AUGUSTA UNIVERSITY

MEDICAL
PARTNERSHIP

UNIVERSITY OF GEORGIA

10th Annual Medical Partnership Student Research Symposium

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November 2, 2020

Special Virtual Event

Welcome to the tenth annual
AU/UGA Medical Partnership Research Symposium!

This event is an opportunity to showcase the activities of our students during the summer between the first and second years of their medical studies. Students were encouraged to engage in a scholarly activity which could include laboratory science, clinical, or other research. Students more interested in a participatory clinical experience were encouraged to also engage in "inquisitive observation and reflection" in order to derive a more complete understanding of the health problems within the context of the greater community.

The posters represent the results of the students' endeavors. We are grateful to all of the faculty members at AU, UGA, and other institutions, who have mentored the students, and to the community clinicians, both in Athens and elsewhere, who have shared their expertise and provided the clinical settings to learn both the art and science of doctoring.

Michelle A. Nuss, MD
Campus Dean

Research Poster Abstracts

Poster No.	Student	Poster No.	Student
1	Charles Adams	21	Aakash Patel
2	Matthew Adams	22	Alexis LeBlanc Perlman
3	Zachary Adams	23	Laura Pride
4	Kyle Ahmed	24	R. Alexander Reese
5	Annelise Bonvillain	25	Sophia Sakers
6	Tyler Crawford	26	Tejas Sardar
7	Christopher Cuneo	27	Faiz Saulat
8	Oliver Davidson	28	Sujay Sreenivasan
9	Lily Francis	29	Alexander Sweeting
10	Rachel Gerald	30	Alexander Sweeting
11	Charlie Grossnickle	31	Dina Teshager
12	Kathryn Harbin	32	Mary Thornsberry
13	Syed Hyder	33	Kyle Ulversoy
14	Ladonya Jackson-Cowan	34	Pomi Yun
15	Ladonya Jackson-Cowan		
16	Sebastian Kahf		
17	Sejoong Kang		
18	Thomas Layman		
19	Maryam Mansoura		
20	Daye Park		

Predicting Work Status and Post Traumatic Stress Disorder 1 Year Following Orthopedic Trauma

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BACKGROUND: Acute traumatic injury has known implications for both physical and mental health. Various psychological outcomes such as PTSD, anxiety, and depression are common and may, with the physical trauma, contribute to a patient's inability to return to work following trauma. The purpose of this study is to build a risk prediction model to identify trauma patients at the time of injury who are at high risk for these outcomes and subsequent difficulties returning to work one year later.

METHODS: Patients aged 18-89 presenting with an operative orthopedic trauma injury were eligible for enrollment in a social determinants of health study. Patient medical and injury information was collected remotely via electronic medical records. One year after injury, patients completed a phone survey which included current work status, a 5-item validated score for probable PTSD, and pain medication usage. Univariate analysis using t-tests, chi-squared, and Fisher's exact tests will be conducted to examine associations between social and medical factors at the time of injury and work status at 1 year.

RESULTS: Out of 79 patients who responded to the one-year follow-up survey, 34 (43%) were still taking time off or on medical leave. 29 (37%) patients were back to their pre-injury level of work, 12 (15%) patients reported modified work duty, and 3 (4%) patients reported modified work hours. 44 (56%) patients met probable PTSD criteria by answering "yes" to 3 of the 5 PTSD questions.

CONCLUSIONS: Patient 1-year return to work status is variable in the orthopedic trauma patient population. Preliminary data suggests further research into the work status of orthopedic trauma patients at 1 year is warranted given the large number of patients still taking time off or on medical leave in our sample. A larger sample size expanding to include trauma patients' 2-year work status is necessary for a thorough review of the effects of acute traumatic injury on patients' ability to return to work.

A Retrospective Survey of the Feasibility of Classifying Learning Objectives into Knowledge Templates

Matthew Adams[1,2], Charlie Grossnickle[1,2], Maryam Mansoura[1,2], Lynn Ramsey[2], W. Scott Richardson[2]
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BACKGROUND: Knowledge is believed to be stored in memory in schema that link known facts about a topic. Expert clinicians have been found to have highly developed schemas that they use in everyday reasoning. We hypothesize that medical students might benefit from the use of scaffolding to help them build their knowledge schema. As an early step in this inquiry, we surveyed our preclinical curricular learning objectives to determine what proportion of them can be mapped to cognitive scaffolds in the form of knowledge templates.

METHODS: We retrieved all of the preclinical weekly learning objectives (LOs) for the 2015 - 2016 academic year. The 10 knowledge templates had been previously developed over years of clinical and teaching practice. Three reviewers independently read each LO, classified them into a template of best fit, and rated how well they fit these templates on a Likert scale from 1 - 5, where 5 was best fit. Reviewers then met, reviewed their ratings, and resolved any disagreements by consensus. The primary outcome is the overall proportion of weekly LOs that fit at least one knowledge template.

RESULTS: Year 1 contained 240 LOs and Year 2 contained 308. Results showed that 98% of LOs from Year 1 and 99% from Year 2 fit at least one knowledge template. In Year 1, the most common template, BP7, showed a prevalence of 26.7%. In Year 2, D7 was the most common template and showed a prevalence of 30.8%. Overall, only 1.1% of LOs did not fit any of the knowledge templates.

CONCLUSION: The majority of the preclinical LOs during the 2015 - 2016 academic year could be classified within these 10 knowledge templates or with a hybrid. Limitations of our data include that we surveyed only one year's curriculum from one medical school. If reproducible, these findings suggest that it is feasible to write preclinical LOs in such a way as to reinforce students' use of these knowledge templates to provide them cognitive scaffolding as they build their medical knowledge.

Health Disparity-Targeted COVID-19 Testing Through a Mobile Clinic

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BACKGROUND: The AU/UGA Medical Partnership Mobile/Athens Free Clinic (AFC) mobile primary care clinic started seeing patients in underserved communities in Athens-Clarke County and the surrounding areas in March of 2018. When the COVID-19 pandemic struck, we partnered with the local government and the Georgia Department of Public Health (DPH) to transform our clinic into a mobile COVID-19 testing unit to reach the same at-risk communities. The purpose of this project was to determine if we could use established community connections of AFC to increase COVID-19 testing in vulnerable populations in Athens, GA, and also to see if positivity rates would be higher in these populations.

METHODS: We established a hotline using Telzio for remote management by medical students and physicians. Patients of AFC and other people in Athens without reliable transportation can call the hotline to request testing. The AFC team then completes door-to-door COVID-19 testing as well as pop-up testing at AFC community sites.

RESULTS: As of July 16, 2020, we have already tested 1,663 people, and testing is ongoing. During our preliminary analyses, we have found that the breakdown of our testing demographics is 33% African American, 35% White, and 29% Hispanic. We have had 75 cases, which is a positivity rate of 5.2%. Our case demographics are 25% Black, 25% Non-Hispanic White, and 45% Hispanic. For the state of Georgia, current case demographics are 21% African American, 19% Non-Hispanic White, and 6% Hispanic White.

CONCLUSIONS: We have been able to test a significant number of marginalized patients at AFC community sites and those that don't have reliable access to transportation. We have found a significantly higher percentage of Hispanic cases in comparison to Georgia.

Quantification of Fractionated Electrograms During 3D Mapping Does Not Predict Continued Need for Antiarrhythmic Drug Use Following Pulmonary Vein Isolation

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BACKGROUND: With the improved success of Pulmonary vein isolation (PVI), additional risk stratification is needed to guide therapy. Recent research has shown the use of fractionated electrograms has promise for identifying extent of cardiac fibrosis (a strong indication of outcomes). We hypothesized that fractionated electrograms would serve as a surrogate for fibrosis and help guide both ablation lesion sets and adjunctive pharmacotherapy.

METHODS: Retrospective, chart review of patients undergoing PVI at Piedmont Athens Regional between Jan 2019 and May 2020. Fractionation maps were created by the EnSite Precision mapping system using data obtained with an Advisor HD grip mapping catheter. Electro anatomical maps were created in normal sinus rhythm. A fractionated electrogram was defined as a three component, 0.1 mV amplitude signal EGM where each signal was separated by 15 msec. We compared Fractionation Index (FI), defined as a percentage of fractionated EGMs obtained prior to ablation, against patient reported symptomatic improvement and termination of anti-arrhythmic drug (AAD) therapy at 12 months.

RESULTS: 243 patients were followed retrospectively for one-year post PVI. FI plotted against symptomatic improvement showed 7.69% for symptomatic patients vs 6.98% for asymptomatic patients (p = 0.282) and 6.66% for patients still on AADs vs 7.40% off AADs at 1 year (p= 0.263).

CONCLUSION: The percentage of fractionated EGMs obtained during 3D mapping prior to PVI did not predict either symptomatic improvement or need for continued antiarrhythmic drug therapy post ablation.

The Role of Telemetry in Patients with COVID19 Being Treated with Hydroxychloroquine

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BACKGROUND: The lack of effective treatments for COVID-19 has led physicians to use medications that have previously been FDA approved for other illnesses including lopinavir/ritonavir, azithromycin, oseltamivir, and hydroxychloroquine. Of these, hydroxychloroquine has received particular attention.   Unfortunately, hydroxychloroquine can interfere with cardiac repolarization and increase the risk of Torsade de Pointe (TdP), a potentially life-threatening arrhythmia heralded by QTc prolongation on an ECG.   Retrospective data from NYU demonstrates that between 10-20% of patients receiving hydroxychloroquine can have potentially life-threatening changes to their QTc (preprint). While QTc typically shortens during febrile illnesses, several studies have demonstrated that QTc prolonging medications can have a disproportionate effect on QTc at higher temperature thereby dramatically increasing the risk of TdP and sudden death.

METHODS: Patients hospitalized at Piedmont Athens Regional between March 15 and May 1 for COVID and treated with hydroxychloroquine were identified via retrospective chart abstraction. QTc was calculated days 4-10 of treatment every 12 hours for 28 patients using archived telemetry strips and correlated with the closest recorded temperature. In addition to QTc, heart rate and temperature, demographic risk factors known to affect QTc (gender, age, etc.), and lab values such as LDH and WBCs were also recorded.

RESULTS: Data from 90 patients was available for abstraction. For patients treated with hydroxychloroquine, there was no difference in QTc in patients with average daily temperatures >38.0C versus <38.0C (446 msec vs 452 msec, p=0.6). Treatment with hydroxychloroquine versus no treatment did not affect mortality (26.8% versus 27.6%, p=0.86).

DISCUSSION: Temperature does not appear to dynamically impact QTCc prolongation with hydroxychloroquine treatment in patients with an average daily temperature >38C. As the impact on temperature may be non-linear, future studies should address the impact of hydroxychloroquine on QTc at Tmax, rather than average daily temperature.

Measuring the Effects of Glycemic Control on Outcomes and Complications of Orthopedic Trauma Surgery in a Hip Fracture Cohort

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BACKGROUND: Diabetes and metabolic syndrome have both shown an association with increased post-surgical morbidity and mortality; however, here is a lack of data analyzing the differences between post-surgical outcomes for patients with well-controlled and uncontrolled hyperglycemia. This project aims to establish that relationship.

METHODS: This is a retrospective cohort study of 655 patients admitted to Grady Memorial Hospital (Atlanta, GA) with hip fractures between January 2016 and January 2020. Chart review included collection of diagnosis of diabetes, diabetic medication history, glucose measurements on arrival and throughout hospitalization, total insulin requirements throughout hospitalization, and length of stay. This data will be regressed against complication and outcome data to estimate the relationship between glycemic control and outcomes of orthopedic trauma surgery.

RESULTS: The mean age of this cohort was 60.75 years (59.0% male). 21.1% of patients had a previous diagnosis of diabetes. On admission, the mean glucose was 151.62 mg/dL (80-579 mg/dL). Mean glucose over the course of hospitalization was 165.89 mg/dL (46-579 mg/dL).

CONCLUSIONS: 21% of patients were known to be diabetic on admission for hip fractures – however throughout the course of the hospitalization, many hip fracture patients were found to be hyperglycemic. Additional analysis will demonstrate the association between glucose control and outcomes for hip fracture patients.

HYPOTHESIS: We hypothesize that patients with well-controlled diabetes will have better surgical outcomes as measured by non-home discharge, unexpected ICU admission, SSI, wound complications, and mortality.

Incidence and Recovery Rate of Peripheral Nerve Injury in Operative Pelvic Ring Fractures

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BACKGROUND: Operative pelvic ring injuries confer significant destructive force to the pelvic floor that may result in lasting injury to peripheral nerves of the lower extremities. The incidence rates of specific peripheral nerve injuries are unclear in the current literature. The present study seeks to determine the incidence of peripheral nerve injuries resulting from pelvic ring fractures and quantify the rate of recovery.

METHODS: 305 skeletally mature patients (age 13 to 94) with operative pelvic ring injuries treated at a single level 1 trauma center were reviewed for associated peripheral nerve injury. The specific nerves reviewed included sciatic, femoral, obturator, and lateral femoral cutaneous nerves (LFCN). In cases with apparent nerve injury, level of injury and time to maximal recovery were recorded. Additionally, patient demographics, mechanism of injury, associated injury, surgical approach, pelvic ring fracture type, pain score, and weight-bearing compliance were reviewed.

RESULTS: 252 patients were included in the final analysis. 18% (45/252) were found to have nerve injury – 11.5% to the sciatic nerve, 1.1% to the femoral nerve, and 5.4% to the LFCN. 37.2% of patients with nerve injury experienced no recovery, 32.6% experienced partial recovery, and 30.2% experienced full recovery. Average time to recovery was 207 days.

CONCLUSIONS: The present study demonstrates that peripheral nerve injury commonly occurs in operatively treated pelvic ring injuries. In cases with associated nerve injury, approximately 2/3 of patients experienced at least partial recovery within the first post-operative year. This provides treating physicians with valuable information for patients to set expectations regarding recovery from these life-altering injuries.

Comparison of the severity of OCT changes in Black American and Caucasian American diagnosed with NMOSD

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BACKGROUND: Neuromyelitis optica spectrum disorder (NMOSD) is a group of central nervous system inflammatory diseases historically associated with multiple sclerosis, but of different etiology, and with poorer prognosis. NMO is in part mediated by an autoantibody directed against aquaporin-4 (AQP4) and affects the optic nerves, spinal cord, and brain. Pathophysiology includes demyelination, astrocyte injury, and blood-brain barrier disruption. Epidemiological studies have estimated that aquaporin-4 autoimmunity may affect 16,000-17,000 United States citizens and may disproportionately affect black patients. Optical Coherence Tomography (OCT) has been shown to demonstrate peripheral retinal nerve fiber layer thinning and may be useful for the differential diagnosis and progression monitoring.

NMOSD has been shown to have both different prevalence and disease severity across racial groups. Black patients were more likely to experience earlier onset of the disease than Caucasian patients and a more severe attack with poor recovery at onset. Early diagnosis of NMOSD is important for the treatment of the disease, since cumulative disability results from each attack, and several disease modifying therapies have been shown in phase 3 clinical trials to reduce attack frequency and severity.

METHODS: In this retrospective chart review, patients who met inclusion criteria and relevant documents within them were reviewed. Excel and socscistatistics will be used to generate p-values. Unpaired, two-tailed student's T-test was selected as appropriate.

RESULTS/DISCUSSION: Results are pending further patient data collection. Patients will undergo OCT testing upon return to clinic for routine care. We hope to demonstrate that OCT testing will prove as a reliable marker for disease progression in both Black and Caucasian Americans.

Characterizing Microbiology Among Patients with Diabetic Foot Ulcer and Related Complications in the Grady Health System

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BACKGROUND: Diabetic foot infections (DFIs) are a leading cause of lower-extremity amputations. Most patients with DFI in the United States receive broad-spectrum antibiotics with anti-methicillin resistant S aureus (MRSA) and Pseudomonas spp activity. However, there is limited data regarding the microbiology of DFIs in the United States including the prevalence of MRSA and Pseudomonas spp.

METHODS: This is a retrospective chart review of patients admitted to Grady Memorial Hospital (Atlanta, GA) between January 1, 2016 and December 21, 2019 with a DFI. A DFI was diagnosed with (1) clinical documentation and/or (2) a culture obtained from a diabetic foot ulcer and/or (3) a lower-extremity amputation or debridement of the foot during the hospital admission. Each hospital admission with a DFI was counted as a separate DFI episode. DFIs were divided in soft tissue and osteomyelitis, and osteomyelitis was defined radiologically. Preliminary results are presented.

RESULTS: 362 patients with 621 DFI episodes were included. 256 (41%) DFI episodes were soft tissue infections and 365 (59%) were osteomyelitis. Among 621 DFI episodes, 250 (38%) had sample taken for culture (155 obtained surgically and 95 obtained non-surgically) and 220 (88%) were culture-positive. The most common bacterial species was S. aureus (38%) followed by Streptococci (32%), other gram-positive bacteria (30%), and Enterobacteriaceae (29%). Regarding drug-resistant bacteria, methicillin-resistant S. aureus (MRSA) was present in in 14% of cultures and Pseudomonas spp were present in 9% of cultures. 56% of samples were polymicrobial.

CONCLUSION: Most patients with DFI did not have a sample obtained for culture suggesting use of empiric antibiotics is common. S. aureus was the most common bacteria in this cohort. MRSA and Pseudomonas spp were uncommon.

How healthcare providers assess the accuracy of the medical history given by patients with dementia

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BACKGROUND: Patients with dementia (PWD) often suffer from impairments in memory and other cognitive domains, raising concerns about their accuracy as medical historians. The goal of this study was to assess if healthcare providers (HCP) view collecting history from PWD as a problem in their practice, and how they collect histories from PWD.

METHODS: Cross sectional survey data was collected anonymously from a convenience sample of practicing HCPs using GoogleForms. The questionnaire included standard demographics and assessed the following domains: how providers determine historian accuracy and if collecting a history from PWD is a problem in their practice.

RESULTS: The response rate was 59% with 17 HCPs responding to the survey, including physicians (n=8) and advanced practice providers (n=9). These HCP practice types included emergency medicine (53%), surgery (18%), and other specialties like internal medicine (12%). The mean age of respondents was 36 yrs (26-51 yrs), 70% were female, and mean years since completion of training was 8 years (1-22 yrs). 53% of respondents overall reported that PWD accuracy as a historian was a concern for them: 75% of those with less than 10 years of practice and 20% of those with 10 years or more. When concerned about medical history accuracy, 100% endorsed using informal observation techniques, with the majority reporting they also rely on the medical record or family/patient reports. One respondent reported using a dementia screening tool. 59% of respondents reported not having time to use ancillary source of data in collecting an accurate medical history.

CONCLUSION: This study suggests that most clinicians find the accuracy of PWD history giving a concern and time constraints impede the collection of history from ancillary sources. There is no recognized framework for such assessment, so future research to develop such a framework that can aid HCPs in obtaining an accurate history from PWD in a timely manner is warranted.

A Retrospective Survey of the Feasibility of Classifying Learning Objectives into Knowledge Templates

Matthew Adams[1,2], Charlie Grossnickle[1,2], Maryam Mansoura[1,2], Lynn Ramsey[2], W. Scott Richardson[2]
[1]Medical Scholars Program, [2]Augusta University/University of Georgia Medical Partnership, Athens, GA

BACKGROUND: Knowledge is believed to be stored in memory in schema that link known facts about a topic. Expert clinicians have been found to have highly developed schemas that they use in everyday reasoning. We hypothesize that medical students might benefit from the use of scaffolding to help them build their knowledge schema. As an early step in this inquiry, we surveyed our preclinical curricular learning objectives to determine what proportion of them can be mapped to cognitive scaffolds in the form of knowledge templates.

METHODS: We retrieved all of the preclinical weekly learning objectives (LOs) for the 2015 - 2016 academic year. The 10 knowledge templates had been previously developed over years of clinical and teaching practice. Three reviewers independently read each LO, classified them into a template of best fit, and rated how well they fit these templates on a Likert scale from 1 - 5, where 5 was best fit. Reviewers then met, reviewed their ratings, and resolved any disagreements by consensus. The primary outcome is the overall proportion of weekly LOs that fit at least one knowledge template.

RESULTS: Year 1 contained 240 LOs and Year 2 contained 308. Results showed that 98% of LOs from Year 1 and 99% from Year 2 fit at least one knowledge template. In Year 1, the most common template, BP7, showed a prevalence of 26.7%. In Year 2, D7 was the most common template and showed a prevalence of 30.8%. Overall, only 1.1% of LOs did not fit any of the knowledge templates.

CONCLUSION: The majority of the preclinical LOs during the 2015 - 2016 academic year could be classified within these 10 knowledge templates or with a hybrid. Limitations of our data include that we surveyed only one year's curriculum from one medical school. If reproducible, these findings suggest that it is feasible to write preclinical LOs in such a way as to reinforce students' use of these knowledge templates to provide them cognitive scaffolding as they build their medical knowledge.

Analysis of Pre-term Infants with Perforating Necrotizing Enterocolitis and Associated Long Term Neurodevelopmental Implications

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BACKGROUND: In a growing population of surviving preterm infants with perforating Necrotizing Enterocolitis (NEC) there is significant risk for neurodevelopmental delay. This study aims to analyze abnormalities of a cohort of preterm infants with surgical NEC to contribute to current medical knowledge and assess best predictors for long term neurodevelopmental impact.

METHODS: Medical charts of 34 infants born at <28 weeks (from Nov 2016-July 2018) who were transported to Children's Hospital of Atlanta at Egleston for surgical intervention for perforating Necrotizing Enterocolitis. Data collected from first hospital encounter through discharge including: age and measurements upon admission, birth history, treatments administered, type of procedures each patient received, and cranial ultrasound results (CUS). Patient data from follow up visits at 1 and 2 years corrected age was also collected in which neurodevelopmental delay was assessed using Bayley Scales of Infant Development (III).

RESULTS: Of the 34 babies, 20 babies were excluded from long term neurodevelopmental abnormalities due to loss of follow up, with three babies lost due to death before discharge. Notable patterns in this population include significantly decreased head circumference (16th percentile) when compared to average weight and length (23rd and 24th percentile respectively). Of the routine Cranial Ultrasounds performed, 16 patients showed abnormal and 18 showed normal results. Of the abnormal results, 9 were mild abnormalities (Grade I-II hemorrhage) whereas 6 were severe (Grade III-IV hemorrhage). Of the 14 patients that were able to follow up at 1 and 2 years corrected age, all 14 showed neurodevelopmental delays in at least 2+ categories of Bayley Scales(III).

CONCLUSION: This study supports the need to further investigate the predictive indicators of neurodevelopmental delay in NEC babies and highlights the importance of evaluating the predictive value on early neuroimaging findings on neurodevelopmental outcome in this population.

Tetralogy of Fallot with MAPCAs: Improving Outcomes of Complex Pulmonary Artery Connections in Congenital Heart Disease

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BACKGROUND: Tetralogy of Fallot (ToF) w/ major aortopulmonary collateral arteries (MAPCAs) is a complex congenital heart defect with morbidity and mortality varying between institutions. Quality improvement measures have recently begun at Children's Healthcare of Atlanta (CHOA) to improve outcomes in this cohort.

METHODS: A retrospective chart review was conducted for 69 ToF w/ MAPCAs patients who were encountered at CHOA since 2007. Relevant data metrics including medical and surgical histories, catheterization data, echocardiogram data, and re-intervention data were consolidated into a REDCap database. Data was analyzed according to primary (death or transplant) and secondary outcomes (reintervention, surgeries to complete repair, RV:Ao ratio at complete repair).

RESULTS: Of the 69 patients who underwent repair at CHOA prior to implementation of the new protocol, 91% were alive at most recent follow-up. Out of this cohort, only 57% reached complete repair (CR). The median RV:Ao ratio at follow up was 0.6 with only 8% of patients having ratio below 0.35. Of available data, the 10-year freedom from surgical and transcatheter re-intervention for CR patients was 69% and 51% respectively. Median number of re-interventions was 1.0 for CR patients and 2.0 for non-CR patients. The most common re-intervention in both groups was PA angioplasty. Of all re-interventions in CR patients, 79% were PA re-interventions compared to 96% for non-CR patients.

CONCLUSION: Out of patients who reached CR, 92% of patients had unacceptable RV:Ao ratio at follow-up, and this is thought to be secondary to pulmonary architecture. Under the new protocol, preservation of PA branches in the neonatal period is expected to significantly improve mortality, post-repair RV:Ao ratio, and quality of life.

Th2 Sensitization in the Gut-Brain-Skin Axis: How Early Life Th2 Driven Inflammation Contributes to Developmental and Psychological Abnormalities

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BACKGROUND: We recently reported that 90% of children with developmental delays and/or memory impairment have one or more component of atopic disease; atopic dermatitis (AD), asthma and/ or allergic rhinitis (AR). In over 60% of patients with atopic disease, AD is the first clinical manifestation, often occurring within the first year of life. These findings suggest that unregulated increases in Thelper-2 (Th2) driven inflammation (such as seen in atopic diseases) can exert deleterious effects on the developing brain, and that pediatric dermatologist may serve as the first line of prevention. This prompted us to conduct a literature search evaluating 1) The association between AD and developmental and psychological aberration in children, and 2) the contributing mechanisms.

METHODS: PubMed literature search.

RESULTS: AD is associated with developmental abnormalities including; developmental delays, memory impairment, autism spectrum disease (ASD) and epilepsy/seizures. AD is also associated with and psychological dysfunction including; Attention-Deficit/Hyperactivity Disorder (ADHD), depression, anxiety, suicide ideation and attempts. Th2 driven inflammation, as seen in AD, leads to alterations in IL-4, neurotrophins and glucocorticoids within the gut-brain skin axis. These modifications drive detrimental inflammatory changes in the developing brain. This ultimately lead to reduced connectivity and transmission resulting in developmental and/or psychological manifestations.

CONCLUSIONS: Early Life Th2 driven inflammation interferes with the developing brain by disrupting connectivity and transmission, leading to developmental and/or psychological consequences.

Atopic Dermatitis is Associated with Cognitive Dysfunction in Children and Adults: A NHIS study from 2008-2018

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BACKGROUND: Atopic dermatitis (AD) is a common inflammatory skin disease in children and adults. Little is known about the association of AD with cognitive dysfunction. The objective of this study was to examine the association of AD and cognitive dysfunction, including memory impairment and developmental delays, in US children (age <18 years) and adults (≥18 years).

METHODS: Data were analyzed from the National Health Interview Survey (NHIS) 2008-2018 for children (n=109,842) and 2012 NHIS (n=34,491) for adults. The NHIS utilizes a multistage, clustered, cross-sectional design.

RESULTS: The prevalence of cognitive dysfunction, such as memory impairment (0.87% vs. 0.42%), developmental delays (6.96% vs. 3.87%) and attention deficit (hyperactivity) disorder (ADD/ADHD) (10.78% vs. 8.10%) were higher in children with versus without AD. The prevalence of memory impairment was higher in adults with versus without AD (7.15% vs. 4.14). In multivariable logistic regression models adjusting for age, sex, race, income, education level, geographic region, asthma, hay fever, anxiety and depression, AD in children was associated with higher odds of memory impairment (adjusted odds ratio [95% confidence interval]: 1.74 [1.40-2.16]), developmental delays (1.59 [95% CI] 1.47-1.71) and ADD/ADHD (1.32 [1.24-1.40]) compared to children without AD. Memory impairment (1.53 [1.29-1.82]) was also increased in adults with AD compared to those without.

CONCLUSIONS: In a nationally representative sample of the US population, a significant positive association between AD and cognitive dysfunction was identified in both children and adults.

Understanding patient perspectives to improve education in the opioid epidemic: a survey of trauma surgery patients

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BACKGROUND: Current attempts at opioid education fall short of having patients understand the risk of addiction and safety of opioids. If we can understand the initial patient perspective in those receiving opioid treatment, we may be able to effectively target future education efforts to improve understanding of addiction risks and enhance patient outcomes.

METHODS: A population of 25 trauma surgery patients were surveyed at either their 2-week or 6-week post-op follow-up. The survey consisted of 15 statements on topics such as patient understanding of opioid risk, the safety of an opioid prescription, view of "addicts'" behavior as roadblock to receiving medication, and the origin of patients' knowledge of opioids. Patients answered on a scale from 0 – 10 based on how much they believed each statement to be true.

RESULTS: Patients gave an average score of 8.39 ± 1.40 for the statement 'Properly dosed prescriptions prevent the risk of addiction to opioids,' while an average score of 6.55 ± 1.47 was given for the statement 'If I take my medication as prescribed, I have no risk of becoming addicted.' An average score of 6.95 ± 1.53 was given for the statement 'Addicts ruin the ability of patients with real pain to get opioids.' An average score of 4.70 ± 1.56 was given for the statement 'I have learned most of what I know about opioids from media such as TV, news, and movies.'

CONCLUSION: This data provides evidence that patients may believe a prescription is entirely protective of addiction, which is a dangerous attitude. There is also evidence that patients view "addicts" as a separate population from themselves, which may suggest implicit biases that lead to further belief of immunity from addiction. Many patients also receive their information on opioids from social media and entertainment sources, which may be contributing to these biases. These views represent potentially powerful targets for future patient education efforts.

Is there a correlation between change in mitochondrial function and exercise exposure in work measure for patients with peripheral artery disease?

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BACKGROUND: In patients with peripheral arterial disease, proper exercise training program often improves claudication by enhancing blood flow to skeletal muscles and mitochondrial capacity. Lately, near infrared spectroscopy (NIRS) has been utilized to effectively improve claudication in PAD while minimizing discomfort for patients. However, it remains unclear how long should the NIRS-guided exercise be performed in patients with PAD. Confirming the correlation between work measurements during exercise and mitochondrial capacity would provide a better direction for establishing a guideline for NIRS-guided exercise program.

METHODS: 17 patients were enrolled in NIRS-guided exercise training program for 12 weeks. Patient's mitochondrial capacity was measured at the beginning of the study and after 12 weeks by using change in rate constant method. Patient's change in rate constant and sum of work and sum of power performed during exercise training were evaluated using regression analysis.

RESULTS/DISCUSSION: Linear regression model of sum work vs change in rate constant showed a R-square value of 0.094. The P-value for the intercept (sum work) was 0.264. The P-value for the X variable (change in rate constant) was 0.231. Similarly, linear regression model of sum power vs change in rate constant showed a R-square value of 0.00041. The P-value for the intercept (sum power) was 6.766E-11. The P-value for the X variable (change in rate constant) was 0.939.

CONCLUSIONS: There is no statistical correlation between amount of work performed and change in rate constant. This shows that mitochondrial capacity improvement from NIRS-guided training is not always related to the amount of work patient performs during the exercise training. This can be attributed to several reasons such as amount of hypoxia to target skeletal tissue induced during training, low number of study subjects, and prior activity and fitness levels of the patients.

A case report and literature review of pimavanserin augmentation to clozapine for treatment-resistant schizophrenia

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INTRODUCTION: Clozapine is the gold standard therapy for treatment-resistant schizophrenia. Even so, clozapine non-response is common (50%), and negative symptoms rarely improve. Thus, there is wide interest in novel agents to augment clozapine treatment. Pimavanserin, an inverse agonist of 5HT2A agonist, has been making waves as a promising option for clozapine augmentation. Here, we present a negative case of pimavanserin augmentation to clozapine for treatment-resistant schizophrenia.

CASE DESCRIPTION: : A 27-year-old male presented to an outpatient psychosis specialty clinic with a 1.5 year history of treatment-resistant schizophrenia characterized by delusions of identity and refractory auditory hallucinations. After an increased clozapine dose failed to reduce symptoms, pimavanserin was initiated to augment clozapine. Initially, no changes were noted, but after four weeks of pimavanserin augmentation, the patient reported nausea, vomiting, and sedation as side effects. Additionally, the patient's primary caretaker noted increased response to auditory stimuli, worsened mood, and increased negative symptoms over the next several weeks. Furthermore, clozapine serum concentration dropped below the therapeutic threshold in the three months following initiation of pimavanserin treatment. Due to the exacerbation of symptoms and difficulty tolerating pimavanserin, it was discontinued. Next, aripiprazole was prescribed concurrently with an increased dose of clozapine with the goal to increase clozapine serum concentration and improve symptoms. Subsequently, the patient noted less severe auditory hallucinations and primary caretaker noted broad overall improvement in mood, response to internal stimuli, and activities of daily living.

DISCUSSION: While pimavnserin remains a promising candidate for clozapine augmentation, this case illustrates that it is not a silver bullet. Further research is needed to understand the efficacy of clozapine augmentation with pimavanserin and the potential for adverse reactions.

A Retrospective Survey of the Feasibility of Classifying Learning Objectives into Knowledge Templates

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BACKGROUND: Knowledge is believed to be stored in memory in schema that link known facts about a topic. Expert clinicians have been found to have highly developed schemas that they use in everyday reasoning. We hypothesize that medical students might benefit from the use of scaffolding to help them build their knowledge schema. As an early step in this inquiry, we surveyed our preclinical curricular learning objectives to determine what proportion of them can be mapped to cognitive scaffolds in the form of knowledge templates.

METHODS: We retrieved all of the preclinical weekly learning objectives (LOs) for the 2015 - 2016 academic year. The 10 knowledge templates had been previously developed over years of clinical and teaching practice. Three reviewers independently read each LO, classified them into a template of best fit, and rated how well they fit these templates on a Likert scale from 1 - 5, where 5 was best fit. Reviewers then met, reviewed their ratings, and resolved any disagreements by consensus. The primary outcome is the overall proportion of weekly LOs that fit at least one knowledge template.

RESULTS: Year 1 contained 240 LOs and Year 2 contained 308. Results showed that 98% of LOs from Year 1 and 99% from Year 2 fit at least one knowledge template. In Year 1, the most common template, BP7, showed a prevalence of 26.7%. In Year 2, D7 was the most common template and showed a prevalence of 30.8%. Overall, only 1.1% of LOs did not fit any of the knowledge templates.

CONCLUSION: The majority of the preclinical LOs during the 2015 - 2016 academic year could be classified within these 10 knowledge templates or with a hybrid. Limitations of our data include that we surveyed only one year's curriculum from one medical school. If reproducible, these findings suggest that it is feasible to write preclinical LOs in such a way as to reinforce students' use of these knowledge templates to provide them cognitive scaffolding as they build their medical knowledge.

Effects of a Dedicated Heart Failure Clinic on the Utilization of Advanced Pharmacologic Therapies

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BACKGROUND: Treatment modalities for Heart failure with reduced Ejection Fraction (HFrEF) include device-based therapies, such as cardiac resynchronization therapy (CRT), and guideline directed medical therapy (GDMT). Mineralocorticoid receptor antagonists (MRA), neprilysin inhibitors, and sodium-glucose transport protein 2 inhibitors (SGLT2-I), represent new classes of medications that have been demonstrated to reduce morbidity and mortality, yet require intensive monitoring and are often beyond the scope of conventional subspecialty practices, potentially contributing to their underutilization.

METHODS: A population of 212 patients who underwent CRT at Piedmont Athens Regional between 2016 and 2020 were identified. Variables such as demographics, co-morbidities, visits to the Heart Failure Clinic (HFC), and medications at the time of implantation were recorded to determine the impact of a dedicated heart failure clinic on GDMT in patients undergoing CRT. Patients were included if they qualified for CRT (EF <35% with a left bundle branch block or greater than 40% iatrogenic right ventricular pacing with an EF less than 50%). Patients with insufficient data at the time of implant were excluded.

RESULTS: : 93 patients met the inclusion criteria and were included in the final analysis. HFC patients recorded lower EF (29.2 vs 33.1, p=.057) and higher NYHA (2.86 vs. 2.64, p=.025) prior CRT implantation. With respect to GDMT, HFC visits were not associated with an increased utilization of beta blockers (87% vs. 81%, p=0.23) or ACE inhibitors/Angiotensin Receptor Blockers (61% vs 71%, p=0.63). HFC visits were, however, associated with higher utilization of novel pharmacologic therapies including both neprilysin inhibitors (19.5% vs. 5.8%, p=0.04) and MRAs (47% vs. 21%, p=0.007). There was no difference in utilization of SGLT2-I (4.9% vs. 3.8%, p=0.81).

CONCLUSION: A dedicated HFC improves utilization of the next generation of pharmacologic therapies for heart failure.

Diabetic Retinopathy: A Comprehensive Review

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DEFINITION: Diabetic Retinopathy (DR), a microvascular pathology of the retina, is the result of chronic hyperglycemia due to diabetes mellitus.

PATHOGENSIS: In DR, hyperglycemia induces microvascular and ultimately, neural damage, to the retina via protein kinase c activation, advanced glycation end products, oxidative stress, inflammation, the polyol and hexosamine pathways, vascular endothelial growth factor (VEGF), and genetic and epigenetic changes.

EPIDEMIOLOGY: DR is the leading cause of non-traumatic vision loss in the working age and elderly populations of many countries. The individual lifetime risk of developing DR in T2DM patients is 50-60% and up to 90% for T1DM patients. At a population level, an estimated 90 million people have DR, and of those, 17 million have proliferative DR and 21 million have diabetic macular edema (DME).

DIAGNOSIS: DR is staged into mild, moderate, or severe non-proliferative DR, or proliferative DR. In any stage of DR, DME can develop. Routine diagnosis is often by fundoscopy, but imaging modalities such as fluorescein angiography and optical coherence tomography (OCT), and OCT angiography. Fundus autofluorescence, various biomarkers, and other novel methods are currently being researched.

MANAGEMENT: Essential management consists of serum glucose and lipids, and blood pressure management. Pharmacologically, Intravitreal anti-VEGF and intraocular glucocorticoids have recently been applied to clinical practice. Laser photocoagulation, a mainstay treatment since the 1970's, is used in cases of proliferative DR and DME. Development in photocoagulation methods and devices continues to researched.

OUTLOOK: Artificial intelligence (AI) demonstrates promise in ophthalmology, especially DR screening where early detection is valuable. In many studies, AI using deep learning methods were able to achieve both sensitivities and specificities greater than 90%, and in 2018 the FDA approved an autonomous software for DR and DME detection.

Management of Segmental Tibial Defects

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BACKGROUND: Segmental tibial defects pose a challenge to surgeons and researchers due to their variability and risk of complications. Currently, the decision of management strategy is based on surgeon preference and experience. If we develop a guideline for management based on patient factors and injury characteristics, we can standardize care and provide a platform for future research.

METHODS: We interviewed two experienced limb reconstruction surgeons to elucidate decision making criteria for different treatment options. We used the interviews to draft a clinical guideline for the management of segmental tibial defects.

RESULTS: Based on our initial interviews, we divided each injury into five subsets: host status, soft tissue injury, bone loss, articular injury, and neurovascular injury. We developed a 4-point scale that included each category, for a total of 16 points. Decision points depended on various factors within each of the given subsets. Experts agreed that defects >5cm should be treated with bone transport regardless of all other variables. For patients with some bone continuity, experts recommended bone graft if the soft tissue and vascular injuries are minor or if the patient gets a muscle flap (rotational or free tissue transfer). For patients with <5cm of bone loss, reconstruction depended on host status, with different algorithms between the surgeons. One surgeon recommended bone transport if the total score was > 11. The other surgeon recommended bone graft if the total score was <6, and a bone transport otherwise. Both surgeons agreed that acute shortening should be reserved for patients who have no other reconstructive options.

CONCLUSIONS: Tibia bone defects are challenging to manage, with experience-based decision making due to sparse data. Based on our study, bone transport is the method used more frequently by experienced surgeons, with the use of bone grafting if injuries to other tissues are less severe.

Retrospective Review of Intramural Hematoma of Aorta: Natural History, Repair, and Outcomes at a Single Institution

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BACKGROUND: Endovascular approach to the repair of thoracic aortic pathology has more recently become the preferred treatment method, particularly for aneurysm and dissection given the high operative risk. For other acute aortic syndromes, such as intramural hematoma (IMH) and penetrating aortic ulcer (PAU), the standard of care has not been well established, though the use of endovascular intervention has become increasingly widespread. This study will add to the body of current research examining and comparing patients with IMH based on management strategy as well as better defining the natural progression of this aortic pathology.

METHODS: This study is being conducted as a retrospective review of adult patients presenting to The Emory Clinic, Emory University Hospital, Emory University Hospital Midtown, and Emory Saint Joseph's Hospital with aortic intramural hematoma and/or penetrating aortic ulcer that were managed with open surgical treatment, endovascular treatment, or imaging surveillance between 1/1/2009 to 8/20/2019. These data are being extracted from a database created from radiology keyword searches for intramural hematoma and penetrating aortic ulcer, as well as ICD 9 and 10 codes associated with a broad spectrum of aortic pathology. From this database, patient charts are being reviewed and sorted based the presence of an aortic pathology (IMH, PAU, aneurysm and dissection) as identified in clinical notes or radiology reports. The radiology imaging is then reviewed by a vascular surgeon to confirm the diagnosis of IMH and/or PAU.

RESULTS & DISCUSSION: Data collection is ongoing. The subset of patients identified with the target pathology of IMH will undergo further analysis. This will include evaluation of demographic information to identify potential social determinants affecting treatment and outcomes, as well as statistical analysis of treatment methods, complications and clinical outcomes.

Incidence and predictors of neurologic death in patients with brain metastases

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BACKGROUND: Neurologic death (ND), defined as intracranial disease progression with accompanying neurologic symptoms in the absence of life-threatening systemic disease, is the most serious consequence of intracranial disease among patients with brain metastases (BMs). Data indicating which factors are predictive of this outcome remain limited, however. Identifying patients at increased risk of experiencing ND will guide improved care and further research aimed at preventing ND.

METHODS: We identified 1,218 patients with newly diagnosed BMs managed at Brigham and Women's Hospital from 2008-2015. Demographic and tumor characteristics for patients experiencing ND, non-neurologic death, and who were alive at last follow up were analyzed by a Fine and Gray competing risks regression to identify predictors of ND, with non-neurologic death serving as a competing risk.

RESULTS: ND was associated with number of BMs (hazard ratio [HR] 1.01 per 1 metastasis increase, 95% CI 1.01-1.02, p<0.001) and three primary tumor sites (with non-small cell lung cancer as the reference): melanoma (HR 4.67, 95% CI 3.27-6.68, p<0.001), small cell lung cancer (HR 2.33, 95% CI 1.47-3.68, p<0.001), and gastrointestinal cancer (HR 2.21, 95% CI 1.28-3.82, p=0.005). Additionally, among patients with breast primaries, HER2+ tumors displayed increased risk of ND relative to the reference subtype (HR+/HER2-) in univariable analysis (HR 2.41, 95% CI 1.00-5.84, p=0.05). Conversely, a reduced association with ND was found in patients with good Karnofsky performance status (90-100 versus 30-80, HR 0.67, 95% CI 0.48-0.95, p=0.03) and progressive extracranial disease (HR 0.50, 95% CI 0.38-0.67, p<0.001).

CONCLUSION: Patients with melanoma, small cell lung cancer, gastrointestinal, and HER2+ breast cancer primaries as well as greater intracranial versus extracranial disease burden harbor significant risk of ND. Future research investigating novel intracranial approaches should focus on these populations.

Development of Microneedle Patches with Hydrophobic Matrices

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BACKGROUND: Microneedle patches (MNPs) are microprojection needles ranging in lengths from 100-1000 μm attached to a supporting backing in arrays of 100s of needles. They act by breaching the uppermost layer of the skin in a minimally invasive and painless manner delivering drugs/vaccines. In this study, we will be exploring a number of hydrophobic matrices for the manufacturing of MNPs in an attempt to overcome some of the limitations with current microneedles like the ability to deliver hydrophobic drugs without the need of the use of harsh organic solvents in the MNPs manufacturing.

METHODS: Over the course of one month, MNPs were manufactured by casting various hydrophobic matrices into molds using different backing polymers and filling methods. We employed vacuum and centrifuge mold filling, with and without heat, over different time intervals. Finally, the MNPs were left to dry at room temperature with desiccant and then microscopically imaged.

RESULTS: We were able to fill the molds with various hydrophobic matrices using a combination of centrifuge and vacuum filling. While the hydrophobic materials comprised the microneedles, we cast a second solution onto the mold to form a water-soluble backing layer to promote separation of the microneedles from the patch backing after applying the patch to the skin. Further developmental steps are needed to assure sharpness of all microneedles through effective filling of the molds with the hydrophobic matrices.

CONCLUSION: These findings suggest the feasibility of casting hydrophobic matrices into MNPs. Further studies are needed to optimize the manufacturing method to ensure effective insertion into the skin and stability of delivered drugs/vaccines.

Feasibility, Safety, and Efficacy of Robotic TLIF Surgery in Ambulatory Surgery Centers

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BACKGROUND: Chronic low back pain is the second leading cause of disability in the U.S. Minimally invasive transforaminal lumbar interbody fusion (MI-TLIF) is a common surgical approach for select patients with lumbar radiculopathy and/or instability. The addition of robot-guided pedicle screw insertion systems (Mazor X) to MI-TLIFs has further reduced risks and improved outcomes. Robotic MI-TLIFs performed in the ambulatory surgery center (ASC) setting could offer patients a safe and effective alternative to hospital-based lumbar fusion.

METHODS: A retrospective chart review of 69 adults who underwent robot-guided MI-TLIF at the GNSCS ASC between May 2018-May 2020 was performed. Demographics, medical history, surgical parameters, long-term outcomes, and complications were assessed. Results for robotic ASC TLIFs including fusion and complication rates were compared to historical controls. Welch's t-tests, nonparametric ANOVA with post-hoc multiple comparisons tests, and chi-squared tests were used as appropriate.

RESULTS: There were significant reductions in surgery duration (t=2.57, P=0.012) and length of stay (LOS; t=8.65, P<.0001) for the ASC group. There were also significant decreases in VAS at post-op (Z=4.48, P<.0001) and final follow-up (Z=5.70, P<.0001) visits, and 89.9% of cases showed improved symptoms. The fusion success rate for ASC surgeries was 100%. There was an absolute decrease in complication rates with ASC surgery, but no significant difference from controls (X^2[1.52, 1], P=0.22).

CONCLUSIONS: The study saw a significant reduction in both surgical time and LOS for robotic TLIFs at the ASC compared to hospital controls. Patients undergoing robotic outpatient TLIF had improvement in their symptoms, high fusion rates, and low complication rates. Outpatient robotic TLIF in the ASC setting represents a promising alternative to traditional options for lumbar fusion.

An Unusual Case of Streptococcus Pneumoniae Spinal Infection Disguised as Back Pain

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BACKGROUND: This case illustrates a delayed diagnosis of an atypical presentation of an epidural abscess containing *Streptococcus pneumoniae*, a Gram-positive, lancet-shaped, facultative anaerobic bacteria. It is the most common bacterial cause of community-acquired pneumonia. However, spinal infections caused by *S. pneumoniae* are rare, making them difficult to recognize.

CASE: A 51-year-old woman with a history of hypertension presented with persistent back pain and bilateral extremity weakness. She had no medical history of trauma, type 2 diabetes mellitus, intravenous (IV) drug use, or immunodeficiency. She was initially diagnosed with degenerative disc disease and treated with non-steroidal anti-inflammatory drugs (NSAIDs) and a referral for orthopedic surgery. After consult from orthopedic surgery and OBGYN, the patient was sent to the nearest emergency department (ED). Labs revealed leukocytosis, elevated alkaline phosphatase, and elevated protein gap. Interventions included empiric coverage of Zosyn and Vancomycin on presentation, a 14-gauge pigtail drain catheter of the right psoas abscess, and laminoforaminotomy with epidural abscess evacuation. The causative microbe was determined by culture to be *S. pneumoniae*. She could walk with no neurological deficits and was referred to hematology/oncology for the elevated protein gap. A peripherally inserted central catheter (PICC) was placed, and she was discharged with a therapeutic plan for 8 weeks IV ceftriaxone.

CONCLUSION: An epidural abscess should be included in the differential diagnosis of back pain refractory to pain medication, even in the absence of obvious signs of bacterial infection. Unusual organisms should be considered in patients with no obvious risk factors for an epidural abscess. Despite the delay in diagnosis, a favorable outcome was achieved with a combination of drainage, surgical decompression, and IV antibiotics for the epidural and right psoas abscess caused by *S. pneumoniae*.

Comparison of XY versus XY and XZ Mapping During Pulmonary Vein Isolation Using the HD Grid

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BACKGROUND: Pulmonary vein isolation (PVI) has emerged as a cornerstone of management for atrial fibrillation. Traditional mapping using a circular catheter collects electrograms (EGMs) along the circumference of the vein (XY). Cardiac fibers, however, enter the veins at oblique angles (XY and XZ). For fibers traveling longitudinally into the vein (XZ), perpendicular to the circumference of the vein, EGMs may not be detected. The Advisor HD Grid catheter, however, overcomes this shortcoming by mapping in both the XY and XZ dimensions.

METHODS: All patients who underwent PVI at Piedmont Athens Regional over a 6-month window, January - June 2017 (spiral) and 17-month window, January 2019 - May 2020 (HD Grid)) were included in the study. A retrospective chart review was performed to determine recurrence rates between the two cohorts. These cohorts were further broken up by the status of their atrial fibrillation at the time of ablation.

RESULTS: 278 patients met inclusion criteria, with 84 patients undergoing ablation with a Spiral Catheter, and 194 patients undergoing ablation with the Advisor HD Grid Catheter. For patients with paroxysmal atrial fibrillation, 22.1% of patients had a reoccurrence of atrial fibrillation at 12 months when mapped with the spiral catheter versus 16.0% with HD grid (p=0.104). For patients with persistent atrial fibrillation, 7.0% of patients had a reoccurrence of atrial fibrillation at 12 months when mapped with the spiral catheter versus 6.2% with HD grid (p=0.64).

CONCLUSION: There was no significant difference in reoccurrence rate of atrial fibrillation when using either the Advisor HD Grid or Spiral Catheter for patients with either paroxysmal or persistent atrial fibrillation.

Comparison of Fluoroscopy Exposure in Tacticath SE Ablation Catheter versus in Tacticath Ablation Catheter

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BACKGROUND: Pulmonary vein isolation (PVI) has emerged as a cornerstone of management for atrial fibrillation. This procedure typically includes the use of fluoroscopy studies for catheter navigation, thus exposing both health care workers and the patient to harmful ionizing radiation.

HYPOTHESIS: : We hypothesized that the next generation Tacticath SE ablation catheter would reduce fluoroscopy time compared with the previously used Tacticath ablation catheter due to its ability to be visualized using Mediguide virtual fluoroscopy.

METHODS: Retrospective analysis of patients who underwent PVI at Piedmont Athens Regional Hospital over a three year period (06/15/2017 to 06/25/2020). 140 patients were ablated using a Tacticath ablation catheter, and 85 patients were ablated using the sensor enabled Tacticath SE. The average fluoroscopy study time between the two cohorts were subsequently compared.

RESULTS: The average fluoroscopy time using the Tacticath ablation catheter was 4.96 minutes versus 3.6 minutes with the next generationTacticath SE ablation catheter (27.4% reduction, $p < 0.001$).

CONCLUSION: In combination with Mediguide Virtual Fluoroscopy, the Tacticath SE ablation catheter significantly reduces fluoroscopy study time and ionizing radiation in PVI procedures.

Quantification of Fractionated Electrograms during 3D Mapping Does Not Predict Recurrence of Atrial Fibrillation at One Year

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BACKGROUND: While quantification of fibrosis using cardiac magnetic resonance (CMR) imaging has been shown to correlate with atrial fibrillation (AF) reoccurrence, this expertise is limited to a few centers. 3D mapping, however, is performed in the majority of pulmonary vein isolation (PVI) procedures.

HYPOTHESIS: We hypothesized that the burden of fractionated EGMs obtained while creating an electroanatomical map at the start of PVI would serve as a surrogate of fibrosis and correlate with reoccurrence rates at one year following PVI.

METHODS: Retrospective analysis of patients undergoing PVI at Piedmont Athens Regional between January 2019 and May 2020. Fractionation maps were created by the EnSite Precision mapping system using data obtained with an Advisor HD Grid mapping catheter. Electroanatomical maps were created in normal sinus rhythm. A fractionated electrogram was defined as a three component, 0.1 mV amplitude signal EGM where each signal was separated by 15 msec. We compared Fractionation Index (FI), defined as a percentage of fractionated EGMs obtained prior to ablation, against recurrence rates.

RESULTS: 260 patients were followed retrospectively after PVI for one year. For the entire patient population, average fractionation without recurrence was 7.12% and 6.67% with recurrence (p value = 0.456). In paroxysmal AF, FI without recurrence was 6.55% and with recurrence was 8.01% (p value = 0.456). In persistent AF, FI without recurrence was 7.29% and with recurrence was 6.07% (p value = 0.105).

CONCLUSION: FI does not predict AF reoccurrence at one year post-PVI. It is feasible that either fractionation is not an effective predictor of recurrence at one year or that this study failed to adequately control for confounding.

Medical School Curricular Factors that May Contribute to Students' Choice of Specialty

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BACKGROUND: The Augusta University/University of Georgia Medical Partnership (AU/UGA MP) was founded in 2009 to address the problem of primary care physician shortage in the state of Georgia. Primary care is defined as Family Medicine, General Internal Medicine, and Pediatrics. Student interest in primary care is crucial to increasing the primary care workforce which has been shown to decrease healthcare cost and increase quality of life. Our objective in this study is to illuminate curricular factor(s) that may influence students' decisions to pursue given medical specialties-specifically primary care.

METHODS: AU/UGA MP Alumni were recruited to participate in this study via email. The survey was sent to 220 alumni. Data was collected and analyzed using Qualtrics with a 28-question survey including: demographic information, specialty interest upon admission/graduation, and curricular factors that may have influenced specialty decision. Primary care was defined as family medicine, pediatrics, and internal medicine.

RESULTS: We obtained a 38% response rate to the survey. The top specialties chosen upon admission: Undecided (12.5%), Internal Medicine (11.25%), Pediatrics (10%), Emergency Medicine (8.75%), Orthopedic Surgery (8.75%), Surgery (7.5%). The top specialties chosen after graduation: Internal Medicine (22.50%), Pediatrics (11.25%), Family Medicine (10%), Emergency Medicine (6.25%), Surgery (6.25%). 71% of alumni reported that the curriculum influenced their specialty decision; 65% identified Small Group Learning (SGL) as positively influencing their interest in the specialty they ultimately chose. Faculty relationships with students were also reported to influence specialty decisions.

CONCLUSIONS: Our collected survey responses demonstrated that there was a 17% increase in interest in primary care specialties from enrollment to graduation. Additionally, it was noted that SGL had the greatest effect of any curricular component on students' choice of specialty.

Implications for clinical practice from an exploratory analysis of nutrition-focused smartphone applications

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BACKGROUND: Smartphone applications are an increasingly popular tool for consumers to access health information and monitor behaviors related to diet and nutrition. There remains a need for research evaluating the content and features of commercially available nutrition-tracking apps to determine the clinical relevance. The purpose of this on-going study is to systematically identify and evaluate nutrition-focused smartphone applications to describe the clinically relevant features they provide to users.

METHODS: Smartphone applications were selected from the iTunes and Google Play online stores based on previously established selection criteria. A rubric was designed for using an iterative bottom-up exploratory approach in which apps informed the content of the rubric. Each app was examined by three researchers using the rubric and screenshots of the available content as evidence of features.

RESULTS: A total of eleven smartphone applications were evaluated on iOS and Android systems. Preliminary results show that although apps provide users with features such as goal setting, tracking, education, feedback, and recommendations, the majority of these features were not referenced by evidence-based sources. Several apps allow tracking of biomarkers and anthropometrics.

CONCLUSION: The results of this study will be used to inform how mobile phone nutrition apps may be a useful application in clinical settings. App designs, particularly those that promote health behavior change, should demonstrate a strong basis in evidence based practices so that users can make the most informed decision.

Cost Analysis of Heart Failure Care During the Coronavirus Pandemic

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BACKGROUND: Literature regarding the effect of the SARS-CoV-2 pandemic is still emerging. Some experts in the field of heart failure (HF) speculate that HF patients may be disproportionately affected compared to the general population. Factors include social isolation induced changes in dietary and lifestyle behaviors that may increase cardiovascular risks and may trigger HF destabilizations. By evaluating the pandemic-related changes in cost and clinical outcomes of HF patients at Piedmont Athens Regional (PAR), the existing literature on pandemic response can be enhanced with recommendations for heart failure care before, during, and after an outbreak occurs.

METHODS: A cohort of 100 patients with a primary final coded diagnosis of HF from 2019 and 2020 was randomly selected and costs were estimated using the largest predictor of cost in the inpatient setting: length of stay. The cohort of 100 patients was then separated into a pre-pandemic time period, including patients admitted before March 11th, and a pandemic time period, including those admitted from March 11th to the end of June.

RESULTS: This study revealed an average length of stay (cost) of 4.86 days ($32,578) and 5.77 days ($38,664) in the 2020 pre-pandemic and pandemic period, respectively. Additionally, the average rehospitalization rate was 0.175 and 0.209 in the 2020 pre-pandemic and pandemic period, respectively. Analysis showed no statistically significant results between cohorts. Additional analyses are under way to evaluate the effect of comorbidities and demographics on the results of the study.

CONCLUSION: This study contributes to the evolving literature on the effects of the SARS-CoV-2 pandemic on HF patients. The results show no significant difference between the cost or clinical outcomes of HF patients during the pandemic compared to similar time periods before the pandemic. Notably, this study is centered around care provided by PAR and may not be applicable to the generalized HF population.

Dynamic Breathing MRI: A promising biomarker of diaphragmatic function in COL6-related dystrophy patients and LAMA2-related dystrophy patients

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INTRODUCTION: The natural histories of COL6-related dystrophy (COL6-RD) and LAMA2-related dystrophy (LAMA2-RD) are notable for progressive restrictive lung disease, resulting in respiratory insufficiency/the need for non-invasive ventilation. We sought to explore the application of the imaging modality of real-time cine MRI in children with COL6-RD and LAMA2-RD. Cine MRI allows for the direct visualization of diaphragm and chest wall movements during breathing.

METHODS: Chest wall and diaphragm magnetic resonance imaging (MRI) was performed on 3T scanners in patients with COL6-RD (N=14), LAMA2-RD (N=5) and healthy volunteers (HV) (N=10). Imaging was performed during the basal free breathing state and coached deep breathing. Automated algorithms were used to quantify diaphragm and chest wall movement.

RESULTS: The specific CMD subtype diagnosis was significantly related to percent diaphragm excursion (p<0.001) while post-hoc tests showed significant pairwise differences between the COL6 patients and both HV and LAMA2 patients (p<0.001 and 0.001) but not between LAMA2 patients and HV (p=1.00). Diagnosis was also significantly related to percent chest wall excursion (p<0.01). However, post-hoc tests showed no pairwise difference between the COL6 patients and HV (p=0.71) but a significant difference between the COL6 and LAMA2 patients (p=0.03), and also between the LAMA2 and HV patients (p<0.01) when looking at chest wall excursion.

CONCLUSIONS: We hypothesize that the chest wall movement area is better preserved in COL6-RD patients despite the disproportionate diaphragmatic weakness characteristic of COL6-RD. In contrast, the diaphragmatic movement observed in LAMA2-RD patients is better preserved. This may be a mechanism for compensating for decreased chest wall movement as seen in LAMA2-RD. These findings suggest that cine MRI has the potential to serve as a biomarker of diaphragmatic function as well as a potential outcome measure in future clinical trials.

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