the wild type wave versus 4.3% in Alpha/Delta versus 0.4% in the Omicron wave ($p < 0.001$). Rates of other maternal complications are shown in Figure 1. There were no cases of stroke, myocardial infarction, acute renal or hepatic failure in the cohorts. **Conclusion** Maternal complications of COVID were higher during the Wild type and Alpha/Delta waves compared to the Omicron wave. Incidence of specific complications was variable during each wave of the pandemic.

	COVID WAVE			P-Value
	Wild-type	Alpha/Delta	Omicron	
Age	29.97 +/- 5.6	31.65 +/- 12.8	31.08 +/- 5.2	0.136
BMI	31.92 +/- 6.3	31.32 +/- 6.0	32.28 +/- 7.1	0.302
Gravidity	2.98 +/- 1.8	2.84 +/- 1.6	2.84 +/- 3.2	0.797
Parity	1.46 +/- 1.4	1.12 +/- 1.1	1.23 +/- 1.0	0.016
GA at diagnosis	26.55 +/- 11.0	26.01 +/- 9.3	24.22 +/- 9.04	0.029
GA at delivery	37.36 +/- 5.1	38.5 +/- 1.8	37.94 +/- 3.1	0.008

Table 1: Demographic characteristics presented as means +/- SD



Funding

source(s): N/A

If human subjects are included, indicate date/number of Committee on Research Involving Human Subjects (CORIHS) approval: 5/12/2020; IRB2020-00311

Financial disclosures: None

11. Title: Wild type through Omicron: Obstetric outcomes across COVID-19 waves

Authors: Bijal Parikh, MD¹; Rakasa Pattanaik, BS²; Eliane Shinder, BS²; Cassandra Heiselman, DO¹; Diana Garretto, MD¹; David Garry, DO¹; Kimberly Herrera, MD¹

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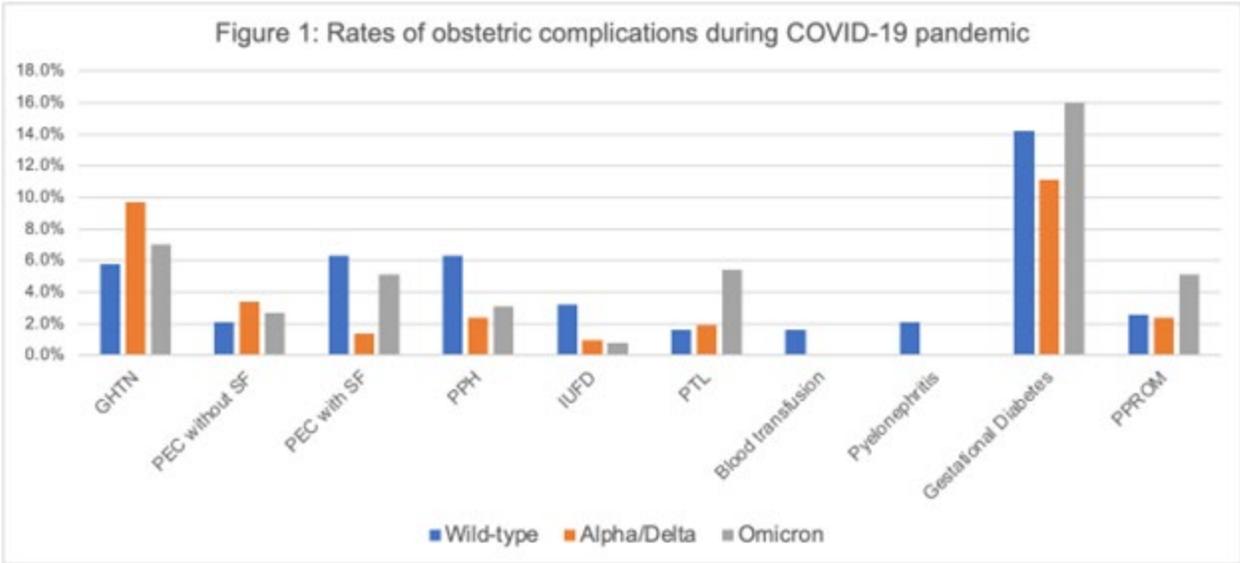
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Introduction SARS-CoV-2 has been associated with poor obstetrical outcomes. Few studies exist that specifically compare these outcomes across the waves and variants of the pandemic. We sought to determine which COVID-19 wave was associated with worse obstetrical outcomes. **Methods** Retrospective study of pregnant patients with SARS-CoV-2 between 3/6/20 and 2/28/22. Three distinct waves of the pandemic were identified that correlated to the following variants: Wild type (3/6/20-12/31/20), Alpha/Delta (1/1/21-12/14/21), and Omicron (12/15/21-2/28/22). Baseline demographics and clinical outcomes were collected. The primary outcome was a composite of obstetric complications (PPH, IUFD, PTL, blood transfusion, pyelonephritis, GDM, and PPRM). Statistical analysis was performed using Chi square tests, student T-tests, and logistic regression modeling, with statistical significance defined as $p < 0.05$. **Results** There were 654 patients included in the analysis with 190 (29%) patients in the wild type wave, 207 (31%) patients in the Alpha/Delta wave, and 257 (39%) patients in the Omicron wave. Baseline demographics are shown in Table 1. Alpha/Delta and Omicron waves had statistically significant higher odds of obstetrical complications compared to wild type (OR 2.00; 95% CI 1.31-3.08). The incidence of preeclampsia with severe features varied from 6.3% during wild type versus 1.4% during Alpha/Delta versus 5.1% during Omicron waves ($p < 0.026$). Patients with multifetal gestation had significant lower odds of obstetric complications (OR 0.16; 95% 0.06-0.43). Patients that had no hospitalization had significantly higher odds of obstetric complications (OR 2.77; 95% CI 1.08-7.09). Rates of other obstetric complications are shown in Figure 1. **Conclusion** Obstetric complications varied across COVID waves with a higher risk in the Alpha/Delta and Omicron waves compared to the wild type wave. The risk of preeclampsia with severe features was higher in the wild type and Omicron waves compared to the Alpha/Delta wave. Multifetal gestation had a protective effect for developing obstetric complications.

	Obstetric complications		p-value
	Yes (N=124)	No (N=530)	
AMA	82 (66.1%)	319 (60.4%)	0.260
BMI >30	76 (65%)	287 (57.3%)	0.145
Chronic HTN	6 (4.8%)	20 (3.8%)	0.609
Pregestational DM	6 (4.8%)	13 (2.5%)	0.228
Asthma	8 (6.5%)	56 (10.6%)	0.183
Pregnancy induced HTN	19 (15.3%)	69 (13%)	0.469
Gestational DM	14 (11.3%)	77 (14.5%)	0.390
Multifetal gestation	11 (9.2%)	8 (1.7%)	0.001

Table 1: Maternal characteristics presented as N (%)



Funding

source(s): N/A

If human subjects are included, indicate date/number of Committee on Research Involving Human Subjects (CORIHS) approval: 5/12/2020; IRB2020-00311

Financial disclosures: None



STAFF



1. Title: The Relationship Between High Frequency Heart Rate Variability Index (HFVi) and Epidural in the Laboring Parturient

Authors: Morgane Factor, MD¹, Alexa Christophides, MHA¹, Bahaa Daoud, MD¹, Tiffany Angelo, MD¹

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Presenting author Category: Staff

Main body of the abstract:

Introduction: Pregnancy resulted in the birth of 3,605,201 babies in the United States during the year 2020. The majority of these women experienced the process of labor in order to have a spontaneous vaginal delivery. Neuraxial anesthetic techniques provide effective pain relief and have minimal maternal and fetal side effects. Although labor pain itself is not life threatening, it can be distressing. In 2016, MDoloris received 510(k) clearance for their HFVI monitor. The HFVI is a measure of high frequency heart rate variability that is proposed to serve as a non-invasive measure of parasympathetic tone that may be useful as an additional guide to effectiveness of nociception during anesthesia. HFVI is scaled from 0 to 100; with previous studies suggesting values ≥ 50 indicate adequate analgesia. HFVI values have been shown to decrease in response to painful stimulation, and these decreases are reduced by analgesic agents. Our study will examine the correlation between the ANI values generated by the HFVI Monitor and reported pain in the awake, laboring parturient before and after initiation of epidural anesthesia.

Methods: Patients will undergo routine admission to Labor & Delivery and routine management of their labor. The patients will have the HFVI monitor sensors placed and data measured and recorded for at least 3 contractions prior to epidural placement. Patients will be asked to report their pain scores at multiple time points, including pain they felt at the beginning of, the peak, and resolution of uterine contraction. The same reporting will resume 15 minutes after epidural medication bolus administration for at least 3 contractions.

Results: The primary analysis will assess the strength of correlation between pain and ANI value prior to the placement of the epidural. Additional analyses may include a separate model to assess the association between pain and ANI value after epidural placement. A full model may be run with both epidural and an epidural*pain interaction term to assess how ANI values differ before and after the epidural placement, as well as how the association of pain and ANI values differ before and after the epidural placement. **Conclusions/clinical relevance:** If there is an increase in the ANI value with the persistence of uterine contraction despite the initiation of epidural anesthesia, we may be able to identify a more objective measurement for adequate analgesia during the painful process of labor. A continuous objective measure of pain would be highly useful for laboring patients.

Funding source(s): N/a

Approval: IRB2022-00459 Approved 10/13/2022 No Exp.

Financial disclosures: No disclosures to report.

2. Title: Comparison of Oxytocin Bolus vs Infusion in Elective Cesarean Section

Authors: Tiffany E. Angelo, D.O.¹, Reona Kimura BA², Morgane Giordano-Factor, M.D.¹, Bahaa E Daoud, M.D.¹, Ayesha Khan, M.D.¹, Jamie Romeiser, PhD¹, Elliott Bennett-Guerrero, M.D.¹

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Presenting Author Category: Staff

Introduction: Nearly 20% of maternal deaths worldwide, are attributed to postpartum hemorrhage. However, the optimal strategy for administering oxytocin, the most commonly used uterotonic agent, remains unknown. Our standard at Stony Brook is an infusion of Oxytocin 18 IU/hour (0.3 IU/min). This is proven to be effective in achieving adequate uterine tone but the time to uterine tone is longer (3-4 mins) [7]. Significant blood loss can occur with delayed uterine tone since the estimated uterine blood flow is 500-700 mls/min [8]. We hypothesize that bolus oxytocin is superior to infusion in time to achieving adequate uterine tone. To determine if there is a difference between a bolus of oxytocin and a continuous infusion, we initiated a double-blind randomized controlled trial (RCT).

Methods: IRB approval was obtained and the RCT was registered at ClinicalTrials.gov. The study aims to enroll 120 participants across two arms, bolus and infusion. After cord clamping, the participant receives a bolus of oxytocin/placebo and a 1-liter bag of infusion of oxytocin/placebo at the same time. The 1-liter infusion is administered for 1 hour and then the rate is adjusted as per protocol for the next 3 hours. Uterine tone is assessed every minute for 10 mins in both arms. If uterine tone is adequate at 3, 6, or 9 mins, a second infusion of 500ml bag of oxytocin/placebo is started and maintained for 4 hours. If uterine tone is inadequate at 3 or 6 mins, a repeat bolus is administered. If tone is still inadequate at 9 mins, 2nd line uterotonic agents are administered, the infusion rate of 1-liter bag is increased for the next 1 hour and then decreased for the following 3 hours as per protocol. A post-procedure patient satisfaction question is given on the day of surgery.

Results: Data from 120 patients will be analyzed. To date, 60 patients have been enrolled.

Conclusion: This study aims to identify which method of oxytocin administration provides adequate uterine tone more quickly with few side effects and improved patient satisfaction.

Funding source: Internal - Department of Anesthesiology, Stony Brook Medicine

IRB approval: IRB2021-00558, Date: 11/11/2021

Financial Disclosure statement: The authors report no financial disclosures.

3. Title: Mechanism of Sonic Hedgehog (SHH) signaling induction in intestinal epithelial cells during radiation injury

Authors: Rabina Lakha, Emilia J. Orzechowska-Licari, Vincent W. Yang, and Agnieszka B. Bialkowska

Affiliation: Department of Medicine, Renaissance School of Medicine at Stony Brook University, Stony Brook, NY, USA

Presenting author: Rabina Lakha (lakha.rabina@stonybrookmedicine.edu)

Presenting author' Category: Staff

Abstract

Introduction: Sonic Hedgehog (SHH) signaling is crucial for embryonic development and in adults. Mutation in this pathway hinders migration, differentiation, and proliferation, including tumorigenesis. Within the intestinal epithelial cells, SHH is induced shortly after irradiation, and its inhibition impairs regeneration by abrogating epithelial-stromal crosstalk. However, the mechanisms regulating the activation of SHH upon injury in intestinal epithelial cells are unknown. **Aim:** To explore the mechanism that governs the induction of SHH signaling in intestinal epithelial cells upon irradiation. **Methods:** To identify transcription binding sites in mouse and human *SHH* promoters, we utilized the NCBI genome browser to obtain nucleotide sequences of the promoters and the JASPAR database of transcription binding sites. We performed a computational analysis to identify transcription factors (TFs) that bind to *SHH* promoters (mouse and human) with a relative profile score threshold of 85% or above. To assess whether identified TFs are induced during irradiation, we collected enriched intestinal epithelial cells after 3h, 6h, and 24h from 12Gy irradiated and sham-irradiated mice. RT-PCR and immunohistochemistry (IHC) were performed on the intestinal epithelium isolated from sham- and 12Gy-irradiated mice. *In vivo* experiments were performed with $N=3$, while *in vitro* studies were done with $N=6$. Statistical analysis was performed using a t-test with a p-value <0.5 as significant. **Results:** The computational analysis identified 73 TFs binding to the mouse *Shh* promoter and 217 TFs binding to the human *SHH* promoter. Comparative analysis showed that 22 TFs are common for mouse and human SHH promoters. For the first analysis, we selected 10 TFs (KLF4, GATA4, STAT3, NF-YA, EGR2, TCF3, BCL6, BHLHA15, FOXJ2 and HIF1A) based on the fact that they are upregulated in other models upon injury (e.g., DNA damage). Using RT-PCR, we showed that 24 hours post-irradiation, *Nfya*, *Klf4*, *Stat3*, *Foxj2*, *Hifa1*, and *Gata4* were upregulated enriched intestinal epithelial cells of mice exposed to 12Gy as compared to sham-irradiated mice. Furthermore, IHC performed on mice intestines showed the presence of phosphorylated-STAT3 in the intestinal epithelial cells of villi and crypts, confirming that STAT3 was activated during irradiation. **Conclusions:** Our preliminary results identified a set of TFs that bind to the SHH promoter and are upregulated early after radiation injury. We plan to complete an IHC analysis of other identified factors and confirm their binding to the SHH promoters using CHIP-PCR.

4.* **Title:** Keratin 17 is a negative prognostic and predictive biomarker in pancreatic ductal adenocarcinoma

Authors: Lyanne Oblein¹, Lucia Roa-Peña¹, Sruthi Babu¹, Emanuel Petricoin^{2,3}, Edik Blais³, Natalia Marchenko¹, Felicia D. Allard⁴, Ali Akalin⁵, Wei Jiang⁶, Brent Larson⁷, Andrew Hendifar⁷, Minsig Choi¹, Luisa F. Escobar-Hoyos^{1,8*}, Kenneth R. Shroyer^{1*} *Co-senior authors

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Presenting author' Category: Staff

Background: There is an urgent need to understand why patients with clinically and histologically identical pancreatic ductal adenocarcinomas (PDACs) differ in response to treatment, disease progression, and survival. Although two standard chemotherapies are available, predictive biomarkers to guide regimen selection have not been defined. We previously reported that keratin 17 (K17) expression is a hallmark of PDAC cases with shortest patient survival. Furthermore, K17, explored using *in vitro* and *in vivo* murine models, drives resistance to gemcitabine (GEM) and 5-fluorouracil (5-FU), the most common chemotherapeutic agents currently used. Here, we aimed to validate the prognostic value of K17 and to further explore its role as a predictive biomarker.

Methods: We used a cohort of 305 cases, with localized disease and who had gone tumor resection. An indirect immunoperoxidase method was used to detect K17 expression on surgical specimens, as previously described. Survival was plotted using Kaplan–Meier curves and hazard ratios (HRs) were calculated using Cox proportional hazard regressions for both, overall survival (OS) and progression-free survival (PFS). **Results:** Patients in the high-K17 expression group had shorter overall survival [median=25 mo., HR=1.511, p=0.0338] than those in the low-K17 expression group (median=42 mo.). In addition, high K17 expression was associated with shorter median OS (p=0.0533) and PFS (p=0.0340) in patients who were treated with Gemcitabine/nab-Paclitaxel (GEMTAX) therapy, compared to low-K17 counterparts. Same correlation was observed in patients treated with 5-FU based therapies suggesting that low K17 expression predicts a significant survival benefit in patients treated with 5-FU based as an adjuvant therapy. When we further separated our cohort by K17 level of expression and compared GEM based and 5-FU based therapy responses, we found that low K17 expression predicts enhanced therapeutic response to 5-FU based therapy compare to Gem based in advanced stage PDAC (p=0.0231) and patients with tumors with high K17 expression do not benefit from either chemotherapeutic agent (p=0.9485).

Conclusions: K17 expression is confirmed as a robust prognostic biomarker, significantly correlated with poor OS and PFS in two independent cohorts of PDAC patients. More importantly, our results indicate that high K17 expression predicts PDAC resistance to gemcitabine and 5-FU chemotherapies and low K17 identifies a group of patients that can benefit from 5-FU based chemotherapy when compare to GEM based therapies. Collectively, our findings have implications could guide the development of K17 as a predictive biomarker for gemcitabine-based interventions in both adjuvant and palliative settings, to optimize therapeutic efficacy for PDAC.

Funding source(s): This work was supported by academic enrichment funds of the Department of Pathology at the Renaissance School of Medicine, Stony Brook University, the Pancreatic Cancer Action Network, and Perthera Inc. KR and LEH are supported by a Pancreatic Cancer Action Network American Association for Cancer Research Acceleration Network Grant (18–65-SHRO). LEH is supported by the Damon Runyon Foundation, the Hirshberg Foundation for Pancreatic Cancer Research and the Yale School of Medicine-Department of Therapeutic Radiology.

Date/number of Committee on Research Involving Human Subjects (CORIHS) approval: All studies were performed in accordance with guidelines and regulations of the Stony Brook Medicine Institutional Review Board (IRB) protocol 94651-31. Patient consent was waived by the IRB agreements for each participating site because the research was restricted to the analysis of de-identified remnant waste surgical pathology specimens.

Financial disclosures: K.R.S. and L.E.H. are consultants for KDX Diagnostics Inc. E.B. is an employee of Perthera and owns stocks in the company. E.F.P. has received compensation as an officer of Perthera, Inc. and owns stock in the company. He also has consulted for Theralink Technologies, Inc. and received compensation as Chair of the Science Advisory Board and owns stock in the company. The additional authors report no conflicts of interest.

5. Title: Development and validation of a novel self-report measure of coping

Authors: Anastasia J. Philippopoulos¹, Amanda Levinson PhD¹, Heidi Preis PhD^{2,3}, Marci Lobel PhD^{2,3}, Brittain Mahaffey PhD¹ (Psychiatry and Behavioral Health, Renaissance School of Medicine, Mind-Body Clinical Research Center¹; Stony Brook University Department of Psychology²; Stony Brook Department of Obstetrics, Gynecology, and Reproductive Medicine³)

Presenting author: Anastasia Philippopoulos (Staff; anastasia.philippopoulos@stonybrookmedicine.edu)

Introduction

Available validated measures of stress and coping are either burdensome to complete or do not tap ecologically valid coping strategies. As a result, the literature examining the effects of coping strategies on psychological wellbeing has produced heterogeneous findings. Brief self-report measures of real-world coping strategies are needed in order to accurately assess the effects of coping as well as the interactive effects between coping strategy and type of stress (i.e., the fit between the nature of the stress and the coping strategy). The purpose of the present study is to validate a new coping instrument, the Stony Brook Coping Inventory (SBCI), designed to assess stress coping styles in response to discrete stressors.

Methods

The SBCI is comprised of 28 items, with items 1 through 10 assessing common stressors (e.g., financial situation, relationships, etc.) and items 11 through 28 assessing coping strategies used: (1) prayer, (2) social support-seeking, (3) problem-focused coping, (4) reappraisal, and (5) avoidance. College students enrolled in a psychology course at Stony Brook University were offered course credit for completion of an online Qualtrics survey assessing symptoms of depression, anxiety, OCD, stress, and coping. To evaluate the factor structure of the SBCI, we conducted an exploratory factor analysis (EFA) via SPSS using principal axis factoring and varimax rotation followed by a confirmatory factor analysis (CFA).

Results

Participants ($n = 488$; $M_{age} = 19.86 \pm 2.18$) were primarily White ($n = 171$; 37.6%) and Asian ($n = 171$; 37.6%), and just over half of the sample identified as female ($n = 277$; 56.8%). We excluded participants who completed the survey in less than five minutes ($n = 54$).

The factors derived from the EFA aligned with four factors of our *a priori* model— reappraisal, social support, avoidance, and prayer— but not problem-focused coping. Nevertheless, items 13 and 18 had high secondary loadings so we conducted CFA, separating these items into their own factor (problem-solving). These findings aligned with our hypothesized factors except for item 22, which was removed due to low factor loading (.457), negligible influence on Cronbach's alpha, and ambiguous theoretical relationship to the 5 factors. All 5 factors demonstrated strong reliability ($\alpha > .7$).

Conclusions

In an undergraduate sample, the SBCI aligned with our predicted factor structure, demonstrating strong construct validity. Individual subscales demonstrated strong reliability. Future studies should examine fit between types of stress and the strategies people use to cope with them.

Funding source(s)

Brittain Mahaffey received support from National Institute of Child Health and Human Development of the National Institutes of Health, Grant K23HD092888 as well as institutional start up monies from Stony Brook Medicine Department of Psychiatry while conducting this work.

CORIHS Approval

IRB2022-00171

6. Title: Step into Health: Barriers to Enrollment into Stepped Care Treatment Program for Weight Management

Authors: Anastasia J. Philippopoulos¹, Jill Stadterman¹, Farah Hasan¹, Ghazal Sinha MD², & Genna Hymowitz PhD¹. (Psychiatry and Behavioral Health; Renaissance School of Medicine; Mind-Body Clinical Research Center¹; Stony Brook Family, Population & Preventive Medicine²)

Presenting Author: Anastasia J. Philippopoulos (Staff; anastasia.philippopoulos@stonybrookmedicine.edu)

Main Body

Although treatment guidelines recommend intensive, multicomponent behavioral interventions for adults with a body mass index (BMI) above 30, many existing weight loss interventions are costly and neglect individual needs. We explore demographic factors associated with engagement with our stepped care treatment program to identify ways to increase participation, particularly among individuals from historically marginalized backgrounds.

Eligible family medicine patients (Age ≥ 18 ; BMI ≥ 25) were screened by phone for interest in our program from October 2022 to January 2023. BMI scores and demographic information from initial questionnaires (e.g., race, gender, age) were compared to assess factors associated with those who completed a patient navigation visit or declined participation. National and state area deprivation index (ADI) scores were calculated using patients' residential addresses to assess socioeconomic disadvantage. Sample characteristics of those who did and did not participate were compared using chi square tests.

Individuals in the sample ($n = 221$; $M_{age} = 48.2 \pm 13.6$) primarily identified as female ($n = 152$; 68.8%) and non-Hispanic White ($n = 158$; 76.7%). Individuals had an average BMI of 32.98 ($SD = 7.44$), national ADI of 23 ($SD = 12.1$), and state ADI of 5 ($SD = 1.5$). Of the eligible patients contacted, 36 (16.3%) completed a patient navigation visit (responders) and 185 (83.7%) declined participation or were unresponsive (non-responders).

Responders and non-responders did not differ significantly on sociodemographic factors such as race ($\chi^2 (1, n = 206) = 1.29$; $p = .26$), gender ($\chi^2 (1, n = 221) = 2.78$; $p = .10$), BMI ($\chi^2 (2, n = 218) = 4.61$; $p = .10$), age group ($\chi^2 (2, n = 221) = .49$, $p = .78$), national ADI ($\chi^2 (6, n = 221) = 3.66$, $p = .72$), or state ADI scores ($\chi^2 (8, n = 221) = 4.97$; $p = .76$). Nevertheless, a greater percentage of the responders was female-identifying (80.6% vs 66.5%), non-White (30.6% vs 21.8%), and living with severe obesity (> 40 ; 25.0% vs 11.5%) compared to the non-responders.

Initial analyses did not reveal significant differences between groups. However, trends in gender, race, and BMI suggest that female-identifying, non-White, individuals with severe obesity may be more likely to take advantage of this free weight loss program. Most contacted individuals were unreachable or otherwise declined participation, despite the visit occurring remotely and free of cost. Thus, finding additional ways to increase engagement, particularly among people vulnerable to overweight and obesity, is warranted.

Funding source(s)

Pilot Grants Program in Psychiatry and Behavioral Health. Title: "Monitoring and Addressing Weight Management Utilizing a Stepped Care Treatment Program."

CORIHS approval

IRB2021-00211 4/13/2021

7. **Title:** COVID-19 Symptom Load As a Risk Factor For Chronic Pain: A National Cross-Sectional Study

Authors: Jamie L. Romeiser, PhD^{1,2}
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Presenting Author: Sunitha Singh; Sunitha.singh@stonybrookmedicine.edu;

Presenting Author' Category: Staff

Introduction: A COVID-19 infection with a high initial severity is associated with development of long-COVID conditions. One such condition is chronic pain. At the population level, it is unknown if severity of a COVID-19 infection is a predictor of chronic pain above and beyond the traditional slate of pre-established risk factors. The purpose of this study is to examine whether COVID-19 severity of infection may be a new risk factor for chronic pain.

Methods: Using data from the 2021 National Health Interview Survey (n=15,335), this study examined the adjusted odds of experiencing high frequency levels of pain in the past 3 months for those who reported no/mild symptoms from a COVID-19 infection, and those reporting moderate/severe symptoms from COVID-19, compared to those never infected. A 1:1:1 propensity score matched analysis was also performed to examine the odds of pain.

Results: Prevalence of pain was higher in the moderate/severe symptom group compared to the no infection group (25.48% vs 19.44%, p <0.001). Both the adjusted model (odds ratio [OR] = 1.28, 95% confidence interval [CI] = 1.09, 1.51) and matched model (OR = 1.45, CI = 1.14, 1.83) revealed higher odds of pain for those with moderate/high COVID-19 symptoms compared to no infection.

Conclusion: A moderate/highly symptomatic COVID-19 infection may be a new risk factor for chronic pain. As the absolute number of severe COVID-19 infections continues to rise, overall prevalence of chronic pain may also increase. While knowledge continues to unfold on long-haul symptoms, prevention of severe infections remains essential.

Funding source: None.

CORHIS approval: N/A

Financial disclosure statement:

Jamie Romeiser has no financial disclosures.

Christopher Morley has no financial disclosures.

Sunitha Singh has no financial disclosures.



FACULTY



1.* Title: Glomerular mRNAs are Alternatively Spliced and Polyadenylated Leading to Multiple Isoforms in Podocytopathies

Authors: Amy Webb: Department of Bioinformatics, The Ohio State University
Claire Burton: Abigail Wexner Research Institute at Nationwide Children's Hospital
Rachel Cianciolo: Department of Pathology, The Ohio State University
Claire Moore: Molecular and Chemical Biology, Tufts University School of Medicine
Shipra Agrawal: Division of Nephrology and Hypertension, Department of Medicine, Stony brook University Renaissance School of Medicine (formerly at The Ohio State University and Nationwide Children's Hospital)

Presenting Author: Shipra Agrawal, Shipra.Agrawal@stonybrookmedicine.edu, Faculty

Background: Alternative mRNA processing events, such as alternative splicing (AS) and alternative polyadenylation (APA) play important roles in physiology, development, and disease; however, there is very limited knowledge of their roles in glomerular disease and chronic kidney disease. Glomerular disease, often characterized by podocyte loss and injury and proteinuria, can lead to chronic kidney disease and end stage kidney disease. We hypothesized that AS and APA events of glomerular RNAs is associated with podocyte injury and proteinuria during glomerular disease.

Methods: Glomerular damage characterized by proteinuria was induced by puromycin aminonucleoside (PAN) or adriamycin (ADR) to mimic human minimal change disease (MCD) or focal segmental glomerulosclerosis (FSGS), respectively. Urine and serum chemistries, kidney histology and glomerular RNA-seq analyses were performed. JunctionSeq and APATrap bioinformatics analyses was performed to detect APA and AS glomerular events. Correlation of differentially expressed genes (DEGs) was performed with known glomerular disease genes, and splicing and polyadenylation factors.

Results: Robust proteinuria was induced in both PAN-MCD and ADR-FSGS models, accompanied by hypoalbuminemia, hypercholesterolemia, and histological alterations in the kidneys (protein casts and podocyte hypertrophy). Out of 13,265 genes, MCD model resulted in 1033 and FSGS model in 1308 glomerular DEGs with $abs(\log_2FC) > 1$ and $P_{\text{adjust}} < 0.05$. Of 80 analyzed genes with established roles in glomerular disease, 30 were altered in both MCD and FSGS. Significant AS was identified in 136 and 1875 genes in MCD and FSGS models, respectively. In accordance, of 50 splicing factors analyzed, 3 were altered in MCD and 5 in FSGS. Significant APA was identified in 71 and 746 genes in MCD and FSGS nephrosis, respectively, and of 173 polyadenylation factors analyzed, 21 were altered in MCD and 24 in FSGS. Specifically, the identified AS and APA events affected genes of the slit diaphragm complex such as *Nphs1*, *Nphs2*, and *Tjp1*, which are critical determinants of podocyte structure and function and the glomerular filtration barrier.

Conclusion: Association of global glomerular mRNA alteration due to AS and APA with podocyte and glomerular injury is a newly recognized phenomenon, with potential implications for enhanced mechanistic understanding and therapeutic intervention of glomerular and chronic kidney disease.

Funding source(s):

- ✓ Dialysis Clinic Inc. to SA
- ✓ Nationwide Children's Hospital to SA

If human subjects are included, indicate date/number of Committee on Research Involving Human Subjects (CORIHS) approval

- ✓ NA

Financial disclosures: None

2. Title: A Historical Perspective on Diversity in Clinical Laboratory Sciences Program

Authors: Afrinash Ahamad ^{1 2 3} and Jeannie Guglielmo ¹

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Funding- no funding is available

Abstract

Diversity is integral for an effective learning environment and pedagogy. It is a concept that differentiates a group of people from one another based on but not limited to age, ethnicity, gender, health care, mental health, and sexual orientation. Contemporarily, diversity is up-trending in all disciplines of healthcare but systemic inequalities remain and have been reported in healthcare. One way to end the inequalities is to prepare a diverse clinical team from early training so that deep-seated differences can be eliminated, which often merely stem from “cultural blankness” and lack of culturally diverse interaction. Currently, in the United States, 244 Medical Laboratory Science programs are training laboratory medicine professionals but the level of diversity in these programs remains enigmatic. In this study, we determined the student and faculty diversity in the Clinical Laboratory Sciences programs at Stony Brook University. We retrospectively analyzed the data over 20 years for the traditional and 8 years for the hybrid programs. Over 20 years, 502 students graduated from the traditional program, and 96 students graduated from the hybrid program. In the traditional program, an average of 25 students enrolled with 75% female and 25% male; in the hybrid program, an average of 12 students with 8.5 females and 3.5 males enrolled. The traditional program had the highest proportion of Asian students (50%), with White students making up 24.5%, whereas the highest proportions in the hybrid program were 35% White students and 24% Hispanic students. Among the 5 boroughs of New York City, the highest proportion of student representation was from Queens and Manhattan in both traditional (24.1%) and hybrid programs (16.7%). There were 30% of male and 70% of female faculty served in the traditional program (2002-2017) whereas the current representation of full-time faculty is 100% female. Our data show the diversity of students and faculty in clinical laboratory sciences programs at Stony Brook University institution. Our study is the first to highlight the diversity in laboratory science programs over 20 years in the United States.

3. Title: A variant Rash: Lyme borreliosis misdiagnosed as a fungal infection

Authors: Afrinash Ahamad, MS, MLS(ASCP) SM(ASCP)^{1 2 3}, Maaz Farooqi MD, Bushra Tehreem⁴, MD, Nada Naiyer, MD⁵

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Funding: No funding is available

Abstract

Lyme Disease (LD) is not unfamiliar to residents of the East Coast of the United States. *Borrelia Burgdorferi*, a spirochete transmitted via *Ixodes* tick, is responsible for Lyme borreliosis. An early localized infection appears as a conventional Erythema Migrans (EM) rash, a hallmark of the disease reported in a set of the patient population, while atypical or no rash has also been documented in cases of LD. Despite the prevalence of the disease in the United States, a lack of knowledge on the interpretation of symptoms and the inappropriate timeline used for diagnostic testing results in misdiagnosis and adversely impacts the patient's outcome. We present a case of a 57-year-old Caucasian female, otherwise healthy individual, who visited the urgent care with fever, fatigue, and multiple atypical erythematous macules. The blood results of IgG/IgM for tick-borne disease performed within one week after the onset of the symptoms were negative and the patient was diagnosed with a fungal infection. However, persistent fever and fatigue resulted in repeated serological testing and the eventual diagnosis of Lyme borreliosis.

4. Title: Δ Np63 Transcription Factor as a Novel Suppressor of Psoriasis

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ABSTRACT

Introduction: p63 transcription factor is critical for the embryonic development of the outer skin layer, the epidermis. However, its role in the adult skin is poorly understood. Here we genetically ablated Δ Np63, the main p63 isoform, in the adult epidermis *in vivo* and found that besides its known roles in epidermal homeostasis, stemness, and proliferation, Δ Np63 is critical to suppress psoriatic inflammation.

Methods: A conditionally inducible LoxP-Cre model, Krt14-CreT2 mice, was used to ablate Δ Np63 in Krt14^{pos} basal epidermal cells where Δ Np63 is predominantly expressed. qRT-PCR, immunohistochemistry (IHC), and H&E were used to assess Δ Np63 ablation efficiency and the ensuing phenotype. Single-cell RNA sequencing (scRNA-seq) was used to reveal differentially expressed genes and pathways. Mouse skin and human psoriasis biopsies were analyzed by IHC, H&E, and immunofluorescence. Chromatin immunoprecipitation (ChIP) was performed to identify Δ Np63 binding sites. Unpaired Student's *t*-test was used for statistical analyses.

Results: Δ Np63-ablated mouse epidermis showed psoriasis-like histopathology. scRNA-seq and the Reactome pathway analysis of the isolated primary Δ Np63-ablated keratinocytes revealed a broad upregulation of the inflammatory program at 1 day post-ablation: IL-1/10, IL-4/13, and IL-36 pathways. We confirmed IL-36 protein upregulation in the ablated mouse skin, which was comparable to human psoriasis vulgaris biopsies. Epidermal stratification defects also mimicked human psoriasis, i.e., expansion of basal Krt14 into the supra-basal layers, its overlap with spinous and granular markers Krt10 and Loricrin, and patches of lost granular marker Filaggrin. Mechanistically, *IL-1a*, *IL-18*, *IL-24*, and *IL-36 γ* were among the most upregulated interleukin genes in Δ Np63-ablated keratinocytes, suggesting that Δ Np63 is their negative regulator. Indeed, we found many potential p63 binding sites in the regulatory regions of these genes and confirmed their p63 binding by ChIP/qRT-PCR. Finally, we found that p63 expression is significantly reduced in human psoriatic skin, supporting its negative regulatory function there.

Conclusions and clinical relevance: Our data reveal a novel critical role of Δ Np63 as a keratinocyte-specific suppressor of psoriasis. Psoriasis is a chronic autoimmune disease driven by an interplay between the immune system and epidermis. It was recently proposed that the epidermis rather than the immune cells play the primary role in psoriasis. Our findings support this unconventional model. Modulation of the levels of p63 or its newly identified negative cytokine effectors may provide a novel path to psoriasis prevention and/or treatment.

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5. Title: Biomarkers and Strain Echocardiography for detection of Subclinical Cardiotoxicity in Breast Cancer Patients receiving Anthracyclines

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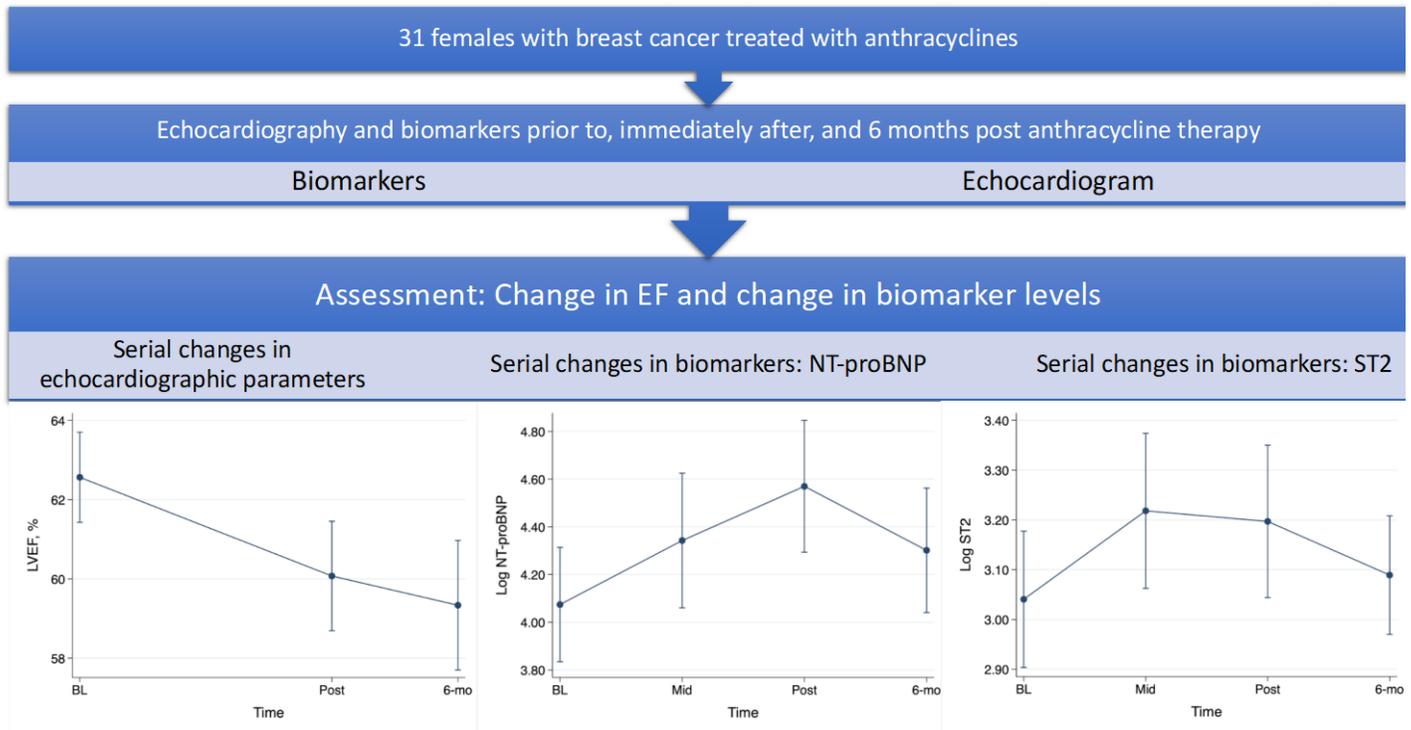
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Presenting author Category: Faculty

Introduction The optimal surveillance and management strategies for breast cancer patients receiving anthracycline therapy is limited by our incomplete understanding of the role of biomarkers heralding the onset of cardiotoxicity. The purpose of this study was to determine whether there is a temporal correlation between cardiac biomarkers and subclinical left ventricular dysfunction in breast cancer patients receiving anthracycline chemotherapy. **Methods** Thirty-one females between 46-55 years old with breast cancer treated with anthracycline chemotherapy were prospectively enrolled. Cardiac biomarkers were correlated with echocardiography with speckle tracking at baseline, post-anthracycline therapy, and 6 months post-anthracycline chemotherapy. Subclinical cardiotoxicity was defined as $\geq 10\%$ reduction in global longitudinal strain (GLS). **Results** There was a relative reduction in left ventricular ejection fraction (LVEF) $\geq 10\%$ in 5/30 (17%) and 7/27 (26%) patients post-anthracycline therapy and 6 months post-anthracycline therapy, respectively. Subclinical cardiotoxicity was noted in 8/30 (27%) and 10/26 (38%) patients post-anthracycline and 6 months post-anthracycline therapy, respectively. Baseline N-terminal pro B-type natriuretic peptide (NT-proBNP) was the strongest predictor of LVEF ($\rho = -0.45$; $p = 0.019$), with post-therapy NT-proBNP values illustrating similar predictive value ($\rho = -0.40$; $p = 0.038$). Interim changes in ST2 and galectin-3 correlated with 6-month change in LVEF ($\rho = -0.48$; $p = 0.012$ and $\rho = -0.45$; $p = 0.018$, for ST2 and galectin-3, respectively). Changes in galectin-3 from baseline to mid-therapy paralleled changes in GLS. **Conclusions/ Clinical Relevance** NT-proBNP, ST2, and galectin-3 correlate with reduced LVEF among breast cancer patients receiving anthracycline therapy. Additional trials focusing on a cardiac biomarker approach may provide guidance in the early diagnosis and management of anthracycline-induced cardiotoxicity.

This study adds to the literature on the use of biomarkers in the prediction of cardiotoxicity among breast cancer patients receiving anthracyclines, with ST2, galectin, and NT-proBNP suggesting the most promise. Here we have utilized noninvasive testing including biomarkers and two-dimensional or three-dimensional strain imaging to assess cardiotoxicity at regular intervals. With the noninvasive nature of this testing, obtaining imaging and biomarkers at baseline and at various intervals early in cancer therapy may be of incremental benefit to these patients. Until further data suggests evidence of a more tailored approach, it is worthwhile to consider continuous monitoring of these patients pre-, during- and post anthracycline therapy

Central Illustration: Biomarker Correlation with Cardiotoxicity among Patients receiving Anthracycline-based Chemotherapy



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Financial disclosures

- Smadar Kort is on the advisory board for Medtronic
- Hal Skopicki is on the speaker's bureau for AstraZeneca and Pfizer
- Javed Butler is a consultant for Abbott, Adrenomed, Amgen, Array, AstraZeneca, Bayer, Boehringer Ingelheim, Bristol Myers Squibb, CVRx, G3 Pharmaceutical, Impulse Dynamics, Innolife, Janssen, LivaNova, Luitpold, Medtronic, Merck, Novartis, Novo Nordisk, Roche, and Vifor.
- Michelle Weisfelner Bloom is a consultant and on the speaker's bureau for AstraZeneca and Bayer Pharmaceuticals

6. Title: Delirium with Psychosis in an Elderly Woman with Autoimmune Encephalitis

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Presenting author's category: Faculty

Introduction: Delirium is very common in elderly patients with acute illnesses. Patients can display a broad array of symptoms ranging from lethargy to severe behavioral abnormality (1). Antipsychotics were used in a case of delirium that turned out to be due to autoimmune encephalitis.

Case description: An elderly female in her 80's with history of hypertension, and hypothyroidism first presented to another facility with confusion and was treated for urinary tract infection. She returned with fluctuating mental status. Workup was negative except for EEG showing seizure activity, and she was given 1 gram of Levetiracetam intravenously (IV). She was discharged on Valproic acid 4 days later.

She presented to our facility 3 weeks later with visual hallucinations, compulsivity, and insomnia. Her private physician had initiated a workup for mild cognitive impairment. Her exam was normal except that she could not do serial sevens. Repeated workup was normal. Neurology suggested a 5-day course of 1 gram IV methylprednisolone daily, with no improvement.

Psychiatry recommended antipsychotics with no response. She developed akathisia with Haloperidol and was given Benztropine. Later, she was given 5 days of IV immunoglobulin, her symptoms improved, and she was presumed to have autoimmune encephalitis. Her antipsychotic regimen was tapered off before discharge.

Discussion/Conclusion: Acute illness in an older individual with cognitive impairment is a predisposing factor for delirium. The etiology is not always obvious. Risk mitigation and prompt treatment therefore rely on a sophisticated strategy to address the contributing factors (1). A systematic review of 26 randomized controlled trials and observational studies, evaluating 5607 adult inpatients with delirium, does not support routine use of Haloperidol or second-generation anti-psychotics for treating delirium in adult inpatients (2). This case illustrates how polypharmacy can occur, and adversely affect outcome. Refraining from initiating medications for which there is a lack of clear indication for their use, may be an easier task than deprescribing.

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Financial disclosure: None

7. Title: Post Discharge Follow-up Call Found to Decrease 30-Day Pneumonia Readmission Rate.

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Presenting author's category: Faculty

Introduction: The prospect of reducing hospital readmissions is of increasing interest to researchers and policy makers because of its potential to improve the quality of care and lower health care cost (2). We formed a pneumonia task force with the goal of preventing avoidable hospital readmissions and improving the quality of care provided to patients hospitalized with pneumonia. Analysis of a scripted phone call highlights need for improvement in post discharge phone conversation.

Methods: Chart review of readmitted patients revealed opportunities for improvement. Monthly meetings occurred to discuss the data and brain-storm ways workflow and processes of care could be refined, to assure compliance with evidence-based guidelines and to effect smooth transitions. Data highlighting opportunities for improvement led to the development of an inpatient pneumonia power plan, the use of the Pneumonia Severity Index, the creation of a pneumonia discharge checklist, and the development of a pneumonia discharge patient education tool. We analyze a timely follow-up phone call within 24-48 hours on discharged pneumonia patients with a scripted template.

Results: 2021 second quarter had 31 pneumonia discharges; 28 (90%) were called. None of 7 patients who received a scripted call was readmitted; 3 of the 24 patients (12.5 %) who received non-scripted call were readmitted.

Third quarter had 30 pneumonia discharges; 28 (93%) were called. None of the 10 who received a scripted call was readmitted; 3 of the 20 (15%) who received non-scripted call were readmitted.

Fourth quarter had 29; 23 (79%) were called. None of the 15 patients who received a scripted call was readmitted; 1 of the 14 (7%) who received a non-scripted call was readmitted.

Scripted calls were associated with a 0% readmission rate and non-scripted calls were associated with 7-15% readmission rate.

Conclusion: The use of a 24-48-hour post discharge scripted phone call provides a structured method for the nurse to assess a patient's health status and to ensure hospital follow-up visit, leading to a reduction in readmission rates in the sample studied.

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Financial disclosure: None

8. Title: A Rare Case of Recurrent Reversible Vasoconstriction Syndrome (RCVS) Causing Severe Anxiety

Author: Patricia Boromee, MD Department of medicine, Hospitalist Division

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Presenting author's category: Faculty

Introduction: When patients present with severe thunderclap headache (HA), life threatening etiology such as Cerebral Vascular Accident (CVA) must be ruled out. RCVS, a condition that rarely reoccurs, can be a possibility. This rare recurrent RCVS case led to severe anxiety in our patient.

Case presentation: A female with history of hypertension, dyslipidemia, coronary artery disease visited an emergency room (ER) with thunderclap HA but was discharged home after negative workup. Three days later she visited another facility for non-resolution of HA, she was sent to our facility, and workup including Cat Scan (CT) of the head was negative. She then, had a generalized seizure, and was given 1 mg of Lorazepam and 1500 mg of intravenous (IV) Levetiracetam. She was admitted under neurology after cerebral angiogram showed evidence of RCVS of bilateral middle cerebral arteries (MCAs). She was placed on nimodipine, a calcium channel blocker used to treat RCVS. Repeated brain magnetic resonance angiography showed resolution of stenosis. She was then discharged home.

Nine months later, she was again transferred to us with 7 days of debilitating HA. Her exam and blood work were normal. Cerebral angiogram redemonstrated right MCA stenosis. She was placed on nimodipine 60 mg every 4 hours with resolution of HA. However, she developed anxiety and panic attacks requiring continued psychologic counseling after realizing that she belongs to the 5% of patients who suffer from recurrent RCVS.

Discussion/Conclusion: RCVS comprise a group of diverse conditions, all characterized by reversible multifocal narrowing of the cerebral arteries, heralded by sudden onset (thunderclap), severe HAs with or without associated neurologic deficits (1). This condition is severe and can be a source of significant distress for patients and providers. Sequelae of RCVS include ischemic or hemorrhagic CVAs. RCVS has been reported in people aged 10 to 76 years, but occurrence peaks at around 42 years and the syndrome is more common in women than men (2). This case highlights that we need to think outside the box when evaluating any medical condition. We should keep in mind that the geriatric population is not spared from RCVS.

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Financial disclosure: None

9. Title: Root Cause Analysis of a Pressure Injury in the Setting of Transition of Care

Authors: Patricia Boromee, MD: Department of medicine; Anshu Singh, MD, CMD, HPM: Long Island State Veterans Home: Department of Medicine

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Presenting author's category: Faculty

Introduction: This root cause analysis of a pressure injury in the setting of transition of care highlights need for improvement in SBAR (Situation, Background, Assessment, Recommendation) of wound status, to enhance multidisciplinary delivery of timely care and prevention.

Case presentation: An elderly male in his 80's with dementia, diabetes, non-ambulatory, fecal and urinary incontinence, chronic foley catheter, presented with altered mental status. On day 1 of his illness, he became lethargic and was sent to the hospital. Four days prior, he had been documented with moisture associated skin damage in the nursing home (NH). In the emergency room (ER) WBCs were 20.02/mm³ (4.8-10.8), creatinine was 2.87 ng/dL (0.5-1.2) from baseline, 1.4. ER physician noted a "stage 4 sacral pressure injury".

On day 3, wound care nurse found an unstageable 7 cm x 7 cm, sacral wound, butterfly shape, with moist black and yellow necrotic tissue, with serosanguinous exudate, malodorous with purple discoloration proximally, with peri-wound erythema. On day 5, general surgery performed sharp excisional debridement, and electrocautery. Post procedure note cited a "stage 2 pressure injury".

Methods: A thorough chart review was performed at the NH and the hospital. Braden scale was used to estimate patient's risk. A Fish diagram was made with the patient's risk factors. This led to identification of need for process improvement via educating staff to utilize a common SBAR communication tool.

Results: There were significant discrepancies in the documentation by the ER provider, the wound care nurse and in the surgical post debridement note. The SBAR from the NH was incomplete. Downstaging of the pressure injury, a practice not endorsed, was noted post debridement. Patient had an estimated Braden score of 10, denoting high risk for pressure injury.

Discussion/Conclusion: This case analysis encompassed the Braden Scale and led to standardized in-service training for NH staff regarding importance of SBAR. A skin integrity lecture series for staff at the NH and daily wound care rounds occurred. Medical residents doing geriatric rotation at this NH are actively involved in wound rounds.

This practice flags patients across disciplines and helps to address early intervention for securement of specialty beds, moisture barriers for incontinence, etc.

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2. European Pressure Ulcer Advisory Panel. Guidelines on treatment of pressure ulcers. *EPUAP Rev.* 1999; 1:31-33
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Financial disclosure: None

10. Title: Multidrug Aerosol Delivery During Mechanical Ventilation

Authors: Ann D. Cuccia¹, MPH, RRT-NPS, RPFT, FAARC, Michael McPeck², BS, RRT, FAARC, Janice A. Lee², MD, MSc, Gerald C. Smaldone², MD, PhD

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Faculty, School of Health Professions, Respiratory Care Program

Abstract:

INTRODUCTION:

In the critically ill, pulmonary vasodilators are often provided off label to intubated patients using continuous nebulization¹⁻⁵. If additional aerosol therapies such as bronchodilators or antibiotics are needed, vasodilator therapy may be interrupted. This study assesses aerosol systems designed for simultaneous delivery of two aerosols using continuous nebulization and bolus injection without interruption or circuit disconnection.

METHODS: One *i-AIRE* dual-port breath-enhanced jet nebulizer (BEJN) or two Aerogen® Solo vibrating mesh nebulizers (VMN) were installed on the dry side of the humidifier. VMN were stacked; one for infusion, the second for bolus drug delivery. The BEJN was powered by air at 3.5 L/min, 50 psig. Radiolabeled saline was infused at 5 & 10 mL/h with radiolabeled 3 mL and 6 mL bolus injections at 30 and 120 min respectively. Two adult breathing patterns (duty cycle 0.13 and 0.34) were tested with an infusion time of 4 h. Inhaled Mass expressed as % of initial syringe activity (IM%/min) was monitored in real time with a ratemeter. All delivered radioaerosol was collected on a filter at the airway opening. Transients in aerosol delivery were measured by calibrated ratemeter.

RESULTS: IM %/h during continuous infusion was linear and predictable, mean ± SD: 2.12 ±1.45%, 2.47 ±0.863% for BEJN and VMN, respectively. BEJN functioned without incident. VMN continuous aerosol delivery stopped spontaneously in 3 of 8 runs (38%); bolus delivery stopped spontaneously in 3 of 16 runs (19%). Tapping restarted VMN function during continuous and bolus delivery runs. Bolus delivery IM% (mean ± SD): 20.90 ±7.01%, 30.40 ±11.10% for BEJN and VMN, respectively.

CONCLUSION: Simultaneous continuous and bolus nebulization without circuit disconnection is possible for both jet and mesh technology. Monitoring of VMN devices may be necessary in case of spontaneous interruption of nebulization.

Funding Information:

The State University of New York at Stony Brook holds patents in the fields of nebulizer development and inhaled drug delivery, which have been licensed to InspiRx.

Author Disclosure Statement:

Dr. Smaldone is a consultant to InspiRx and is a member of the Advisory Board; Ms. Cuccia serves as a consultant to InspiRx, Inc.; Mr. McPeck and Dr. Lee have no conflicts.

11. Title: The Stony Brook Medical Center Experience with the “Game Changing Drug,” Cenobamate, for Patients with Focal Drug Resistant Epilepsy

Authors: Hannah D. Kravets (1) Yana Krutoshinskaya MD (2)

Department of Neurology Stony Brook University Medical Center: (1) High School Student (2) Faculty

Abstract

It is estimated that about 30% of patients with epilepsy have a drug resistant epilepsy (DRE). It is defined by the international league against epilepsy (ILAE) as failure of adequate trials of 2 tolerated, appropriately chosen and used anti-seizure medications (ASM) to achieve sustained seizure freedom. The odds of seizure freedom with an addition of another ASM, in this patient population was reported as 24% with 3rd ASM and 14% with a 6th. (1) The ILAE encourages surgical evaluation after a failure of a second ASM. This abstract represents a quality assurance project to assess if CNB should be tried at our center before surgical evaluation in our DRE patients with focal epilepsy.

We conducted a retrospective chart review on our patients, 18 or older, with focal DRE. The patient’s average seizure frequency was compared to 3 months before the initiation of CNB to at least 3 months after a “final dosage” was established (follow up ranged from 3 to 28 months). CNB was the last ASM added. Patients who discontinued CNB due to side effects, were taken out of the final analysis (6 patients), as well as 3 patient who were just started on the titration regimen. In total we had 16 patients who met the inclusion criteria.

In total there were 16 patients who met the inclusion criteria thus far, 5 men and 11 women. The age range was 25 to 69 years. 7/16 patients (43%) were seizure free for a period of at least 3 months. The average reported seizure reduction was 70% (ranging from no change in seizure frequency in 3/16, and 7/16 with seizure freedom). The men had a 93% seizure reduction while the women had a 59.6% seizure reduction. Of note, of the 3 oldest women in the group (59-69 age range) 2 had no change in the seizure frequency and one had only 30% seizure frequency reduction.

Our center’s experience, thus far, supports the existing literature that CNB is superior to other ASMs in leading to a significant reduction of seizures in patients with focal DRE. We suspect that our center’s higher percentage of seizure freedom, than the one reported in the literature (an estimated 28% seizure freedom) and the total reduction in seizures (an estimated total of 55.6% in the literature) is due to our small number of patients. (2) It is also important to highlight that 5/7 of the patients who became seizure free were on dosages of less than 200mg (ranged from 100mg to 150mg). It is interesting that three oldest women in our group (59 to 69yr), either did not have a seizure frequency reduction, or a relatively low reduction. On the other hand, it was encouraging that 2 patients with failed resective surgery became seizure free on CNB. More research is needed to determine, the types of patients that may benefit most from CNB. The results lend support to consider CNB in patients with focal DRE before surgical evaluation. The study also lends support that dosages less than 200mg can lead to seizure freedom.

12. Title: Childbearing Practices Among Pediatric Critical Care Medicine Physicians

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Abstract:

Introduction: The medical career has played a role in the childbearing decisions of many women physicians. In particular, many choose to delay having children while putting their career first. The consequences of delaying childbearing include infertility and higher risk pregnancies in those with advanced maternal age. Pediatric critical care medicine (PCCM) can be rewarding but can also be very demanding with the care for unstable critically ill children, the need for end-of-life discussions with caregivers, its long work hours, multiple alternating night and day shifts, 24-hour calls, and non-clinical work duties. Nevertheless, little is known of the effect, if any, that a PCCM career exerts on parenthood. This study aimed to elucidate childbearing decisions among practicing PCCM physicians and assess whether those decisions differed throughout time.

Methods: After Institutional Review Board (IRB) approval, a REDCap survey was posted on the Facebook *Pediatric Critical (Intensive) Care* group and the Facebook *PICU Women Physicians Group* between March and April, 2022. The survey was followed by a phone interview of participants who were willing to be contacted for more information about their childbearing practices. The data was analyzed using descriptive statistics, Fisher exact test for categorical data comparisons, and thematic analysis for qualitative data for which themes and ideas were summarized.

Results: Most PCCM faculty had their first child as a faculty (52.3%) or fellow (25.5%), and the time when they had had their first child was similar regardless of when they underwent PCCM fellowship training ($P = .47$). Those who underwent PCCM training in previous eras had higher childbearing rates, except for those who trained in the 1990s who had the highest rates of having no children ($P < .001$). Most (78.6%) PCCM trainees wishing to have children planned to have a child as faculty. The most common factor influencing childbearing decisions among PCCM physicians was their career, in particular their desire to finish training, career advancement goals as faculty, and long work hours. Other factors included their age, finances, and marriage time.

Conclusion: Most pediatric intensivists begin having children as a PCCM faculty or fellow. This has not changed significantly over time. The major factor for delaying childbearing is their career. Further studies are needed to assess whether childbearing while practicing PCCM, with its particular work and career demands, has an impact on the physician's health, wellbeing, career, and work performance.

Funding: This work was not funded.

Committee on Research Involving Human Subjects (CORIHS): This work was approved by the Central Michigan University (CMU) and Detroit Medical Center (DMC) Institutional Review Boards on March 3, 2022. CMU 2021-749 and DMC 19791.

Financial disclosures: The authors have no financial disclosures to report.

13. Title: Severe Methotrexate Toxicity in a 16-year-old with Pre-B-Acute Lymphoblastic Leukemia and Monoallelic *FANCM* Mutations

Authors: Nicole Muhlbauer, MD^{1*}, Michelle Nash, MD¹, Rina Meyer, MD¹, Devina Prakash, MD¹, Laura Hogan, MD¹

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Introduction:

Although genetic evaluation in patients with a pediatric malignancy is not typically completed prior to initiation of therapy, an unanticipated chemotherapy toxicity often prompts further investigation. Fanconi Anemia (FA) is characterized by defects in the DNA damage response pathway and the inability to maintain genomic stability. Aberrations in FA proteins results in a heterogenous spectrum of clinical syndromes including congenital anomalies, bone marrow failure and cancer predisposition.¹ In this case, we report a patient with monoallelic *FANCM* mutations who experienced life-threatening methotrexate toxicity resulting in permanent end-organ damage.

Case:

A previously healthy 16-year-old boy of Hispanic descent presented with fatigue, weight loss, and epistaxis. The patient was diagnosed high risk pre-B-acute lymphoblastic leukemia with central nervous system involvement. He initiated interim maintenance therapy which included vincristine, mercaptopurine, intrathecal methotrexate, and intravenous high-dose methotrexate (5 gm/m² over 24 hours). During the methotrexate infusion the patient experienced nausea, emesis and diarrhea. At completion of the 24 hour infusion, his serum creatinine increased more than six-times his baseline level and measured 3.15 mg/dL; the methotrexate level measured 564.00 µmol/L; the expected level at 24 hours is <150 µmol/L. In addition to hyperhydration with alkalized fluids and high-dose leucovorin, dialysis was initiated and the patient received glucarpidase within twenty-four hours. Within two days of the initial toxicity, he developed severe mucositis of his entire gastrointestinal tract requiring a patient-controlled analgesia pump for pain control. Additionally, he experienced an acute liver injury with a transaminitis, a conjugated hyperbilirubinemia, and coagulopathy. Five days following the initial toxicity, he had an episode of hypoxia and cardiac arrest. Following the arrest, brain imaging was consistent with methotrexate induced-leukoencephalopathy and hypoxic brain injury.

A genomic evaluation was performed to identify an underlying cause for the significant methotrexate toxicity. Whole exome sequencing detected two monoallelic *FANCM* mutations inherited from the patient's mother. The L211Yfs*2 variant is a truncating lesion resulting in loss of function and is identified as a likely pathogenic variant. The p. A122V variant mutation has not been described as pathogenic to date.

Conclusion

Here we report a case of childhood pre-B-cell lymphoblastic leukemia with two monoallelic mutations in *FANCM* that experienced severe methotrexate toxicity resulting in hematologic, nephrotic, hepatic, and neurologic damage. This serves to support the need for extended genomic profiling of pediatric patients who experience unexpected toxicity to chemotherapy, despite any preceding clinical stigmata that would be suggestive of FA.

No funding or financial disclosures.

14. Title: WeStep: An Individualized Neurorehabilitation Gait System using Music and AI

Authors: Margaret Schedel¹, Shubham Jain², Petar Djuric³, IV Ramskrishnan², Lisa Muratori⁴

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Presenting author' Category: Faculty

Introduction: Gait impairment is a hallmark of Parkinson's disease (PD). The general hypothesis underlying the motor deficits in PD is that there is an overactive indirect basal ganglia pathway, resulting in nearly constant thalamic inhibition, and the inability to select and execute a desired motor plan. A potential therapeutic approach is to tap into the ability of music to stimulate rhythmical movement. Music-based rehabilitation has been guided by the finding that the majority of the brain regions and networks activated by listening to music are not exclusive to music listening, but also process language, auditory perception, elements of cognition, and/or motor control. Entrainment is thought to result from direct and dynamic neuronal coupling between the auditory and motor systems. This wealth of musically-delivered motor guidance may function to mitigate hypokinetic tendencies and improve other components of rhythmic gait.

Methods: We are investigating the use of music in a unique therapeutic intervention aimed at improving gait in individuals with PD: Wearable Sonification Therapy Equipment for Parkinson's (WeSTEP). WeSTEP uses two innovative approaches: the use of error signals (rather than correct movement cueing) and a multivariate, gait-sonification algorithm that can provide real-time auditory feedback. Using our WeSTEP system, we are creating an individualized model for each person with PD based on their own target optimal walking pattern. From acquired body-worn sensor data, the applied machine learning method learns the parameters of the individualized model used for detecting distortions in gait. The learning amounts to optimizing the parameters of the model with respect to an adopted cost function.

Results: We compare models generated from traditional LSTM and transformer-based models as transformers are considered the current state-of-the-art for sequential data. Using low-profile sensors sending feedback to the user through a smartphone, we distort music as the individual deviates from their target gait. The negative biofeedback is used as a training tool to improve walking with the resulting distortions reflecting both temporal (velocity, double support time) and spatial (stride length or symmetry) components of gait. This novel form of rehabilitation training allows the user to discover how to modify their gait through a largely implicit process of motor adaptation, using auditory error signals delivered through music on their own phones to drive trial-and-error learning.

Conclusion: The WeSTEP has the potential to produce large changes in gait coordination and rhythmicity in people, across a wide range of cognitive abilities, without requiring a diversion of attentional resources.

Funding: N/A

Human Subjects: N/A

Financial Disclosures: N/A

15. Title: Mental Health Service Demand in Stony Brook's Outpatient Child and Adolescent Psychiatry Division Through the Covid-19 Pandemic

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Introduction: The emergence of the Covid-19 pandemic presented challenges and opportunities for mental healthcare services and interventions, and according to research significantly impacted the mental health of the child and adolescent population. Multiple stressors experienced by children and adolescents during the pandemic, including social isolation (Fong & Iarocci, 2020), loneliness, lack of physical exercise, family stress and wellness (Gassman-Pines et al, 2020), and an overall feeling of being unsafe have been noted as significantly increasing the risk for mental health problems of anxiety and depression (Racine et al, 2020). Increased access to mental health services has been imperative to meet this increased demand for services. At the Stony Brook Outpatient Division of Child and Adolescent Psychiatry, a 177% increase in demand for services (based on number of new patient visits) was seen from fiscal year 2018/2019 to 2021/2022. The current study explored the perceived impact of the COVID-19 pandemic on treatment seeking behaviors.

Methods: As part of routine clinical operations, caregivers completed intake questionnaires via a HIPPA-compliant online survey platform prior to the scheduled intake evaluation appointment. The intake packet included questions regarding the main reasons for wanting help for their child, as well as demographics, and symptom questionnaires including the Child Behavior Checklist (CBCL, Achenbach & Rescorla, 2001). CBCL data is currently available after December 2021. Qualitative coding was used to identify themes for presenting concerns and reasons for seeking diagnostic evaluation or therapeutic treatment. Descriptive statistics and regression were used for analysis.

Results: Caregivers of 2,209 children (Mean age = 12.14 years, $SD = 3.6$) seeking mental health care services between October 2020 and October 2023 completed the online intake questionnaires. Preliminary coding indicated that 9% of caregivers identified the COVID-19 pandemic or virtual learning as a part of the reason for seeking mental health evaluation or treatment for their child. The mention of the COVID-19 pandemic or virtual learning was positively associated with child age and parental education (p -values < .001) but was not significantly associated with time. Caregivers with a COVID/remote learning presenting concerns also rated their children as having significantly higher anxious, depressed, and somatic symptoms and lower rule breaking behavior on the CBCL than those who did not (p -values < .05).

Conclusions/clinical relevance: The COVID-19 pandemic continues to be perceived by caregivers as impacting child and adolescent mental health. Internalizing symptoms in particular may have been exacerbated by pandemic-related factors and sequelae.

Funding Source: N/A

CORIHS approval: IRB 2022-00352

16. Title: Importance of *ALK* gene sequencing in pediatric anaplastic large cell lymphoma

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Introduction

Anaplastic lymphoma kinase (*ALK*) gene rearrangements are commonly found in pediatric anaplastic large cell lymphoma (ALCL). *ALK* gene rearrangements encode constitutively activated *ALK* fusion proteins that regulate downstream pathways involved in cell growth, survival, and cell-cycle control. At diagnosis the distinction between *ALK* positive and *ALK* negative ALCL is typically made through immunohistochemistry (IHC) and fluorescence in situ hybridization (FISH) looking for classical rearrangements, most commonly with *NPM1*. *ALK* inhibition is a therapeutic strategy currently being explored in pediatric ALCL. However, IHC and FISH alone do not predict sensitivity to specific *ALK* inhibitors.

Methods

Case report

Results

A previously healthy 12 year-old boy presented with fevers, pleural and pericardial effusions, skin nodules, lung nodules and parenchymal disease, and diffuse lymphadenopathy. Cervical lymph node biopsy demonstrated ALCL, *ALK* + (via IHC and FISH showed t(2;5) confirming an *NPM1-ALK* fusion protein). He achieved complete remission after 2 cycles with multi-agent chemotherapy (dexamethasone, ifosfamide, methotrexate, cytarabine, etoposide, cyclophosphamide, doxorubicin and brentuximab). After his 4th cycle he relapsed and started monotherapy with crizotinib, a first generation *ALK* inhibitor. He had progressive disease after 3 weeks and was changed to combination chemotherapy with brentuximab and nivolumab with the addition of alectinib, a second generation *ALK* inhibitor. He again had progressive disease within 3 weeks and received therapy with ifosfamide, carboplatin and etoposide with a mixed response. Next generation sequencing (NGS) was done at time of second relapse and demonstrated the already known *NPM1-ALK* fusion, but also found an ALKI1171T mutation. NGS was not done at diagnosis so it is unknown if this mutation was present at diagnosis or an acquired mechanism of resistance. Based on preclinical studies and limited clinical studies demonstrating that ALKI1171T mutations are resistant to crizotinib and alectinib but may maintain sensitivity to ceritinib, the patient started ceritinib in combination with brentuximab. Within 4 weeks of starting ceritinib he achieved a complete response that was sustained long enough to get him to allogenic hematopoietic stem cell transplant.

Conclusion

Testing for the presence of *ALK* rearrangements via IHC is standard in pediatric ALCL but cannot solely predict sensitivity to specific inhibitors. Consideration should be made for upfront *ALK* gene sequencing as this may drive therapeutic decisions regarding which inhibitor is most likely to result in a clinical response.

Funding Source: none

No Human subjects included

No financial disclosures

17. Title: Does the presence of peripheral eosinophilia in pediatric inflammatory bowel disease correlate with disease activity?

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Background

Inflammatory bowel disease (IBD), characterized by chronic inflammation of the gastrointestinal tract, affects over 2 million Americans, including 80,000-100,000 children. The pathogenesis of IBD remains an area of ongoing study and involves a complex interplay of genetics, environment, microbiota and immune response. Eosinophils are a rich source of pro-inflammatory cytokines and have been known to play a role in disease progression. There has been an interest in the role peripheral blood eosinophilia (PBE) may have in IBD flares. In children, PBE at diagnosis has been positively correlated with a more severe disease phenotype. Our study aims to determine if this association between PBE and increased disease activity exists at other points in time throughout the disease course in patients with IBD on infliximab or a biosimilar. **Objective** To determine if pediatric inflammatory bowel disease patients receiving infliximab or biosimilar with increased disease activity have increased peripheral blood eosinophilia. **Methods** Pediatric IBD patients presenting for their infliximab/biosimilar infusions were recruited to participate in the study. Disease activity was assessed using the Pediatric Ulcerative Colitis Activity Index (PUCAI) or the Pediatric Crohn's Disease Activity Index (PCDAI) scoring systems. Routine bloodwork was obtained prior to each infusion and was used to assess for the presence or absence of peripheral blood eosinophilia. **Results** There were 48 subjects prospectively recruited to participate in this study. Subjects were separated into two groups, those whose disease was in remission and those with active disease based on PCDAI/PUCAI scores. We found that 30 patients were in remission while 18 patients had clinically active disease. There was no statistically significant difference between the two groups in terms of peripheral blood eosinophilia as defined by % eosinophilia > 3. In fact, although not statistically significant, a higher percentage of patients in remission had peripheral blood eosinophilia. **Discussion/Conclusion** This study demonstrated similar rates of PBE in patients with active IBD compared to patients with IBD in clinical remission based on PCDAI and PUCAI scores. One possible explanation for the lack of difference seen between groups may be that by using patients on infliximab/biosimilar, we selected patients that were well known to our practice and relatively well controlled on biologic therapy. Another explanation could be that elevated disease scores may not be directly correlated with more active disease and may be secondary to functional GI symptoms.

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18. Title Deletion of mdig enhances histone H3 lysine 36 trimethylation and metastatic potential of the triple negative breast cancer cells

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Introduction Breast cancer is the most common cancer among women and is the second leading cause of cancer related deaths after lung cancer. Advanced tumor growth and metastasis remain the major reason that renders many patients as poor candidates for surgical intervention. The mineral dust-induced gene mdig is an environmental regulated gene found to be overexpressed in many human cancers. In breast cancer, high expression of mdig is associated with poor overall survival (OS) of the patients but is favorable for better OS with lymph node metastasis.

Methods We employed CRISPR Cas 9 gene editing approach to knock out mdig in triple negative breast cancer (TNBC), MDA-MB-231 cells. Wild type (WT) and knockout (KO) cells were subjected to global ChIP sequencing, single cell RNA sequencing and quantitative proteomics for further analysis. NSG mouse model of orthotopic xenograft of the MDA-MB-231 cells were established for bioluminescent imaging of the mice. Immunohistochemistry and publicly available data mining tools were utilized.

Results Loss of mdig is a common feature in aggressive breast cancers. We provide evidence showing diminished expression of mdig in human TNBC. Mdig promoted the growth of primary tumors in mice but inhibited the metastasis of these cells in vivo. Knockout of mdig resulted in an enhancement of H3K36me3 in the genome and upregulation of some X chromosome-linked genes for cell motility, invasion, and metastasis. Silencing MAGED2, one of the most upregulated and H3K36me3-enriched genes resulted from mdig depletion, can partially reverse the invasive migration of mdig knockout cells. The anti-metastatic and inhibitory role of mdig on H3K36me3 is an important finding, where our data suggest that mdig is antagonist against H3K36me3 that enforces expression of genes, such as MAGED2, for cell invasion and metastasis.

Conclusion Our studies suggest the different roles of mdig played during the earlier and later phases of tumorigenesis. Through its antagonistic properties on the repressive histone trimethylation markers, including H3K9me3, H3K27me3 and H4K20me3, mdig promotes the expression of oncogenes such as c-Myc, EGFR to promote tumor initiation and growth in the early phase of tumorigenesis. When tumors are well-developed in the later phase, loss of mdig will result in an elevation of H3K36me3 that mostly promotes the transcription and expression of genes contributing to EMT, invasive migration, and metastasis of the cancer cells. This study unraveled new mechanistic insights for metastasis orchestrated by mdig that can serve as potential biomarkers with significance in breast cancer therapies.

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19. Title: Minimal Residual Disease in Hematologic Malignancies: A Scoping Review

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Abstract

Introduction. Hematologic malignancies (HMs) are a heterogeneous group of cancers characterized by neoplastic cells originating from the blood or lymphatic system. Treatment of HMs is not always completely effective, leaving a small population of residual malignant cells in the patient's body. This phenomenon is termed minimal residual disease (MRD) and is important to be detected and quantified to inform subsequent clinical treatment. The way MRD is defined and detected in different HMs vary significantly, as different genes, markers, and limits of detections are used for each one. Most published papers describing MRD do so in the context of one disorder or one methodology at a time. This study aims to provide a comprehensive and updated review of these studies and describe how MRD is defined and detected in all applicable hematologic malignancies, including acute myeloid leukemia (AML), chronic myeloid leukemia (CML), acute lymphoid leukemia (ALL), chronic lymphoid leukemia (CLL), multiple myeloma (MM), and non-Hodgkin's lymphoma (NHL). Different methodologies are currently used to detect MRD for each malignancy, including multiparametric flow cytometry (MFC), polymerase chain reaction (PCR), and next generation sequencing (NGS). Which methodology has the highest sensitivity has always been a point of intense debate. This study reviews the use of each methodology and their respective limits of detection to detect MRD in HM.

Methods. A scoping review was performed on published medical literature, using the PRISMA-ScR checklist. Inclusion criteria: studies describing at least one of the previously mentioned methodologies and its limit of detection, in the context of detecting MRD of at least one of the hematologic malignancies. Exclusion criteria: studies published before 2015 and those without written in a language other than English.

Results. A total of 240 articles gathered by the literature search were screened, and 118 studies remained to be thoroughly reviewed. The limit of detection to assess MRD for each methodology and malignancy was compiled. What markers are used to track clonal tumor cells or where the future of MRD detection is heading was also summarized.

Conclusions. When comparing the three methodologies, it was determined that NGS, the newest methodology used for MRD detection, is generally more sensitive than MFC and PCR. However, it is the most expensive and time-consuming method. Less commonly used methodologies could be further researched and standardized to elucidate MRD in a patient.

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If human subjects are included, indicate date/number of Committee on Research Involving Human Subjects (CORIHS) approval. N/A

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20. Title: Providing Molecular Diagnostics Training to Strengthen Health Systems in Resource Limited Countries

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ABSTRACT

Objectives: Advances in molecular diagnostics are expected to contribute significantly to improving the health of people worldwide. However, incorporation of these technologies in less developed countries remains a challenge. Despite Romania's recent economic growth, the country is in dire need for medical and laboratory staff trained in modern technologies. The aim of the study was to develop a curriculum easily deliverable to health care professionals in Romania, and to evaluate the effectiveness of the training in increasing their understanding of molecular tests.

Methods: The program was developed in accordance with the CDC's quality training standards. It was offered to 50 healthcare professionals and it consisted of online asynchronous lectures and optional synchronous review sessions. Training effectiveness was evaluated following CDC guidelines based on pre- and post-assessments answered anonymously.

Results: 81% of the participants completed the training successfully. Based on the learner's self-assessment, the course was successful in improving the overall knowledge of molecular diagnostics, specifically to understand molecular techniques and interpret results.

Conclusions: There was a very high participant satisfaction with the overall training. This study can serve as a model to be used in other less developed countries willing to incorporate molecular diagnostics to their clinical labs.

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Institutional Review Board determined that the study meets the criteria for a waiver of documentation of consent for participation in the study (IRB2021-00376)

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