Maine Osteopathic Association

2023 Midwinter Symposium – A Hybrid Event

Abstracts

UNE COM Research & Scholarship

February 10, 2023

Holiday Inn by the Bay, Portland, ME

UNE COM Student Highlights

MOA Midwinter Symposium
Holiday Inn by the Bay
88 Spring Street
Portland, Maine

View the Video Presentations by UNE COM students HERE

Friday, February 10, 2023

3:30-4:30 In-Person Research Forum Oral Podium Presentations from top Submissions:

Student Doctor Aishwarya Ayyappan, OMS 3 (Case Presentation)
Title: Investigating Complication of Acute Diverticulitis: Inferior Mesenteric Vein Thrombosis
Mentor: Naveed Qasim, DO, Columbia Memorial Health, Department of Internal Medicine

Student Doctor Sarah Lafleur, OMS 1 (Basic Science Research)
Title: Exploring Tryptophan-induced Macropinocytosis as a Metabolic Vulnerability of Tuberous Sclerosis Complex (TSC) in Lymphangioleiomyomatosis (LAM)
Mentor: Harilaos Filippakis, PhD, UNE COM, Department of Biomedical Sciences

Student Doctor Isabel Smith, OMS 3 (Clinical Research)
Title: Accessibility of Gender-Affirming Surgery in Maine: Identifying Barriers to Care for Gender-Diverse Patients
Mentor: Marilyn Gugliucci, MA, PhD, UNE COM, Division of Geriatrics

Student Doctor Arsal Shah, OMS 1 (Clinical Research)
Title: Association of Repetitive Head Impacts and Chronic Traumatic Encephalopathy with Neurodegeneration in the Cortical Sulcus
Mentor: Thor Stein, MD, PhD, Boston University Alzheimer's Disease and CTE Center, VA Boston Healthcare System

5:30-7:00 Opening Reception & Silent Auction and Video Awards Presentation (Prizes)

Additional information:

Registration and Latest Agenda for the 2023 MOA Midwinter Symposium – A Hybrid Event: Midwinter Symposium 2023 (mainedo.org)

Poster #1

Investigating Complication of Acute Diverticulitis: Inferior Mesenteric Vein Thrombosis

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Introduction: Diverticulitis is an infective process of the colon that can injure and inflame the surrounding mesenteric veins and lead to thrombus formation. This complication most often occurs in the superior mesenteric vein, however in 4% of cases, thrombosis can occur in the inferior mesenteric vein (IMV) instead. Efficient diagnosis is imperative as these cases have a mortality rate of up to 23%. Our patient was diagnosed with a rare IMV thrombosis by contrast-enhanced computed tomography (CT) during treatment for acute diverticulitis.

Case: A 68-year-old male with a history of atrial fibrillation, obesity and Factor VII deficiency presented to the Emergency Room for sudden onset abdominal pain, vomiting, and diarrhea. The patient had normal vital signs except for an oral temperature of 102.5°F. Physical examination showed a soft, non-tender abdomen with normal bowel sounds. Laboratory studies revealed a normal leukocyte count of 6200/ul. Plain abdominal CT scan showed sigmoid diverticulitis with mild thickening and trace peri-colonic infiltration without any other abnormalities. The patient was then discharged on ciprofloxacin and metronidazole oral antibiotics.

The patient returned the next day due to positive blood cultures for Escherichia coli. The patient's C-reactive protein was elevated at 140 mg/L. He was admitted to Telemetry and placed on IV ciprofloxacin and metronidazole. Additional imaging was ordered. The contrast-enhanced CT scan showed acute sigmoid diverticulitis complicated with suppurative thrombophlebitis and thrombosis of the inferior mesenteric vein.

A heparin drip and restricted clear liquid diet were initiated. On hospital day four, patient was converted from heparin to enoxaparin. Patient showed significant symptomatic and clinical improvement with the combined antibiotic and anticoagulant therapy. On hospital day seven, patient was discharged on an apixaban regimen due to his hypercoagulable state.

Discussion: Contrast-enhanced CT is the imaging modality of choice in cases of possible diverticulitis as it can identify complications with high sensitivity. This case of IMV thrombosis is not only a rare and interesting complication of acute diverticulitis, but it also supports the utilization of contrast-enhanced imaging over plain radiographs in these situations.

Acknowledgement: The University of New England College of Osteopathic Medicine and the Columbia Memorial Health, Department of Internal Medicine. This case study was registered with the University of New England Office of Research Integrity (e-mail acknowledgement pending).

Poster # 2

Association Between Primary Care Provider Status and Preventive Health Care Among People Who Inject Drugs

Nenninger[1], Katherine, M.D., M.P.H., Sharp[2], Katherine, M.D., M.P.H., **Bustamente[3], Bianca, B.S., OMS III**, Murray[4], Kim, M.P.P., Thakarar[5], Kinna, D.O., M.P.H.
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[4] Center for Outcomes Research and Evaluation, Maine Medical Center Research Institute, Scarborough, Maine
[5] Division of Infectious Diseases, Maine Medical Center, Portland, Maine

Introduction: Maine's overdose crisis has led to increasing rates of injection-associated infections, such as communicable diseases (e.g., Hepatitis A, B, and C), and bacterial infections (e.g., cellulitis, infective endocarditis). People who inject drugs (PWID) are at increased risk for preventable, communicable infections, such as hepatitis B. Preventive care, such as hepatitis B vaccination, is often delivered through primary care providers (PCPs). However, PWID may not have access to PCPs and may have additional barriers to care including housing instability, lack of transportation, inconsistency in providers, extensive wait times, and lack of provider skill in working with this population. Therefore, many PWID may receive preventive care through other sites such as community-based organizations (CBO) or syringe service programs (SSP). CBO's and SSP's have proven great benefit to PWID but are not designed to deliver the full spectrum of care that a PCP is equipped to provide. The goal of this research is to characterize PCP and preventive care use among PWID in Maine.

Methods: This is a cross-sectional study of PWID hospitalized with infections associated with injection drug use in Maine from January 2019 to May 2020. Descriptive analyses were used to identify characteristics of participants, rates of screening, and vaccination of participants with and without PCPs. Logistic regression analyses were performed to explore the relationship between PCP status and delivery of preventive services for PWID. Hepatitis B vaccination was an outcome of interest.

Results: Of 101 participants, 68 (67%) had a PCP. Overall rates of hepatitis C (93%) and HIV (85%) screening were high and did not differ based on PCP status. More participants with PCPs had previously received a hepatitis B vaccination (62% of those with PCPs, 33% of those without PCPs; P = .006). Only half of those with PCPs recalled receiving a hepatitis B vaccination through a PCP office. Having a PCP was predictive of having received the hepatitis B vaccination (adjusted odds ratio, 3.59; 95% CI, 1.27-7.58; P = .014).

Conclusions: Many PWID in Maine engage with PCPs and preventive care. Results from this study call for enhanced delivery of preventive services and linkages to care for PWID.

Acknowledgement: Maine Medical Center, Maine General Hospital, Eastern Maine Medical Center, and Pen Bay Medical Center. A special thank you to Katherine Nenninger, M.D., M.P.H. and Kinna Thakarar, D.O., M.P.H. for their mentorship and guidance throughout this process. This research was supported by grant U54 GM115516 from the National Institutes of Health for the Northern New England Clinical and Translational Research Network and IRB 1593414-3.

Poster #3

Rhabdomyolysis in a Pediatric Patient with COVID-19 Infection

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[2]Children's Hospital of Los Angeles, USC Keck School of Medicine, Los Angeles, California

Introduction: The most common cause of rhabdomyolysis in children is viral infection, specifically influenza. We present a case of pediatric COVID-19 related rhabdomyolysis, a lesser-known association of this life-threatening syndrome.

Case: A previously healthy eleven-year-old female, up to date on vaccinations, presented from an external emergency department with bilateral calf pain, difficulty standing up or walking straight, an elevated creatinine kinase (CK) of 1168, urinalysis showing trace blood, and a positive COVID-19 test. Five days prior to admission the patient tested positive for COVID-19 after experiencing fever, congestion, cough, and cheek redness. These symptoms resolved three days prior to admission, but upon arrival she endorsed pain in her calves on a severity scale of 2/10 at rest and 8/10 when standing up. Bilateral leg ultrasounds were negative for DVT. Upon admission her CK was trending upwards to 1494. Repeat urinalysis showed straw colored urine with negative glucose, blood, and nitrates. The patient's presentation was consistent with rhabdomyolysis. Other etiologies considered included viral myositis, bacterial or spirochete infections, fibromyalgia, and chronic fatigue syndrome. Rheumatologic etiologies, Guillain-Barre syndrome (GBS), and acute myasthenia gravis were deemed unlikely given the isolated nature of her calf pain. Although there have been rare cases of GBS in the setting of COVID-19 infection, most GBS patients present with progressive ascending limb weakness over several days. CK and chemistries were tracked every six hours with scheduled neurovascular checks and Tylenol for pain control. The patient remained on hyperhydration at 1.5 times maintenance IV fluids. Oral intake and urine output were monitored closely to prevent acute kidney injury. Over the course of her hospital stay, CK levels were as follows: 1494, 2164, 2541, 2260, 2138, 1164, 1038. The remainder of her labs were reassuring. Strict oral rehydration was encouraged and urine output maintained.

Discussion: Children with COVID-19 may present with a wide range of clinical manifestations that are nonspecific and severe, such as immune thrombocytopenia, multisystem inflammatory syndrome, respiratory failure, and myocarditis. Because rhabdomyolysis may be an under-recognized complication of COVID-19 in pediatrics, our aim is to spread awareness of this dangerous potential sequelae.

Acknowledgement: The University of New England College of Osteopathic Medicine and Children's Hospital of Los Angeles, USC Keck School of Medicine. This case study was registered with the University of New England Office of Research Integrity.

Poster #4

FILE OF LIFE™ - Optimization for Patients and Emergency Response Personnel

Dandrea, K.E., OMS-II, **Williams, T.E., OMS-II**, and Gugliucci, M.R., M.A., Ph.D.
The University of New England College of Osteopathic Medicine, Biddeford, ME

Introduction: Accurate patient medical history is paramount for proper care and medical decision making especially during emergency response situations in the home or in the community. The FILE OF LIFE™ (FOL) can provide medical information in such an emergency. The FOL is distributed to communities for placement in the home, usually on the refrigerator door. The FOL contains patient identifiers, medical history, and other notes. Emergency Medical Technicians (EMTs) may access this when they arrive on the scene of an emergency.
In a previous project, the FOL was modified based on feedback from older adults in the community. This project built upon this new prototype in order to optimize the FOL for emergency response personnel as well. To date, there is no known study to check the FOL design suitability for emergency response personnel.

Methods: In this qualitative focus group research, emergency response personnel were recruited through the Maine EMS medical director. Five focus groups were conducted with 10 total participants (n=10). Focus group questions pertained to each of the six sections; patient identifiers, “Emergency Contacts”, “Medical Data”, “Medical Conditions”, “Allergies”, and “Medical Insurance Information” as well as overall comments on the FOL. Qualitative content analysis was conducted by reviewing focus group transcripts and noting participant suggestions.

Results: Overall, 112 comments were made about the FOL by the emergency response personnel. General comments referenced formatting of the document as well as areas of improvement to the individual sections to ensure the edits suggested by older adults for the FOL meets the needs of emergency response personnel. The FOL document was edited based on comments that reached saturation. The patient identifiers, “Medical Data”, and “Medical Conditions” sections received key changes as some items were missing, cou2023ld be consolidated, or are likely not relevant in emergencies. Other minor changes were made throughout the form.

Conclusion: The FILE OF LIFE™ has been a trusted resource to residents of communities that employ it. The suggested changes from this research should facilitate usability of the FOL by older adults and especially meet the needs of emergency personnel. Further research to ensure suggestions for changes in the FILE OF LIFE™ from both cohorts is extended beyond this pilot research.

Acknowledgements: The University of New England College of Osteopathic Medicine and the Carmen Pettapiece Student Research Fellowship program.
This project was approved as exempt by the University of New England Institutional Review Board.

Poster #5

The Role of Spinal Cord Processing of Sensory Input in Maintaining Movement Evoked Breakthrough Pain

Drago[1], K, OMS III, Quattrochio[2], C, Gunther[1], T, OMS II, Eaton[3], V, B.S., King[1,3], T, Ph.D.
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Cancer-induced bone pain is characterized as moderate to severe ongoing pain and is commonly treated with opiates. However, approximately 80% of patients suffering from metastatic bone pain experience episodes of breakthrough pain (BTP) that occur despite medication controlling their background pain. BTP episodes last about 30 minutes and are often triggered by voluntary or involuntary movements. They can occur up to four to six times per day, and dramatically reduce the quality of life of those affected. Previous research demonstrated that movement of a tumor bearing bone induces BTP and blocking peripheral sensory input before movement prevents BTP. In contrast, peripheral nerve block after movement failed to reverse BTP. We hypothesize that peripheral input mediates initiation of movement induced BTP, whereas BTP is maintained centrally through a reverberating circuit within the spinal cord. Using a mouse model of cancer induced bone pain, we determined whether spinal administration of lidocaine or muscimol following hindlimb movement blocks movement induced BTP. Subjects were female C57BL/6 mice, weighing 20-25 grams. Under isoflurane anesthesia, Lewis Lung Carcinoma Cells were implanted and sealed into the femur. BTP was assessed 14 days later using movement-induced suppression of rearing behaviors in an automated open field chamber. Lidocain, muscimol, or saline was administered to the spinal cord five minutes following hindlimb movement and to non-movement controls. Data were analyzed using ANOVA with appropriate post-hoc analysis to determine group differences with significance set at $p<0.05$. Hindlimb movement significantly diminished rearing in tumor bearing animals compared to non-movement controls ($p<0.05$). Administration of spinal lidocaine or muscimol five minutes post-movement blocked the movement-induced depression of rearing behaviors ($p<0.05$ vs movement-saline group). Importantly, spinal administration of lidocaine or muscimol did not alter rearing behaviors in animals that did not receive hindlimb movement. Our findings suggest that movement induced BTP is maintained at the level of the spinal cord. In conjunction with previous studies that demonstrated peripheral nerve block will prevent BTP, but not reverse movement induced BTP, we propose that the BTP is initiated by peripheral input but maintained within the spinal cord.

Acknowledgements: The University of New England College of Osteopathic Medicine. This work has been supported by Kahn Family Foundation Research Fellowships to CQ and KD and by the NIH (National Institute of General Medical Sciences COBRE grant P20-GM-103643) supporting the UNE Behavior Core. The research was IACUC approved (040121-009).

Poster #6

A Rare Case of Multifocal Diffuse Dermal Angiomatosis of the Breast and Lower Extremity

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Introduction: Diffuse Dermal Angiomatosis (DDA) is a rare, acquired, benign variant of reactive cutaneous angioendotheliomatosis. It presents as erythematous to violaceous patches, with indurated plaques and vessel prominence. These lesions can evolve into painful necrosis or ulcerations and is diagnosed via biopsy. DDA was thought to mainly involve the lower extremities, but the breast is now believed to be the most common site. There are only 13 cases reported of DDA with multifocal involvement. The pathogenesis of DDA is not fully understood, but hypothesized to be a result of tissue ischemia with treatment focused on the underlying cause. Risk factors shared by most patients with DDA include macromastia, elevated BMI, atherosclerosis, hypertension, and smoking history.

Case: A 29-year-old obese female presented to the hospital in significant pain, with worsening breast and thigh lesions. She sought hospital treatment for a third opinion after failing two separate courses of antibiotics for possible mastitis and cellulitis from her PCP and breast surgeon. Past medical history includes a recent ICU admission for alcoholic hepatitis requiring hemodialysis and intubation. She is also an everyday smoker. Vital signs were stable and physical exam revealed a violaceous rash, livedo reticularis with small distribution of purpura and black necrotic tissue with firm underlying nodules on the left breast and right thigh. Differentials included calciphylaxis, vasculitis, and concern for malignancy such as Kaposi's sarcoma or angiosarcoma. Various lab tests were completed, and a punch biopsy was obtained resulting in a negative HHV8 and positive smooth muscle actin in the vessels, leading to a diagnosis of multifocal DDA. The patient has been advised to quit smoking and was sent to a specialist.

Discussion: Prompt recognition and early diagnosis of DDA via biopsy is important for successful treatment, as revascularization is often curative, thus limiting the associated morbidity. It is likely a preventable disease and yet another issue practitioners can prevent through counseling patients on smoking cessation and healthy lifestyle choices. DDA of the breast is more common than previously believed, and providers should be aware of this condition, knowing multifocal involvement is also possible. DDA should be considered for all obese women with non-healing lesions on their breast, macromastia, smoking history, and other risk factors for occlusive vasculopathies.

Acknowledgement: The University of New England College of Osteopathic Medicine and St. Joseph Health Hospital Center. This case study was registered with the University of New England Office of Research Integrity (#1122-15; email acknowledgment date 11/30/2022).

Poster #7

Identifying Candidate Drugs to Treat Tat-associated HIV Sensory Neuropathy Through Bioinformatic Analysis

Kohsar, A, M.S., OMS III, Harrison, B, Ph.D., Cao, L, M.D./Ph.D.
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Introduction: Trans-Activator of Transcription (Tat) is a HIV protein that initiates transcription of the virus. While role of this protein in HIV-Associated Sensory Neuropathy (HIV-SN) is ill-defined, the Cao Lab has previously shown the development of peripheral neuropathy-like behavioral changes in the doxycycline-inducible HIV Tat mice. Using differential gene expression profiles, we discovered that Tat induction in these mice interfered heavily with three key signaling pathways: Apoptosis, Inflammation Mediated by Chemokine and Cytokine, and the Toll Receptor Signaling Pathways. The goal of this study was to use bioinformatics databases to identify potential drug candidates by screening traditional neuropathic pain drugs and drugs approved for other conditions that might interact with these Tat-induced signaling pathways.

Methods: First, we interrogated the Drug Set Enrichment Analysis (DSEA) database. DSEA was used to screen a list of known neuropathic pain drugs for their potential to affect the Tat-modified signaling pathways. Then, we used Gene2Drug to identify drugs approved for other conditions that might interact with our signaling pathways of interesting. Candidate drugs then had their FDA approval status checked with the Drugs@FDA tool. Next, we used Epocrates to detect potentially significant drug-drug interactions between our candidate drugs and those currently used in HIV-antiretroviral therapy. Lastly, Cytoscape, a data visualization platform, will be used to illustrate candidate drug interactions with the Tat-modified signaling pathways.

Results: The study is on-going. So far, two candidate drugs were identified: 1) DSEA identified Gabapentin, an anticonvulsant, as a candidate neuropathic pain drug with the potential to interact with the Toll Receptor Signaling Pathway. 2) Gene2Drug identified Bisoprolol, a Beta-1 Adrenergic receptor blocker, as an off-label candidate for its potential to dysregulate the Toll Receptor Signaling and the Apoptosis Signaling Pathways. Potential interactions between Bisoprolol (not Gabapentin) and selected anti-retroviral drugs have been reported.

Conclusion: Using bioinformatics databases, we successfully identify two potential candidate drugs for HIV-SN, Gabapentin and Bisoprolol. Further Cytoscape illustrations will help to identify how they interact with crucial Tat-modified signaling pathways. Future work will involve in-vivo testing of these drugs' efficacy in treating Tat-associated HIV-SN.

Acknowledgements: Kahn Family Foundation Funds

Poster #8

Exploring Tryptophan-induced Macropinocytosis as a Metabolic Vulnerability of Tuberous Sclerosis Complex (TSC) in Lymphangioleiomyomatosis (LAM)

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Introduction: Tuberous Sclerosis Complex (TSC) is a genetic disease that results in the presence of nodes and cysts in several organs in the human body. In the lungs, TSC manifests as Lymphangioleiomyomatosis (LAM), which affects women of early-adult age leading to cystic lung destruction. Current pharmacological treatments for TSC and LAM utilize rapamycin, which inhibits mTORC1; a central signaling hub that regulates cellular growth and metabolism. Unfortunately, TSC and LAM disease progression continues to deteriorate upon treatment cessation, necessitating the need for novel therapeutic approaches that eliminate the disease.

We have shown that TSC2-deficient cells internalize nutrients via macropinocytosis (a non-selective nutrient uptake process). Interestingly, macropinocytosis in TSC2-deficient cells is increased three-fold compared to TSC2-expressing cells ($p< 0.0001$). Many studies have focused on the impact of non-essential amino acids on mTORC1-activation; however, little is known on the role of essential amino acids in TSC and LAM disease progression. We hypothesized that essential amino acids, and specifically Tryptophan (Trp) play a key role in the metabolism and survival of TSC2-deficient cells.

Methods: To understand the role of Trp uptake on macropinocytosis, dextran uptake assays will be performed under different nutrient conditions. Sensitive metabolomic analyses will determine the impact of Trp on cellular metabolism. By utilizing LAT1 (SLC7A5; a Trp transporter) gain- and loss of function assays, we will determine the role of Trp in macropinocytosis in TSC. We will next investigate how Trp impacts lysosomal function (DQ-BSA assays), number (Lysotracker), as well as mitochondrial function (Seahorse analyzer).

Results: In preliminary experiments, we found that macropinocytosis increases by three-fold ($p<0.0001$) in the presence of tryptophan (50uM Trp; 24 hrs). This increase was inhibited when cells were treated with the macropinocytosis inhibitor EIPA (50uM; 24 hrs). Supplementation with other essential amino acids did not trigger macropinocytosis. Using Lyso-IP, we found that TSC2-deficient cells are reprogrammed in a way that promotes tryptophan degradation at the lysosome. Interestingly, treatment with inhibitors that target TDO2 and IDO1, two key enzymes in tryptophan catabolism, selectively inhibited the growth of TSC2-deficient cells (~50%, $p<0.0001$).

Conclusion: Collectively, our data indicate that tryptophan catabolism is a metabolic vulnerability in TSC2-deficient cells involving macropinocytosis and lysosomal metabolism. Further work is needed to determine the molecular mechanisms that underlie this vulnerability and the role of mTORC1 signaling in the regulation of nutrient uptake. Investigating the role of tryptophan and macropinocytosis, is a novel avenue that may reveal new therapeutic targets for TSC and LAM.

Poster #9

Mitigation of Major Hip Injury Due to Fall in an At-Risk, Older Adult Population Using Tango Belt Technology

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[2]Thomas Jefferson University, Malvern, PA

Background: Every year in the United States there are approximately 3 million fall-related emergency room visits for older adults and approximately 300,000 of those lead to hospital admissions due to hip fractures. Additionally, falls are the leading cause of injury-related deaths among the older adult population and cost over $50 billion in medical bills. Since these numbers continue to increase, there is a growing need for fall prevention. ActiveProtective Technologies developed the Tango Belt, a wearable belt that uses motion sensors and algorithms to automatically deploy an airbag when it senses a serious, hip-impacting fall. The goal of this research was to provide comparative evidence for the Tango Belt as an adjunctive intervention to standard-of-care (SOC) to mitigate injuries related to falls in an injury older adult population at-risk for fall injury. This research aim was to compare the Tango Belt with and without SOC in mitigating falls measured by: hip fractures, emergency department visits or hospitalizations. It was hypothesized that the proportion of participants experiencing major hip injuries due to falls is lower in participants receiving SOC plus the Tango Belt than in participants receiving SOC alone.

Methods: Prospective Clinical Controlled Research Study was performed at up to 20 residential care investigational sites including nursing homes, independent, and assisted living sites within the United States. Participants wore the Tango Belts for 6 months, 24 hours a day except to remove for charging, bathing activities and upon patient request. Participants for both the intervention and control arms of the study were recruited from March through the fall of 2022. Inclusion criteria were applied, and baseline pre-screening was conducted. Analysis of the data was conducted using a test of proportions and was adjusted for the propensity score.

Results: During the span of time with the research team, 23 were recruited for the intervention and 73 retrospective control cases were identified. The ratio was one intervention subject to four control subjects. Research is ongoing and no falls data has been generated at this time.

Conclusion: This research appears to be providing comparative evidence for the Tango Belt as an adjunctive intervention to SOC to mitigate injuries related to falls in an injury older adult population at-risk for fall injury.

Acknowledgement: Thomas Jefferson University, the ActiveProtective Technologies' Tango Belt team, and Camilla Hall staff. This work has been supported by the Peter Morgane Student Research Fellowship. IRB exemption was granted by the Advarra IRB committee (protocol COP-0001)

Poster #10

Discovery of Hereditary Hemochromatosis Secondary to Intrauterine Device Placement

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Carpenter, L, D.O., Southern Maine Health Care, Department of Internal Medicine, Biddeford, Maine

Introduction: Hereditary hemochromatosis is extremely common in those of European ancestry, with a disease prevalence approaching one percent. Of those affected, one in ten will develop severe liver disease if left untreated. The average age of presentation is after 40 in males and after menopause in females due to slower iron accumulation during the premenopausal years. The typical symptoms are fatigue, joint stiffness, skin hyperpigmentation, liver abnormalities, and diabetes mellitus with more severe cases developing cardiac abnormalities. Thus, it is important to diagnose early in an attempt to prevent the long-term sequelae of iron overload. Our patient presented with chronic fatigue in the setting of amenorrhea secondary to intrauterine device (IUD) use and was subsequently diagnosed with hereditary hemochromatosis 30 years prior to the average age of diagnosis.

Case: A 26-year-old female presented to our primary care office with complaints of chronic fatigue in the setting of depression and anxiety. Three years ago she had a Mirena IUD placed and last menstrual period unknown. She had a previous trial of Escitalopram and then attempted dual therapy with Wellbutrin, but reported increased fatigue. Additionally, she was experiencing some mild knee pain and stiffness for the last month with no inciting injury. Her subsequent laboratory studies were significant for elevated iron of 187ug/dL, elevated percent saturation 85%, iron binding capacity of 220 ug/dL, ferritin 141ng/mL, leukocytes 8200/uL, hemoglobin 14.8 g/dL, hematocrit 43.4%, mean corpuscular volume 88.4fL, and vitamin D 26.6 ng/mL. At the follow up visit, the patient was still experiencing depression and anxiety and did not feel that the recent increase in Escitalopram dose and addition of Wellbutrin had helped at all; she continued to have significant fatigue. With this in mind, and with the abnormal iron saturation and ferritin results from the previous visit, Hemochromatosis HFE gene analysis was ordered and the patient was found to be homozygous for the Cys282Tyr mutation of the HFE gene. The patient was referred to hematology for therapeutic phlebotomy and reports feeling better with less fatigue.

Discussion: Although the penetrance of the gene mutation low, it is imperative to diagnose Hereditary Hemochromatosis before severe and irreversible iron overload symptoms occur. Although Hemochromatosis is typically diagnosed only in females of menopausal age, it is important to also consider in young females with IUDs if displaying symptoms.

Acknowledgement: The University of New England College of Osteopathic Medicine and the Southern Maine Health Care Department of Internal Medicine. Special thanks to Dr. Lisa Carpenter for her mentorship. This case study was registered with the University of New England Office of Research Integrity (e-mail acknowledgment date 11/28/2022).

Poster #11

Dropout Rate: Clinical Trial Design and Its Effects on Participant Retention

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[2]Maine Medical Center Research Institute, Scarborough, Maine
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Background: The purpose of this study was to assess if including a lead- in phase to a clinical trial will decrease the dropout rate. This is of particular interest to researchers in clinical trials because if the dropout rate becomes too high, then the power of the study can be affected, and results can be deemed insignificant. Unfortunately, the dropout rate is often not included in research publications. This makes it difficult to assess if there is a correlation between dropout rates and the clinical trial designs. Khosla et al (2018) conducted a 20-week pilot trial at the Mayo Clinic, in which atenolol was studied for osteoporosis prevention. The dropout rate in the atenolol group was 17%, compared to 7% in the placebo group, with most of the dropouts occurring in the first month due to fatigue. This pilot trial led to the design of a multi- site trial, *Beta$_1$-Selective Blockade for Prevention of Postmenopausal Bone Loss*. In this multi- site clinical trial, a lead-in phase was added to the study design in which each participant takes half of the treatment dose of atenolol for one month before being randomized. The dropout rate after the lead-in phase at the Maine Medical Center site was compared to the dropout rate of the pilot trial. It is anticipated that the dropout rate between the pilot trial and the Maine Medical Center site would not differ, with the expectation that dropout rates will be low after randomization.

Methods: Participants were recruited and screened on the phone and in person for exclusion criteria. If criteria were met, participants returned for an in person, lead-in phase visit in which they were given half of the trial dose of atenolol to be taken daily for one month. At the end of the lead-in phase, participants were screened for objective and subjective side effects via vital signs, verbal screenings, and maintaining a trial diary. If further criteria were met, and willingness to continue, participants were randomized into the trial.

Results: As of 11/08/2022, 57 lead-ins have been completed. One participant failed due to an objective symptom, and two withdrew from the study due to a subjective symptom for a dropout rate of 5.26%.

Conclusion: At 38.57% recruitment of the clinical trial, the dropout rate at the Maine Medical Center site is less at 5.26% than that of the pilot trial, after the lead-in phase. Further studies of interest include analyzing and contrasting the recruitment strategy differences between the two sites.

Acknowledgement: The University of New England College of Osteopathic Medicine and The Maine Medical Center Research Institute. This work was supported by the Carmen Pettapiece Student Research Fellowship and an NIH grant. Mayo Clinic IRB #: 18-005725.

Poster #12

Adolescent Females Have Higher Rates of Injury in Recreational Ice Skating

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[2]University of Connecticut, Department of Orthopedic Surgery, Farmington, Connecticut

Introduction: Despite its popularity as a recreational activity, the epidemiology of injuries in ice skating are poorly defined. Improved characterization is necessary for more targeted injury prevention efforts. The goal of the present study is to characterize recreational ice-skating injuries and to determine differences in injury rate, type, and location based on sex and on the occurrence of the Winter Olympics.

Methods: This descriptive epidemiology study utilized data from the National Electronic Injury Surveillance System (NEISS) database. It was queried for all ice skating-related injuries, using Code 3255, in all males and females aged 10-19 from 2001 to 2020.

Results: A total of 6001 injuries were reported in the study period. There were significantly higher injury rates in Olympic years. Patients were predominantly female (56%). Females were more likely to sustain injuries to the thorax/abdomen, upper extremity, and lower extremity, and these injuries were more likely to be fractures or sprains/strains. Males were more likely to sustain injuries to the head, and the injuries were more likely to be lacerations/contusions/abrasions.

Conclusion: There are differences in the rate and pattern of injuries in females compared to males. Although this study suggests a female predominance of recreational ice skaters, the demographics are likely less skewed towards females than among competitive figure skaters. The finding that females are more likely to sustain fractures contrasts prior research demonstrating twice as many fractures among male pediatric sports participants. There is a higher rate of injuries during Olympic years, but the pattern of injuries does not change. Previous studies have reported increases in orthopedic burden at emergency departments after the opening of seasonal ice-skating rinks with similar injury patterns. Updated epidemiological studies help providers better prepare for the types of patients they may treat, but further research into mechanisms of injury is necessary to completely understand the differences in injury patterns.

Acknowledgement: The University of New England College of Osteopathic Medicine and the University of Connecticut Department of Orthopedic Surgery.

Poster #13

Characterization of Chronic Pain Population in Maine and the Association with Behavioral Risk Factor Surveillance System Data – A Pilot Study

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Introduction: Chronic pain is debilitating and exerts tremendous burdens on society and individual health. The biopsychosocial model of chronic pain emphasizes the importance of the effects of psychological and socioeconomic factors on pain perception. *The Behavioral Risk Factor Surveillance System (BRFSS),* established in 1984, is the largest annual randomized, anonymous health survey conducted by CDC. BRFSS collects data from US adults in all 50 states regarding demographics, chronic health conditions, health-related behaviors, and preventative measures. This makes it a potential tool to characterize the chronic pain population. Maine has the highest percentage of the population ages over 65 in the US and chronic pain affects more than half of the elderly population. Yet limited information is available regarding Maine residents with chronic pain. Here, we used BRFSS data (2011-2020, Maine CDC) seeking to better understand Mainers suffering from non-cancer pain. BRFSS data are cross-sectional and can be aggregated to identify overall temporal changes.

Method: Data were imported to STATA 17.0 BE for statistical analysis. We identified individuals with chronic pain based on their responses to the question related to diagnoses of arthritis, lupus, gout, and fibromyalgia, as no questions directly asked about chronic pain status. Participants with cancer diagnoses were excluded. Demographics including age, gender, education level, and household income were compared between chronic pain vs non-pain group. Logistic regression analysis was run to test the associations between chronic pain and other behavioral risk factors.

Results: The percentage of participants with non-cancer pain ranges from 33.52% to 40.58% (2011-2020). Individuals with pain are significantly older (average age ranges from 62.8-66.1 in the pain group vs. 50.1-55.7 in the non-pain group), more likely to be females (percent of females ranges 60.03-65.44%), have lower education level, and lower household income. Logistic regression analysis indicated significant positive associations between participants with chronic pain and numbers of mentally unhealthy days, functional decline, and cigarette smoking. While a higher frequency of binge drinking correlated with less chronic pain.

Conclusions: Results suggest that the BRFSS data can be utilized to characterize chronic pain population in Maine and identify potential behavioral interventions that help improve the health of patients with chronic pain.

Acknowledgement: University of New England College of Osteopathic Medicine. This work has been supported by Peter Morgane student research fellowship. This study has obtained IRB exemption from University of New England.

Poster #14

Longitudinal Dynamic Experiences: The Role of Time in Caregivers' Engagement with Screening for Autism Spectrum Disorder

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Introduction: System-level interventions to improve child outcomes require sustained engagement of caregivers over time. Yet, as interventions unfold, the factors influential to treatment, engagement and maintenance may vary. Time is central to the conceptualization of many implementation frameworks, but seldom the specific focus of research studies. Empirically, longitudinal qualitative methods offer a tool to assess temporality and to investigate the dynamic nature of interventions. This paper proposes an analytic approach for qualitative methods to examine dimensions of time during a complex health intervention.

Methods: We engage a framework tailored to the exploration of time in implementation, ranging from articulation of a time-oriented research question to selection of a time-centered analytic approach. To illustrate application, we offer a case study of the experience of 22 caregivers engaged in a multi-stage autism screening process who participated in a series of longitudinal qualitative interviews (n=63) over the period of two to 18 months. Our data analyses examined whether factors emerged: (a) across all caregivers at specific intervention stages, (b) in sequences based on the experiences of caregivers over time, or (c) in both ways.

Results: First, results demonstrate that factors routinely emerged across participants at specific intervention stages. For example, administration of the observation-based screening tool in the second stage of the intervention presented an emotional burden for caregivers that impeded progress towards diagnostic resolution. Second, results demonstrated that prior experiences dynamically influenced caregiver engagement over time. For example, caregivers who had received a borderline score of concern for autism on an early-stage screening tool proceeded to later stages with unique barriers.

Conclusion: Longitudinal qualitative interviews may facilitate in-depth understanding of caregiver and patient experiences, providing insight into how and when specific barriers arise. The analytical approach provides a roadmap for employing longitudinal qualitative methods to investigate the role of time in implementation, with guidance on: (a) optimizing the frequency of data collection, (b) handling attrition, and (c) key decision-points in analyzing longitudinal data.

Poster #15

LGBTQ+ Sex Education Information: Ascertaining What Parents of LGBTQ+ Youth Want to Know (Pilot Study)

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Introduction: Although limited in comparison to other population groups, literature on LGBTQ+ inclusive sex education has already begun to address the need for comprehensive sex education for LGBTQ+ youth. While the literature has started to address LGBTQ+ informed education for healthcare providers, there is no information in the literature about developing educational resources about sex for the parents of LGBTQ+ youth. The focus of this research project has been to ascertain what parents of LGBTQ+ youth wish they knew about LGBTQ+ sex and how to discuss sex with their children. This project's goal was to identify the topics that parents want to know more about, don't understand, or are uncomfortable talking about. The major assumption of this qualitative research project was that parents of LGBTQ+ children want more information about talking to their children about LGBTQ+ sex.

Methods: Qualitative focus group protocols were implemented using semi-structured interview questions to assess the aims as stated above. All interviews were recorded over Zoom and transcribed within Zoom. After conducting the initial review of transcripts and making notes about key points and concepts, the focus group transcriptions were deidentified. Transcriptions were uploaded into QSR NVivo 12+ to conduct thematic coding and identify representative quotes within each theme.

Results: One broad theme was found about LGBTQ+ sex education with subthemes such as sex and different gender identities, general sex education terminology, and gender affirming practices. A second prevalent theme was online resources and how parents were unsure how to identify accurate information online.

Conclusion: There is a need for more information about LGBTQ+ sex tailored to parents/guardians of LGBTQ+ youth. Information about LGBTQ+ sex tends to be found on the internet, so building a website or social media platform for parents/guardians with verified information on sex education topics could be beneficial in facilitating conversations about sex with their LGBTQ+ child.

Acknowledgement: The University of New England College of Osteopathic Medicine. This work has been supported by the Peter Morgane Student Research Fellowship. This project was approved by the UNE Institutional Review Board (IRB) for the Protection of Human Subjects (#0422-22). The researcher has two mentors- one with subject matter expertise, Mx. Brandy Brown, LCSW, and one faculty advisor, Dr. Marilyn Gugliucci, PhD.

Poster #16

Marantic Endocarditis in the Setting of Crescentic Rapidly Progressive Glomerulonephritis: A Case Study

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Introduction: Marantic endocarditis is a rare condition defined by non-infectious heart valve vegetations, commonly seen in settings of malignancy or in rheumatological conditions causing hypercoagulability. This diagnosis is one of exclusion due to its rarity and lack of diagnostic labs and is usually made on post-mortem autopsy. Antemortem presentations typically present with signs and symptoms of embolization which is often fatal. This is a case of a 66-year-old female with marantic endocarditis vegetations in the setting of crescentic rapidly progressive glomerulonephritis (cRPGN).

Case: A 66-year-old female presented to the emergency room with a remote history of hematuria, fatigue, and weight loss. She was admitted to the hospital after serum chemistries showed she was in acute renal failure and had severe iron deficiency anemia requiring 1 unit of packed red blood cells. Her past medical history included a surgical prosthetic aortic valve replacement 10 years prior, chronic lower extremity petechia and purpura, transient ischemic attack, and depression. She had no reported history of autoimmune disease. In the hospital, a kidney biopsy showed glomerular C3 immune complex deposition and cRPGN. Given the correlation of cRPGN with bacterial endocarditis, a trans-thoracic echocardiogram was ordered and showed small mobile densities on the aortic and mitral valves. Serial blood, tissue, and urine cultures, serological studies and rheumatological panels were all negative. Repeat trans-esophageal echocardiogram confirmed the presence of nonmobile masses on the aortic valve without significant dysfunction as well as mobile masses on the mitral valve. The culmination of this data without definitive cause for the vegetations led to a presumptive diagnosis of marantic endocarditis. The patient was discharged on IV vancomycin and ceftriaxone, anti-platelet and statin therapy, and oral prednisone with close follow up with multiple specialists. She declined the option of anticoagulant therapy.

Discussion: The most common causes of endocarditis with valvular vegetations are due to infectious processes. However, if cultures remain negative for common organisms, other causes must be carefully evaluated. This includes exploring underlying conditions of hypercoagulability which can lead to marantic endocarditis. This case emphasizes the insidious nature of marantic endocarditis, as this patient presented with no complaints of cardiac symptoms.

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Poster #17

Plant-Based and Mineral Hydrocarbon-Based Oils for Treatment of Xerosis of the Eye and Skin

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Introduction. The functionality of body coverings, which includes the ocular surface tissues and the epidermis of the integument, is dependent on maintaining hydration. Dehydration results in dry eye and dry skin diseases, which can further lead to functional abnormalities. We compare treatments of xerotic diseases of the eye and skin with traditional mineral hydrocarbon-based (MHB) preparations to those with natural plant-based (NPB) preparations. Ingredients are assessed with the purpose of explaining the differences in mode of action among these lipophilic ingredients.

Methods. Treatments containing NPB and MHB for xerosis of dry eye and skin were compared using a meta-analysis of the literature to assess ingredient differences in up to 10 commonly used pharmaceutical agents. Databases included the National Institutes of Health, DailyMed, Therapeutic Research Center Natural Medicines, and IBM MicroMedex. Data were tabulated encompassing active ingredients preventing dehydration in each preparation. Ingredients were studied to determine safety and efficacy.

Results. The use of MHB preparations, principally petrolatum containing non-polar lipids, cover ocular and skin surfaces and have an extended treatment duration, but leaves inconvenient, unwanted, and at times intolerable, damaging or even toxic residues. The NPB preparations consist principally of triglycerides with their polar triester glycerol residue, which is moderately polar, and the phospholipids, which possess formal charges and are strongly polar. Results provide comparisons of ingredients between MHB (n=11) and NPB (n=10) preparations on the basis of efficacy and safety to eye and skin. Results propose that NPB preparations are safer and more efficacious than MHB preparations to further guide treatment.

Conclusion. The MHB preparations are nonpolar, function passively and hydrate the ocular surface and skin coverings by coating and sealing. This prevents further dehydration while allowing natural body processes to hydrate. Lipids from natural plant sources are very polar and can function actively, especially the anionic polar phospholipids which can penetrate and hydrate the skin. This study (1) catalogs MHB and NPB eye and skin topical preparations, and (2) presents differences in their mode of action. Understanding the composition and mode of action of these preparations may ultimately focus treatments for xerotic eye and skin diseases and facilitate hydration of body coverings.

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Poster #18

Association of Repetitive Head Impacts and Chronic Traumatic Encephalopathy with Neurodegeneration in the Cortical Sulcus

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Background: Chronic traumatic encephalopathy (CTE) is a progressive neurodegenerative disease that has been associated with repetitive head impacts (RHI), typically received through playing contact sports, such as American football. In CTE, neurodegeneration has been described qualitatively, which includes gray matter atrophy and neuronal loss. In Alzheimer's disease (AD), previous work has quantified gray matter cortical thickness, neuronal density, and synaptic density, and found that these neurodegeneration metrics were significantly reduced in AD patients. While some of these measures of neurodegeneration have qualitatively been described in CTE, they have not yet been quantified. Here, we hypothesized that there would be greater neurodegeneration with increasing CTE stage and that it would be more severe at the sulcal depths. Using total years of contact sports play as a proxy for cumulative RHI exposure, we further tested the hypothesis that years of play would predict increased neurodegeneration in CTE.

Methods: Three measures of neurodegeneration (cortical thickness, neuronal density, and synaptic density) were quantified in the dorsolateral frontal (DLF) cortex, via histochemistry, immunohistochemistry, and immunoassays. Participants were included from a cohort of deceased contact sport athletes (n=185), as well as 52 non-athlete controls.

Results: Multiple linear regression models showed that years of play was associated with cortical thinning in the sulcus ($P < 0.001$) and with neuronal loss in the sulcus ($P = 0.041$). After adjusting for tau pathology, additional multiple linear regression models suggested that, in the sulcus, years of play was associated with cortical thinning largely via tau-independent mechanisms, while years of play was associated with neuronal loss largely via tau pathology. Presynaptic loss of α-synuclein was seen with increasing CTE stage. Postsynaptic density of PSD-95 was reduced in Low CTE, but increased in High CTE, suggesting altered reorganization of synapses in High CTE.

Conclusion: Associations of synaptic measures require further studies that consider the sulcal predisposition and increased variability in CTE. Overall, this study provided an association between years of RHI exposure and CTE with neurodegeneration, specifically in the sulcus. Cortical thinning in the sulcus is an important pathological feature, and it may be useful as a radiographic biomarker in future imaging studies for CTE.

Acknowledgement: We gratefully acknowledge the use of resources and facilities at the Edith Nourse Rogers Memorial Veterans Hospital. This work has been supported by the United States (U.S.) Department of Veterans Affairs, Veterans Health Administration, National Institute of Neurological Disorders and Stroke. This work was also supported by unrestricted gifts from the Andlinger Foundation and WWE. Institutional review boards of the Boston University Medical Center approved all study protocols (IRB # H-31614).

Poster #19

Effectiveness and Safety of Steroid Prescribing Practices for Acute Respiratory Distress Syndrome Secondary to COVID-19: a Contribution to a National Study

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Introduction: Infections from SARS-CoV-2 (COVID-19) have been ravaging global healthcare systems since 2019. There has been an increase in incidence of acute respiratory syndrome (ARDS) associated with these infections. ARDS is rapidly formed pulmonary edema, which is non cardiogenic, comes on suddenly, and can result in respiratory failure with hypoxemia. There appears to be a link between ARDS secondary to COVID-19 and worse outcomes. This study is a contribution to a national registry through the University of Kentucky (UK).

Methods: To start, a retrospective chart review was performed. All patient data was de-identified and entered into a RedCap database. From 06/2020 to 06/2021, records were included if they met the following criteria: age ≥18, PCR-confirmed SARS-CoV-2 infection, use of mechanical ventilation (MV), and steroids initiated within 48 hours prior to, or 24 hours after MV (exposure window). Exclusion criteria included ECMO within the first 24 hours and patients previously on steroids for ≥ 48 hours prior to MV. Information recorded included patient demographics, past medical history, intensive care unit disposition, lowest PaO2:FiO2 ratio, highest SOFA score, peak lactate, cumulative input/output, highest inflammatory markers and administration of certain agents within the exposure window. Steroid type, dosage, duration of use and adjuvant steroid use within 28 days was also provided. Efficacy outcomes included length of stay, ICU duration, readmission, intubation length, number of intubations, death within 28 days, prone position, neuromuscular blockade outside of intubation and highest number of pressors. Safety outcomes included hyperglycemia, GI hemorrhage, delirium and new infection.

Results: 10 patients were retrospectively reviewed. To date, 3 have met the criteria and have been entered into the national UK database. The mean age of patients was 65, with 66% being female. Mean length of stay was 22 days. Intubation across patients lasted a mean of 12 days with no in-hospital mortality.

Conclusions: Unfortunately, the pandemic continues after almost four years. ARDS secondary to COVID has been difficult to treat with worse outcomes compared to other viral causes of ARDS. Preliminary results show that steroid use within the exposure window decrease the length of intubation as well as the length of stay. At this point, further investigation is warranted to identify other subgroups of patients with ARDS who would benefit from corticosteroid use.

Acknowledgements: The University of New England College of Osteopathic Medicine and the University of Kentucky.

Poster #20

Accessibility of Gender-Affirming Surgery in Maine: Identifying Barriers to Care for Gender-Diverse Patients

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Background: Chest reconstruction surgery, referred to as "top surgery", is often the initial gender-affirming surgery for female-to-male (FTM) or female-to-non-binary (FTN) people. Not all transgender people choose to undergo gender-affirming procedures, however, top surgery may allow them to fit into their desired gender identity and lessen gender dysphoria. As a marginalized population, gender-diverse people face many barriers to accessing healthcare. Patients are often fearful of medical discrimination, causing them to delay seeking care. These issues are more prevalent in rural states such as Maine, where patients often travel far to see physicians. This pilot study aimed to develop an understanding of barriers encountered by transgender people in Maine when pursuing top surgery. Phase 2 of this pilot project is to create a resource for people seeking top surgery with the hope of reducing the impact of such barriers on care accessibility.

Methods: Qualitative individual interview research design was applied. Participants were recruited using flyers at LGBTQ+ organizations. Eligibility criteria included being assigned female at birth, on the transgender masculine spectrum, having interest in or history of undergoing top surgery in the past 10 years, and age between 18-65. Interviews were conducted virtually. Each of the five participants were asked questions pertaining to their experience with top surgery. Audio transcripts were cleaned, and data was grouped thematically with representative quotes identified through N-Vivo 12+ analysis. Inter-rater reliability was established through the creation of a codebook in which the researchers defined each theme.

Results: The five most prevalent themes identified as barriers to care were, (1) Non-binary gender identity; (providers lacking understanding of non-binary identity); (2) Insurance coverage (insurance plans not covering full cost of surgery); (3) Distrust of physicians (patients delaying surgery consults because of fears of discrimination); (4) Letters of readiness (insurance companies requiring a letter indicating mental health readiness for surgery); and (5) Limited numbers of surgeons practicing in Maine who perform top surgery. Representative quotes were identified within each theme.

Conclusions: Transgender patients in Maine encounter a variety of barriers when seeking consultation for top surgery, especially those who identify as non-binary. This research is ongoing.

Acknowledgement: The University of New England College of Osteopathic Medicine. This work has been supported by the Peter Morgane Student Research Fellowship. IRB approval was granted by the University of New England IRB committee (protocol #0521-32).

Poster #21

Insight into structural understanding of TGF-β2 latency through characterization of missense patient mutations

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Introduction: Transforming growth factor beta2 (TGF-β2) mutations are associated with the connective tissue disorder Loeys-Dietz Syndrome type 4 (LDS4). LDS4 mutations have been classified as loss-of-function that lead to haploinsufficiency, yet TGF-β2 mutation-positive patients exhibit a paradoxical increase in TGF-β signaling with the most widely accepted mechanism being a compensatory increase in expression of the closely related paralog TGF-β1. The focus of our research was to determine how LDS4 missense mutations affect TGF-β2 expression and activity. We hypothesized that a subset of missense mutations are in actuality gain-of-function, which leads to the increased TGF-β signaling associated with LDS4.

Methods: Nine TGF-β2 constructs containing missense mutations were encoded with an N-terminal FLAG epitope tag to enable fluorescent detection by APC-labeled α-FLAG in flow cytometry. To test TGF-β2 activity, Expi293 cells stably transfected with TGF-β signaling responsive CAGA-luciferase reporter were co-cultured with 293 cells separately co-transfected with GARP and either wild type TGF-β2, mutant TGF-β2, or a combination of both, to simulate heterozygosity. Recombinant TGF-β2 was used to generate a standard curve for analysis in Prism.

Results: Cell surface expression by FACS showed that of the nine missense mutations, only one in the growth factor domain was null. The rest of the mutations showed varying expression levels consisting of mutations in both the prodomain and proteolytic cleavage site which did not lead to any decrease in proTGF-β2 cell surface expression. Of the heterozygous patient mutation simulated conditions, mutations in the prodomain and one in the growth factor domain did not alter luciferase activity in assay.

Conclusion: The LDS4 missense mutations tested in these assays did not show spontaneous activation as hypothesized but also didn't all agree with the previous classification, as loss-of-function mutations. Each mutation resulted in differing levels of TGF-β2 activation, providing insight into the importance of each residue and their respective interfaces for maintaining latency. The mutations in the prodomain may have weakened the latent pro-complex but not enough to lead to constitutive release of the growth factor.

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Poster #22

Quality Improvement: Vasectomy Follow Up in a Rural New Hampshire Hospital, a Comparison to the National Trends

Trachtenberg, Ariel M., OMS IV and Stephen D. Marshall, M.D.

Introduction: Vasectomies are a common surgical procedure which can be managed within multiple settings. Paramount to their success is the post vasectomy semen analysis (PVSA), which will determine the sterility of the male and therefore success of the procedure. Current American Urological Association (AUA) guidelines dictate one non-motile PVSA to determine sterility afterwards. We investigated the compliance rate for our patients with PVSA over a five-year period.

Methods: In order to find the compliance rates of men who had vasectomies with an expected PVSA, a retrospective chart review under International Review Board (IRB) exemption was performed. Patients from April 2017 to April 2022 were considered. Patients were recommended to follow up for either one or two PVSA depending on the provider performing the vasectomy. A negative PVSA was only recognized as azoospermia. Data was recorded and evaluated using Microsoft Excel.

Results: The records of 210 patients were reviewed. Their age at procedure, marital status, number of fathered children, comorbid conditions, social factors, urologic history and PVSA results were considered. PVSA compliance was compared to these factors. Average age was 39 years, with 2 average children. Overall, 127 (60%) men returned for PVSA at least once whereas 81 (40%) never returned to our clinic for analysis.

Conclusions: There is a known struggle across the country for PVSA follow up; however, our clinic saw a 60% follow up rate compared to the largely reported averages less than 50%. While AUA guidelines describe 1 negative PVSA sufficient, our clinic did often request multiple PVSA. It would be worth considering less invasive testing such as simple colorimetric testing to improve compliance and decrease healthcare dollars spent.

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Conflict of Interest and Disclosure Statement: None.

Category: Health Services Research – Quality Improvement & Patient Safety

Keywords: Vasectomy, Fertility, Basic Research

Poster #23

Evaluation of Prognostication Tools to Stratify Patient Outcomes Treated with Targeted Temperature Management (TTM)

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Background: More than 350,000 out-of-hospital cardiac arrests (CA) occur annually within the United States. For initial survivors, Targeted Temperature Management (TTM) between 33-36°C can limit secondary brain injury and improve outcomes. At present, all TTM patients receive a common protocol without severity stratification, and validated tools to predict risk of good or poor outcome early after CA are needed to develop a precision medicine approach to TTM. Prediction models based on logistic regression have not been accurate enough, and none of these included processed EEG data. The purpose of this study was to evaluate the bispectral index (BIS) and suppression ratio (SR) in combination with a machine learning algorithm to stratify patient risk in the first 6 hours after CA.

Methods: Adults surviving CA that do not follow commands are treated at Maine Medical Center (MMC) with 24 hours of TTM 33-36°C and monitored with the Medtronic VISTA processed EEG; this data is downloaded for each patient, allowing calculation of the initial and 6-hour BIS and SR. Utstein-compliant data is entered into the International Cardiac Arrest Registry (INTCAR) with a single TTM number as the sole identifier. The BIS and SR data were calculated for each patient and linked to the INTCAR TTM number. Data are presented as median (IQR), and variables were tested using Receiver Operator Characteristic curves to predict good outcome (Cerebral Performance Category [CPC] score of 1 or 2 at discharge).

Results: 421 patients treated with TTM between June 2017 and November 2021 were evaluated, with a median age of 60 (50-69) years, 299 (71%) were male, 310 (74%) were out-of-hospital CA, 303 (72%) were witnessed, initial rhythm was shockable in 157 (37%), PEA in 138 (33%), and time to recovery of spontaneous circulation was 19 (11-29) minutes. A good outcome was obtained in 26% of patients. The SR (AUC=0.80) and BIS (0.78) predicted good outcome better than age (0.55), time to ROSC (0.58), or initial rhythm (0.69).

Conclusion: Processed EEG data best predicted good outcome in the first 6 hours after cardiac arrest. Machine learning algorithms are being evaluated with the assistance of the Roux Institute to assess if they add additional predictive ability to the BIS and SR.

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