

AUGUSTA UNIVERSITY
MEDICAL
PARTNERSHIP
UNIVERSITY OF GEORGIA

*Medical Partnership
Student & Resident
Research Symposium*



October 7, 2019

UGA Health Sciences Campus
Russell Hall

***Welcome to the ninth 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. This is also an opportunity for Internal Medicine residents from the Medical Partnership and Piedmont Athens Regional to present their research work.

The posters represent the results of the students’ and residents’ 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 G. Nuss MD

Michelle A. Nuss, MD
Campus Dean

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Let's Keep the Heart Beating: Cost Analysis of Heart Failure (HF) Management at Piedmont Athens Regional

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In 2017, 6.2 million individuals lived with a diagnosis of heart failure in the U.S. and literature reports an expected increase to 8.5 million by the year 2030. With this in mind, researchers are interested in minimizing HF-related costs and improving health outcomes. The cost of an episode of HF care is substantial and expected to increase along with an increase in HF prevalence. Hospitalizations account for the vast majority of HF-related costs, and 20-25% of patients discharged with a diagnosis of HF are readmitted within 60 days. The goal of this study was to perform a cost analysis of an episode of HF hospitalization at PAR from July 2018-2019. Of the 760 patients admitted for HF exacerbation, we randomly selected 100 charts for inclusion in this study. Through retrospective chart review, we obtained the following data: patient demographics, primary health coverage, length of stay, 30-day readmissions, and inpatient procedures. Estimated charges were tabulated for hospital stay and procedures using Healthcare Bluebook and PAR Chargemaster Service Price List. The mean cost of hospitalization for HF patients decreased by 8.8% from \$15,303 (July 2014-17) to \$13,957 (July 2018-19). Costs differed based on primary health coverage with privately insured patients incurring greater costs than Medicare and Medicaid patients, while those classified as self-pay incurred the least. The mean length of stay was 4.85 ± 4.04 days, with black patients having a higher LOS compared to white patients in most age groups. 30-day readmission rate at PAR increased by 11.1% from 19.9% (July 2014-17) to 31% (July 2018-19). These findings indicate a success in reducing HF hospitalization costs with an incidental increase in readmissions. Further analysis of re-admitted patient charts will help reveal if re-admissions were preventable or not.

Can We Predict who will Need a Feeding Gastrostomy in Premature Babies at Discharge from the NICU: Validation Cohort

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BACKGROUND: Some premature babies struggle to achieve full oral feeds and need a gastrostomy tube (GT) to be discharged from the NICU. Placing a GT can delay discharge for several weeks (w). If we can create a tool to predict which NICU babies are likely to need GT, we may be able to achieve earlier discharge, giving the baby more time at home.

METHODS: An original cohort of 204 NICU babies from 2015-2016 born <30w demonstrated 5 predictive factors for GT: postmenstrual age (PMA) at time of first oral feed, respiratory mode at 32w PMA, need for high frequency ventilation (HFV), diagnosis of necrotizing enterocolitis, or a significant patent ductus arteriosus. The validation cohort consisted of 201 NICU babies from 2017-2018 studied to confirm whether these five factors were universally predictive for a GT in premature babies.

RESULTS: Fourteen babies were excluded due to transfer or death before discharge. The cohort of 187 babies had 37 GT and 150 with no GT. Univariate analysis compared GT vs. non-GT babies in the validation cohort. Common factors such as gestational age at birth, birth weight, and PMA at discharge remained significant. Differences between ml/kg/day of oral feeding at days 10, 20, and 30 of feeding were also significant. Of the five predictive factors in the original cohort, only PMA at first oral feed, respiratory mode at 32 weeks PMA, and HFV remained significant in the validation cohort. Additional statistical analysis is underway to determine how well the validation cohort represents the original cohort but going forward we may have to alter the predictive factors included for the final model.

CONCLUSION: These data contributed to the development of a model to facilitate earlier gastrostomy tube placement and therefore earlier discharge, which overall may lower healthcare costs and improve neurodevelopmental outcomes based on shorter NICU stay. Using this second data set we will further refine the model to find more universal predictors.

Interstitial Fibrosis in the Setting of Repaired Tetralogy of Fallot: A Short Review.

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BACKGROUND: Interstitial myocardial fibrosis (IMF) is a pathological process that has been associated with the development of comorbidities in adult patients with repaired Tetralogy of Fallot (TOF). This review focused on 1) diagnostic techniques of IMF in the patient population of TOF 2) impact of IMF on ventricular function, and 3) risk factors associated with IMF.

METHODS: An extensive PubMed search was conducted using the key terms, "myocardial fibrosis, adult congenital heart disease, repaired Tetralogy of Fallot, serological biomarkers." Articles deemed appropriate included those published within a 4 year time frame.

RESULTS/DISCUSSION: 33 Articles were selected for further evaluation of this review. Histological examination, considered the gold standard for evaluating IMF, has been used to validate cardiovascular magnetic resonance (CMR) parameters and the use of serological biomarkers. In CMR, right ventricular end diastolic volume index (RVEDVi) was reported by several studies to have a positive correlation with other CMR parameter that are representative of the extent of IMF. Stroke volume ratio (SVR) was reported to have positive correlation with the collagen volume fraction (CVF) of biopsied myocardial tissue. Currently, there is a lack of literature available that has studied the correlation between serological biomarkers and histological evidence of IMF in the setting of adult patients with congenital heart disease. However, procollagen III amino terminal propeptide (CIIINP) was associated with increased extracellular volume fraction (EVF) by one study. Studies concurred that higher aortic cross-clamp times, being of female gender, and having volume overload over pressure-overload were all associated with higher degrees of interstitial fibrosis. Time spent under cardiopulmonary bypass and the age of repair are variables that remain contended in regards to their association with severity of IMF. Lastly, within a population of adult patient with TOF, those that developed arrhythmias demonstrated higher degrees of fibrosis in comparison to those that did not upon CMR evaluation.

CONCLUSION: CMR parameters are useful in determining the severity of IMF in patients with repaired TOF. There is a need for the study of correlations between serological biomarkers and extent of myocardial fibrosis in this patient population.

Factors Affecting Initiation of ART and Patient Retention in Care in the Era Before Universal ART

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BACKGROUND: Since 2017 the WHO recommends rapid initiation of antiretroviral therapy (ART) for patients newly diagnosed with HIV. Multiple countries use rapid ART initiation as a means of addressing the challenge of patient loss to follow-up (LTFU) and late presentation. We examined how timeliness to ART initiation before universal rapid ART was influenced by patient factors and its effect on retention in outpatient clinical care.

METHODS: We utilized anonymized data from 2005-2014 from the patient database at the University Hospital for Infectious Diseases. We used SAS software system 9.4 and Excel 2016 to perform the analyses. The Cochran-Armitage, Jonckheere-Terpstra, and Wilcoxon-Mann-Whitney tests were used to examine variables. Kaplan-Meier estimators measured time from diagnosis to viral suppression (VS).

RESULTS: Patients with more recent entry into care initiated ART sooner after diagnosis. Earlier initiation of ART was associated with lower times to VS and patients with a gap in care took longer to achieve VS. A gap in care was more likely occur before ART initiation than after. Early initiation of ART was associated with advanced age, low CD4 counts, non-MSM transmission means, and in patients negative for clinical AIDS.

DISCUSSION: We found significant association between delayed ART initiation and gaps in care. Increased time to VS given a gap in care suggests further clinical research should identify causes of patient LTFU. Retrospective analyses of patient care from before universal ART policy may be a relatively unexplored source of data to help clinicians identify factors associated with gaps in patient care and reduce poor virologic outcomes in people living with HIV.

Validation of the Test of Sensory Function in Infants (TSFI) for Measuring Sensory Responsiveness in Infants at Risk for Autism

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It has been proposed that differences in sensory responsiveness, in particular early in life, may produce cascading effects on development across a number of domains, ultimately yielding the constellation of deficits that have conventionally been associated with autism spectrum disorder (ASD). This theory has cultivated interest in measuring sensory responsiveness, early in life, in infants at risk for a future diagnosis of ASD. The present study sought to validate the Test of Sensory Function in Infants (TSFI), a previously developed measure that has been recommended for use in infancy, for this purpose. Feasibility, procedural fidelity, and interrater reliability, as well as discriminative, convergent, and divergent validity were assessed in forty-one infants who were known to be at heightened risk for ASD based on their status as infant siblings of children diagnosed with the disorder or who were at lower, general population level risk for ASD. Results suggest that it is feasible to administer the TSFI with high fidelity and to code this measure with good-excellent interrater reliability, but that support for convergent and divergent validity in measuring atypical sensory responsiveness in infants at high and low risk for autism is limited. While the TSFI may show some promise in discriminative validity in the hyporesponsiveness subscale, further work is required to ascertain the extent to which these findings generalize to infants and toddlers representing a broader range of ages and developmental status.

Resource Utilization for Critically ill Infants with Bronchiolitis

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BACKGROUND: Bronchiolitis is a common wintertime respiratory condition especially in infants. Management is supportive with no available option to shorten the duration of illness or symptoms. Clinical practice guidelines (CPGs) aid providers in delivering disease-specific care. The American Academy of Pediatrics' (AAP) CPG for non-ICU bronchiolitis encourages minimal resource utilization and has been shown to significantly decrease length of stay (LOS) with no significant change in all-cause 7-day readmission rates. Currently, there is no similar guideline for the PICU setting.

OBJECTIVE: To determine the quality of resource utilization among CHOA PICU (both Egleston and Scottish Rite) providers in the management of bronchiolitis.

Methods: Retrospective chart review of 209 patients diagnosed with bronchiolitis between September 2018 and March 2019. Relevant data metrics were analyzed. Exclusion criteria comprised children older than 24 months, chronic lung disease, congenital heart defect, and pulmonary hypertension. Data was documented in Excel. Data was evaluated using basic statistics.

RESULTS: Scottish Rite was shown to utilize significantly more viral testing, bronchodilator treatments, steroids, chest percussion, and reflux precaution medications. PICU and hospital LOS was significantly shorter for Egleston patients than for those at Scottish Rite ($P(T \leq t)$ one-tail = 0.0051 and $P(T \leq t)$ one-tail = 0.020, respectively), despite both patient samples expressing similar distribution of pathogens and similar level of respiratory support on PICU admission. There was significant difference in readmission rates.

CONCLUSION: Provided there was no significant difference in readmission rates between the two groups, utilization of less resources did not result in poorer outcomes; on the contrary high resource utilization resulted in longer length of PICU and hospital stay. These findings have the potential to encourage CHOA providers, collectively, to use less resources in future bronchiolitis cases.

Novel Realistic Bladder Model Teaches Anatomy & Builds Resident Confidence in Cystotomy Recognition/Repair

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PURPOSE: To develop and pilot an inexpensive, reusable, water-tight moderate-fidelity bladder model that can be used to teach Ob-Gyn residents cystotomy repair.

Background: Cystotomy repair is a required Ob-Gyn milestone procedure; however, low surgical volume for cystotomy may impact resident ability/confidence to perform the procedure. Available simulation models are either expensive or low-fidelity and not water-tight. Our goal is to create a cost-effective, realistic, functional bladder model (visible ureteral jets, water-tight after repair) for simulation of cystotomy repair.

METHODS:

Phase 1: Design and creation of the model using molds developed with 3D design software and 3D printing. The silicone model includes ureters, urethra, trigone, ureteral orifices, rugae, muscularis, and mucosa.

Phase 2: Pilot of the model with Ob-Gyn residents as part of their simulation curriculum. Residents were given a pre- and post-test to identify the model's anatomic landmarks and rate their confidence in 1) identifying cystotomy and 2) performing open cystotomy repair. Residents evaluated the model's fidelity post-simulation.

RESULTS: Eight bladder models were constructed for \$206. The model was water-tight post-repair and cystoscopy demonstrated bilateral ureteral jets. All residents, n=16, had no prior cystotomy simulation and limited experience with cystotomy repair. The model improved ability to identify bladder anatomy (4.3/6 items pre vs 5.8/6 items post, p=0.04) and confidence in both identifying cystotomy (2.14 vs 3.4 of 5, p= 0.006) and performing cystotomy (1.4 vs 3.3 of 5, p=0.014). Learners strongly agreed the model was realistic, mean 4.6/5.

DISCUSSION: Our novel bladder model is cost-effective, realistic and useful for teaching anatomy and simulation of cystotomy repair.

Measuring glare disability in post-surgical cataract patients

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PURPOSE: Glare is one of the leading causes of accidents among older drivers, and is the leading environmental cause of traffic accidents among all adult drivers, regardless of age. Glare is a common complaint among adult viewers, particularly older adult viewers, but glare disability is not commonly measured during a routine eye examination. The purpose of this study was to determine 1) norms for glare disability in post-surgical cataract patients, and 2) whether or not intraocular lens implants that filter short-wave light (which is highly prone to scatter) reduce glare.

METHODS: Data collection is ongoing, as part of a larger study on visual function in otherwise healthy older adults. As a first step, six healthy older participants ($M = 71.17 \pm 4.11$ years) were measured. In all but one participant, measurement was conducted on both eyes. A total of 6 test eyes were fitted with a yellow tinted intraocular lens implant during surgery, prior to testing. A total of 5 eyes were fitted with a clear intraocular lens implant during surgery, prior to testing. Glare was measured using a 1000 W broadband xenon source. A camera system was used to measure the vertical size of the palpebral fissure before and after exposure to the glare source.

RESULTS: After exposure to the glare source, participants exhibited an average squint response of 2.5 mm difference between vertical palpebral fissure size with the eye open naturally, and in the presence of the glare source. Participants with a yellow tinted, short-wave light absorbing intraocular lens tended to have smaller squint responses than those who received clear implants, but additional data is needed to confirm these differences, and is being collected as part of a larger study.

CONCLUSIONS: Short-wave light absorbing intraocular lens implants may reduce symptoms of glare in post-surgical cataract patients.

Access to and Experience with Naloxone: A World-Wide Survey

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INTRODUCTION: Finding solutions to the prevention of death by opioid overdose has become an urgent necessity in the wake of the current opioid epidemic. Opioid overdose can be effectively reversed by naloxone administration. The goal of Take-Home Naloxone (THN) programs is to broadly place this life-saving medication in the hands of lay persons to be used upon witnessing an overdose. THN programs have existed since the 1990s, but recently have been receiving more attention as a strategy to combat the worsening opioid epidemic.

OBJECTIVE: Our study aims to assess worldwide opioid users' experience with opioids and naloxone through an online platform.

METHODS: We are conducting a cross-sectional anonymous survey available online through a link posted on the website Erowid.org. A series of adaptive multiple-choice survey questions was developed. Survey topics include the subject's experience and habits with opioids; fears and experience of overdose; interest, opinion, and experience with naloxone; and potential for naloxone associated moral hazard.

RESULTS: Data is being gathered from March through September of 2019, after which a statistical analysis on the responses will be performed.

CONCLUSION: The data obtained from this study will consist of responses from multiple countries and continents and enable comparisons to be made. Conclusions about opioid users' attitudes and experiences with opioids and naloxone will assist in developing THN programs and reducing death by opioid overdose.

The Evolution of Proton Brainstem Constraints: A Study from the Pediatric Proton/Photon Consortium Registry

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BACKGROUND: Proton radiotherapy is becoming more widely adopted because of its dosimetric capabilities to better place dose in the target tissue. However, normal tissue brainstem constraints are different for proton radiotherapy compared with photon radiotherapy. New, more conservative guidelines were proposed in 2014 to reduce rates of radiation-induced brainstem injury, and here we evaluate the adoption of these guidelines in proton-treated patients prospectively enrolled in the Pediatric Proton/Photon Consortium Registry (PPCR).

METHODS: We analyzed clinical and dosimetric data and radiation plans of 295 patients with primary brain tumors arising in the posterior fossa treated at 13 institutions. Brainstem dosimetry collected included the median (D50%), 10% (D10%), and maximum dose (Dmax), which was defined as the dose to 0.1 cc of the brainstem. We compared the proportion of patients whose treatment plans conformed with the proposed guidelines before and after the new guideline publication.

RESULTS: The tumor histologies were 54% medulloblastoma, 27% ependymoma, 10% glioma, 4% ATRT, and 4% other histology. The median brainstem dose constraint was the most commonly exceeded, followed by D10% and Dmax. From 2012-2014, 63.4% of plans conformed with the new 2014 guidelines, a number that increased to 72.0% after 2015 ($p=0.06$). The ependymoma patients were most likely to have brainstem constraints exceeded when compared with patients with medulloblastoma, glioma, or ATRT ($p=0.0004$, 0.0001 , 0.001 , respectively).

CONCLUSION: We found that the proposal of these new guidelines has led to a trend toward more conservative dose constraints to the brainstem for proton patients. The next step is to evaluate if this apparent change in practice is associated with decreased brainstem injury.

Social Determinants of Health: Outcomes One Year Post-Trauma

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Trauma ranks third in terms of total healthcare expenditures. With this large cost comes a great opportunity for savings. Being able to identify the High-Need High-Cost (HNHC), population, 5% of patients who account for 50% of healthcare expenditures, will be vital to achieve reduced spending. The goal of this study was to identify individuals with a change in circumstances one year post trauma and determine which initial social determinants influenced these changes. One year prior, patients presenting to Grady Medical Center and requiring orthopaedic surgery post-trauma were enrolled consecutively and administer a social determinants of health survey. One year post surgery, patients were followed-up by phone and re-administered a version of the survey. The primary outcomes were rates of PTSD symptoms, continued narcotic pain medication use, functional scores, and return to work status. The portion of individuals reporting at least one PTSD symptom was 82.5% (n= 62) and the portion reporting feeling numb or detached from their surrounds increased from 24.5% to 47.5% compared to one year prior. Regarding work status, 28/62 (45.2%) were not yet working/on medical leave while 21/62 (33.9%) were back to pre-injury level of work. 14/62 (22.6%) reported continued use of narcotic pain medication. Statistical analysis is ongoing and will include correlations between work status, functional score, continued narcotic use, and PTSD symptoms and the initial social factors. The observed increase in PTSD symptoms provides an opportunity for mental health intervention and counseling for this population.

Reproducibility of 2D cine DENSE in a multi-center study in volunteers and patients

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Displacement encoding with stimulated echoes (DENSE) was developed for myocardial displacement mapping capable of measuring large displacements over long periods while maintaining high spatial resolution. DENSE has been shown in previous studies to have clinical applications in detecting left ventricular dysfunction and the prediction of major adverse cardiac events in myocardial infarction. Accuracy and reproducibility are required for the detection and quantification of abnormal myocardial function, and to date there have only been various single site studies to obtain these values. Our goal is to assess the reproducibility of 2D cine DENSE in a multi-center study in volunteers and patients. We will analyze inter-session, inter-user, intra-user, and inter-site reproducibility. Each site will have 10 volunteers and 5 patients analyzed. Each patient will be scanned twice for inter-session reproducibility. Images obtained will include three short axis slices of base, mid, and apex and three long axis slices of 2 chamber, 3 chamber, and 4 chamber. We will analyze patient CMRI for end-systolic strain, twist and torsion, and whole slice strain measurements following the 17-AHA model. Two experts will analyze images at each site for inter-user reproducibility, and one expert will analyze data from all sites for inter-site reproducibility. Lastly, one expert from each site will have a wait period before reanalyzing data for intra-user reproducibility.

Prognostic Value of Fractionation Mapping During Pulmonary Vein Isolation Using the Advisor HD Grid Mapping Catheter

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BACKGROUND: Pulmonary Vein Isolation, PVI, is the current cornerstone treatment for atrial fibrillation, a condition that affects 6 million people annually in the United States. Many of those patients will have a reoccurrences after the procedure. While cardiac magnetic resonance imaging has been used to identify areas of fibrosis that predict reoccurrence, the technique is expensive and available at a limited number of centers nationwide.

HYPOTHESIS: We hypothesized that fractionated electrograms obtained at the beginning of the procedure can serve as a more accessible, less expensive surrogate.

METHODS: 61 patients were followed retrospectively after PVI with regular office visits. The median follow-up time for this study was 111 days. Fractionation maps were created by the EnSite Precision mapping system at the start of the procedure using data from electro-anatomical mapping with the Advisor HD Grid mapping catheter. A fractionated electrogram was defined as a three component, 0.1 mV amplitude signal where each signal was separated by 15 msec. We compared Fractionation Index, FI, against recurrence rates, patient reported symptomatic improvement, and termination of anti-arrhythmic drug therapy. We also investigated any difference in observed FI between patients with persistent atrial fibrillation and paroxysmal atrial fibrillation.

RESULTS: A higher FI correlates with worse outcomes post-PVI procedure. Stronger associations were seen when FI was plotted against recurrence rates (8.00% FI for recurrent patients vs 6.08% for non-recurrent patients, $p = 0.0425$) and symptomatic improvement (8.05% FI for symptomatic patients vs 6.25% for asymptomatic patients, $p = 0.0678$) than with termination of anti-arrhythmic therapy (7.15% FI for patients still on AADs vs 6.30% patients off AADs at 3 months post-op, $p = 0.3827$) and type of atrial fibrillation (7.33% FI for persistent patients vs 6.31% for paroxysmal patients, $p = 0.2832$).

CONCLUSIONS: Fractionated electrograms can be obtained at the beginning of PVI procedures and serve as an indicator of post-PVI recurrence.

Multimodality imaging of pediatric uveitis

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INTRODUCTION: Uveitis is an ocular inflammatory disorder that poses a significant risk of vision loss if complications develop such as posterior synechiae, cataract, retinal scarring, and cystoid macular edema (CME). The incidence of uveitis is 4.3-6.9 per 100,000 in the pediatric population. Etiologies can range from systemic disease to infection, with many of idiopathic origin. Ocular imaging modalities are a mainstay of diagnosis and management, though their use is poorly described in pediatric uveitis. The purpose of this study is to describe trends and findings in multimodality ocular imaging in pediatric uveitis by analyzing the use of imaging modalities and changes in disease management based on the diagnostic study.

METHODS: A retrospective chart review was performed from patients seen at the Emory Eye Clinic in Atlanta, GA between 2005 and 2019. A total of 386 patients were considered, with 274 patients included. Inclusion criteria were patients less than 18 years of age at first visit with a diagnosis of uveitis. Data collected included demographic data, best-corrected visual acuity (BCVA), ophthalmic imaging results (fundus photo, fluorescein angiography (FA), fundus autofluorescence (FAF) and optical coherence tomography (OCT)), and alterations in treatment.

RESULTS: Out of 3210 total visits, the average number of images taken per patient were 9. The most common imaging modality was OCT, with an average CST of 299.3 OD and 303 OS, and the most common findings of OCT being CME (22.2%). Other common imaging modalities were fundus photos, FA, and FAF.

CONCLUSION: Ophthalmic imaging in pediatric uveitis is useful for the diagnosis and management of ocular conditions and complications associated with uveitis. The most common imaging modality used was OCT given the fast acquisition and noninvasive nature of the test which aided in the diagnosis of CME and furthermore led to the treatment of this potentially blinding condition.

Testing a novel halometer device to measure positive dysphotopias

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PURPOSE: Positive dysphotopsia symptoms, such as halo and starburst glare phenomena, are a major cause of traffic accidents in otherwise healthy adults. As adults age, symptoms of positive dysphotopsia tend to increase in intensity, especially during the development of cataract. In most clinical practice, symptoms are self-reported, rather than objectively measured, due to limitations in clinical technology that can measure glare geometry. The purpose of this study was to measure glare geometry (halo and starburst size) on otherwise healthy adult patients after cataract surgery, using a novel device designed for this purpose.

METHODS: Data collection is ongoing, as part of a larger study on visual function in otherwise healthy older adults. As a first step in establishing norms for glare geometry, six healthy older participants ($M = 71.17 \pm 4.11$ years) were measured. In all but one participant, measurement was conducted on both eyes. A total of 6 test eyes were fitted with a yellow tinted intraocular lens implant during surgery, prior to testing. A total of 5 eyes were fitted with a clear intraocular lens implant during surgery, prior to testing. Halo and starburst sizes were measured using a novel halometer device invented for this purpose.

RESULTS: Halo and starburst sizes ranged from 36 mm at a distance of approximately 4 feet from the device, to approximately 220 mm. Starburst sizes were similarly variable, from 137 mm to approximately 304 mm. Participants with a yellow tinted, short-wave light absorbing intraocular lens tended to have smaller halo and starburst sizes than those who received clear implants, but additional data is needed to confirm these differences, and is being collected as part of a larger study.

CONCLUSIONS: It is possible to measure glare geometry using a novel halometer device. Additional data is still needed to determine age- and disease-state norms for positive dysphotopias in a clinical setting.

How is Opioid Prescribing Behavior of Physicians in the Emergency Department affected by Involvement of Orthopedic Residents?

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BACKGROUND: Physician-prescribed opioids are a huge contributor to the current growing opioid epidemic. Though it has been confirmed that opioid prescribing behavior among physicians in the emergency department (ED) can vary, the influence of prescribing habits of orthopedic residents on prescription sizes has not been investigated.

METHODS: This retrospective chart review included 557 orthopedic trauma patients seen in the ED of the same hospital. The ED provider and orthopedic resident involved in each patient encounter were identified, and total quantity of opioids given to each patient while in the ED was calculated in morphine milligram equivalents (MME). The physicians were categorized as either high intensity or low intensity prescribers by comparing their average MME to the median. Regression analysis was used to determine how involvement of low and high intensity orthopedic residents in the care of patients seen by ED providers of different prescribing intensities affected the overall MME given.

RESULTS: For both ED providers and orthopedic residents, the low intensity prescribing group prescribed less MME than the high intensity group ($p < 0.001$). When considering only the patients seen by a high intensity ED provider ($n = 375$), those seen by a low intensity orthopedic resident were given less MME ($n = 64$, mean 36.4) than those seen by a high intensity orthopedic resident ($n = 311$, mean 50.9) ($p < 0.001$). However, when considering only patients who were seen by a low intensity ED provider ($n = 182$), there was no difference in MME between those patients who then saw a low intensity orthopedic resident ($n = 51$, mean 28.2) and those who saw a high intensity orthopedic resident ($n = 131$, mean 34.6) ($p = 0.104$).

CONCLUSION: Low intensity orthopedic residents involved in care of patients seen by high intensity ED providers significantly decreased quantity of opioids given, thus effectively mitigating the high intensity prescribing habits of the ED provider.

Patch testing for allergic contact dermatitis in elderly patients

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BACKGROUND: Pruritic skin conditions are ubiquitous in aging adults, but workup and management remain a challenge for patients and clinicians. Allergic contact dermatitis (ACD) may play a major role in these pruritic eruptions. The incidence of ACD increases with age, but this remains poorly characterized in the literature. Delayed diagnosis can severely impact quality of life, as attempts to treat other causes of dermatitis may show little improvement until ACD is adequately managed. Patch testing is essential for the definitive identification of contact allergens and has consistently been shown to lead to an improvement in quality of life. The use of appropriately comprehensive patch testing panels can hasten diagnosis, but the dearth of epidemiological data on ACD in the geriatric population may make the selection of appropriate panels challenging.

OBJECTIVE: To characterize demographic and comorbid elements of ACD in the geriatric population.

METHODS: We conducted a retrospective chart review of 812 patients who presented to the UCSF Dermatology Clinic for patch testing between October, 2013 and January, 2019. We recorded demographic information, allergen series tested, duration and location of symptoms, history of atopic dermatitis, immunosuppressive therapy at the time of testing, and positive patch test results for each patient.

RESULTS: Of the 812 patients who underwent patch testing, 130 were over the age of 60. Of these 130, 98 had at least one positive reaction; 31 had a history of atopic dermatitis; and 15 were on systemic immunosuppression. Further data analysis will reveal rates of reaction to individual allergens.

CONCLUSIONS: As the aging population continues to grow, it is increasingly important that clinicians be familiar with the unique characteristics of ACD in the elderly. These data should serve as a clinical support for choosing which patients to consider for patch testing and which allergens to test in this growing and unique population.

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

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BACKGROUND: Atrial fibrillation is the most common arrhythmia in the United States and affects millions of people annually. One of the main treatment strategies is an ablation technique called pulmonary vein isolation (PVI). The main goal in PVI is to eliminate all pulmonary vein potentials (PVPs) by mapping the electrical conduction of the heart and ablating the tissue connecting the pulmonary veins to the left atrium. The catheters used for mapping the atria are multielectrode catheters that are placed within the pulmonary vein. The Spiral Catheter and the Advisor HD Grid mapping catheter are two types of catheters that are used for this procedure.

HYPOTHESIS: The main purpose of this study is to determine whether there is an improvement in atrial fibrillation recurrence post-PVI between the two catheters. We hypothesized that the higher resolution Advisor HD Grid would have improved outcomes compared to the Spiral Catheter.

METHODS: We abstracted data from 147 patients who underwent PVI at Piedmont Athens Regional during the months of June 2017 and June 2019. 82 patients were ablated using the Spiral Catheter, and 65 patients were ablated using the Advisor HD Grid Catheter. A retrospective chart review was performed to determine recurrence rates between the two cohorts over the course of 6 months, and these cohorts were further broken up by the status of their atrial fibrillation at the time of ablation (paroxysmal or persistent).

RESULTS: Our study showed that six months following PVI done with the Spiral Catheter, 18.75% of patients with paroxysmal atrial fibrillation and 11.11% of patients with persistent atrial fibrillations had a recurrent episode of atrial fibrillation. Six months following PVI done with the Advisor HD Grid, 19.56% of patients with paroxysmal atrial fibrillation and 21.05% of patients with persistent atrial fibrillation had an episode of atrial fibrillation.

CONCLUSION: Our study showed that there is no significant difference in recurrence rate of atrial fibrillation when using either the Advisor HD Grid or Spiral Catheter.

Functional Impact of Hemocompatibility-Related Adverse Events after Left Ventricular Assist Device Implantation

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INTRODUCTION: Left ventricular assist device (LVAD) therapy aims to prolong survival and improve quality of life and functional status, but also increases the occurrence of hemocompatibility-related adverse events (HRAE). The MOMENTUM 3 study previously analyzed freedom from and burden of HRAE between the HeartMate II (HMII) and HeartMate III (HMIII) LVADs and demonstrated superiority of the HMIII. However, no data exists on if the other centrifugal flow pump (HeartWare) fares similarly.

OBJECTIVE: The purpose of our study was to evaluate for freedom from and burden of HRAE in patients at our institution following implantation of HMII or HW at 6 months follow-up.

METHODS: NYHA functional class, severity of HRAEs, oxygen consumption and 6-minute walk data were collected retrospectively from 374 patients who underwent LVAD implantation with a HMII (n=282) or HW (n=80). Patients were split into two cohorts according to pump type and compared for freedom from HRAEs using both Kaplan-Meier and Cox proportional hazard models and burden of HRAE as measured by a standardized hemocompatibility score.

RESULTS: The Kaplan-Meier curve demonstrated similar freedom from any HRAE through 6 months for axial and centrifugal pumps, 69% in HMII and 61% in HW (p= 0.2). The net hemocompatibility scores were 0.5 and 0.7 in the centrifugal and axial flow groups, respectively, but this was not statistically significant on univariate analysis. Functional outcomes were collected in all patients and are awaiting further analysis to evaluate the impact of HRAE burden.

CONCLUSION: Burden and time to HRAEs were similar between the axial and centrifugal flow pumps in this retrospective analysis. These findings lead to the conclusion that hemocompatibility may differ among third generation centrifugal pumps when compared to axial flow technology and that direct comparison of HRAE between HMIII and HW is required before conclusions regarding differences in HRAE can be inferred between these devices.

Monoclonal Antibody Therapies in Alzheimer Disease

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Alzheimer's disease (AD) is a devastating neurodegenerative disorder characterized by the overproduction or incomplete clearance of amyloid beta ($A\beta$), resulting in self-aggregation to form neurotoxic oligomers, fibrils and plaques. $A\beta$ aggregates are surrounded and infiltrated by activated microglia & astrocytes which contribute the hallmark neuroinflammation seen in AD. The most promising of the disease-modifying treatments in development for Alzheimer's disease utilize passive immunization via exogenous administration of monoclonal antibodies (mAbs) directed against various conformations of $A\beta$. Upon binding to their specific conformation of $A\beta$, some mAbs trigger the classical complement system and utilize microglia to carry out phagocytic and digestive clearance of $A\beta$ from the brain. The Phase III, multicenter, randomized, double-blind, placebo-controlled, parallel-group studies of Gantenerumab & Crenezumab are designed to evaluate the efficacy and safety of the respective monoclonal antibodies in patients with early (prodromal to mild) AD. In each study, approximately 760 patients age 50-90 years old, are selected on the basis of clinical diagnosis of probable or prodromal AD, which is confirmed by a positive amyloid PET scan. Patients are assigned to the experimental or placebo group in a 1:1 ratio and change from baseline is evaluated via CDR-SOB, MMSE total score, ADAS-Cog11 & 13, and ADCS-ADL total score. These Phase III trials are ongoing, and analyzable data is not yet available, however preliminary conclusions suggest that the differing IgG1 & IgG4 backbones employed in Gantenerumab & Crenezumab respectively, result in contrasting levels of complement system activation and thus produce different magnitudes of inflammatory response.

Quality of Regional Nodal Irradiation Plans in Breast Cancer Patients - Can we translate randomized trials results to the clinic?

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PURPOSE: Regional nodal irradiation has been shown to improve disease-free survival by 3-5% for breast cancer. The goal of this project was to audit our network program to determine the compliance of regional nodal coverage, contouring, and dosimetric parameters with respect to accepted guidelines.

METHODS: A retrospective review was performed on 183 patients. Radiation treatment plans were examined to determine what lymph node volumes were treated, whether treated lymph nodes were contoured, the quality of the lymph node contouring, and whether target coverage and normal organ dosimetric constraints were met. Criteria for acceptable target coverage was defined as per the ongoing Alliance A011202 trial.

RESULTS: Despite the presence of macrometastases on SNLN, lymph nodes were not treated at all in 2.2% of patients. Of the remaining 179 patients who received some form of nodal irradiation, 18 patients received radiation to axillary levels 1 and 2 only, while 161 patients received regional nodal irradiation. The regional nodes were not treated when required in 7.3% of patients. Of the 179 patients who received nodal irradiation, treated lymph nodes were not contoured for 2.2%, and at least one region of lymph node contours was unacceptable in 16%. Dosimetric review of target coverage revealed that D90 for axilla level 3 was <90% in 7.5% of patients, D90 for SCV nodes was <90% in 11.2% of patients, and D90 for IM nodes was <80% in 3.7% of patients. Overall, 14.9% of patients did not have adequate nodal target volume coverage. The mean heart dose was >4 Gy for 3.11% of patients, and lung V20Gy was >35% for 8.70% of patients.

CONCLUSION: There was good adherence to recommended nodal volume treatment. However, nodes were either not contoured or had unacceptable contour quality in about 18% of patients and coverage didn't meet acceptable criteria in 14.9% of patients. The small DFS advantage seen in trials may be decreased with these deviations.

The Effect of Preoperative Symptom Duration on Postoperative Outcomes Following Minimally Invasive Transforaminal Lumbar Interbody Fusion

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OBJECTIVE: Examine whether the time spanning from symptom onset to surgical intervention has an effect on postoperative clinical improvement in patients undergoing minimally invasive transforaminal lumbar interbody fusion (MIS TLIF).

SUMMARY OF BACKGROUND DATA: Evidence is limited regarding preoperative symptom duration on patient-reported outcomes (PROs).

METHODS: Patients undergoing a primary, single-level MIS TLIF were retrospectively reviewed and stratified according to preoperative symptom duration (<12 months and > 12 months). Differences in PROs, including Oswestry Disability Index (ODI), 12-Item Short-Form Physical Component Score (SF-12 PCS), Visual Analogue Scale (VAS) back pain, and VAS leg pain, at each postoperative timepoint and were compared between duration of symptoms (DOS) cohorts using linear regression. Achievement of minimal clinically important difference (MCID) for PROs was compared using Chi-Square analysis.

RESULTS: 248 patients were included: 96 had a DOS shorter than 12 months and 152 had a DOS longer than 12 months. When comparing PROs preoperatively, the shorter DOS cohort had significantly worse ODI, VAS leg pain, and SF-12 PCS compared to patients with longer DOS. There was no preoperative difference in VAS back pain between cohorts. Postoperatively, there were no significant differences in improvement of PROs throughout the 12-month timepoint. The shorter DOS cohort had a comparable number of patients achieving MCID for ODI, VAS back pain, VAS leg pain, and SF-12 PCS relative to the longer DOS cohort.

CONCLUSION: Patients with DOS shorter than 12 months exhibited significantly worse ODI and VAS leg pain scores at the time of surgery compared to patients with longer DOS. These patients demonstrated similar clinical improvement postoperatively regardless of preoperative symptom duration. These findings suggest that delayed surgical intervention may not lead to impaired functional recovery in patients with degenerative lumbar disease.

Neonatal Antibiotic Education: Parent assessment regarding effectiveness of neonatal antibiotic education at Piedmont Athens Regional in 2018 and 2019

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The CDC has identified improvement in antibiotic use as a patient safety issue and recognized that antibiotic stewardship (AS) programs can reduce the number of adverse effects linked to antibiotic use. The newborn population is especially susceptible to development of these adverse effects. In 2017, the AS team implemented a newborn antibiotic handout, applying one of the CDC's core elements of stewardship – education. In 2018, a parent phone survey was used to assess effectiveness of education. The survey measured families' knowledge of 3 key education points: antibiotic start, reason, and duration. The team found education was received positively by families but increased consistency of education and documentation at first dose needed to be achieved. The purpose of this study was to continue to assess the effectiveness of family antibiotic education in the NICU at PAR through the phone survey, with the goal of increasing family knowledge of the 3 key education points to 75% and documentation of antibiotic education to 90%. The definition of education was expanded to include verbal education and documentation was incorporated into the electronic medical record. In 2019, 101 families were eligible, and 40 families July 2018 – June 2019 completed the survey. Families who knew at least 1 key education point increased to 80%, compared to 69% in year one. 52% knew all 3 key education points, compared to 47% in year one. 17% recalled receiving the handout, compared to 29% in year one, pointing to the increased emphasis on verbal education. These results indicate that even with just a few interventions – focus on 3 key education points and increased feedback to nurses – there was a notable increase in family awareness of antibiotic use from year one to year two. Both verbal and written education were well received and effective at increasing parent awareness of antibiotic use. More work is needed to achieve our goals for antibiotic education of families in the NICU.

Analysis of The Effect Sonography on has Morbidity and Mortality in the Emergency Department

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OBJECTIVES: The effect of point-of-care ultrasound (POCUS) on patient-centered outcomes such as morbidity and mortality in emergency patients is not well known. Here, we studied the perceived effect of POCUS on morbidity and mortality (M&M) in the emergency department (ED) using retrospective review.

METHODS: At our institution, emergency medicine PGY-4's prepare M&M cases for review with a faculty emergency medicine attending physician on a monthly basis. We reviewed and surveyed these cases to see in which M&M cases point-of-care ultrasound could have prevented or may have contributed to the M&M.

RESULTS: A total of 75 cases of physician error were identified over the 12 months of review. POCUS may have reduced M&M in 27% of cases. Cardiac and lung POCUS were the most likely types of ultrasound that potentially may have reduced M&M. Patients with a chief complaint of chest pain had the highest amount of cases (63%) where POCUS may have prevented the M&M. POCUS may have contributed to the M&M in 12%. The most common problem was inadequately performed or interpreted ultrasound.

CONCLUSIONS: In emergency patients, POCUS could have potentially reduced M&M in 27% of cases. Additionally, adequate performance of POCUS could have also reduced M&M by 12%. Patients with cardiac and pulmonary chief complaints are the most likely to benefit from POCUS in the ED. These findings support the importance of careful and deliberate training and practice of POCUS.

Epigenetic Biomarkers in Blood and Ejaculate of Patients with Testicular Seminoma

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BACKGROUND: Testicular germ cell tumors (TGCTs) are the most common tumors of young male population worldwide. The most frequent type of TGCT is seminoma. It is believed that (micro)environmental and (epi)genetic factors lead to its development. The hypothesis of this proposed prospective study is that in blood and ejaculate, seminoma specific biomarkers at the level of cell-free DNA methylation may be identified.

METHODS: The study was conducted from two groups: healthy volunteers and patients with testicular seminoma. Blood and ejaculate were taken from both groups. Additionally, tumor tissue was taken from patients. A study panel of 8 genes was selected based on their specific dysregulation in seminoma. The methylation pattern of these 8 genes on cell free DNA was examined. Immunohistochemical staining was used to analyze gene expression on the protein level. Analysis of copy variation number of selected genes will be done by ddPCR and DNA methylation pattern in the promotor regions of the genes will be done by qPCR.

RESULTS/DISCUSSION: The study of cfDNA and DNA methylation in tumors, in addition to gene copy number variations, will clarify the proportion of tumor DNA in bodily fluids and show the impact of genomic aberrations in the analysis of cfDNA methylation. Comparison of these results with the protein expression of tested genes in seminoma samples of the same patients will clarify the relation between the use of immunohistochemistry as the "gold standard" in molecular pathology and the proposed new technologies and approaches on the path of personalized medicine development and male reproductive health. Scientific contribution to the field of epigenetic biomarker development in the body fluids from oncological patients is expected.

Investigating Barriers to Telehealth in Congestive Heart Failure Management

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PURPOSE: Congestive heart failure (CHF) is a significant medical and economic issue, impacting 5.7 million adults in the United States and costing \$30.7 billion annually. With a readmission rate of 50% in 6 months, careful attention must be given to transitional care. Telehealth has the potential to empower CHF patients to take control of their health, prevent costly hospital readmissions and improve access to health care in rural areas. We examined barriers to adoption by evaluating the perspectives of internal medicine teaching faculty and residents at Piedmont Athens Regional Community Care Clinic towards a telehealth program to manage CHF.

METHODS: A survey to measure the attitudes and knowledge of clinicians towards telehealth was developed and distributed to residents (n=75) and physicians (n=8). In addition, demographic data was collected to understand the geographic need for telehealth among CHF patients seen at Piedmont Athens Regional Medical Center (PARMC) between August 2018 to June 3, 2019 (n=756). Results: Among the 44 collected responses, the three greatest perceived barriers to accepting a telehealth program were training staff, trusting patient measurements and patient access to internet. The three greatest perceived benefits were increasing access to care, connecting with rural facilities, and reducing readmissions. Most physicians and residents had a low to fair level of self-reported knowledge of telehealth and no prior experience (75%).

DISCUSSION: Although the results showed that training staff and collecting patient data are important barriers to telehealth, it also illustrated that many physicians perceive increasing access as a benefit and are willing to learn more about telehealth. Future steps include distributing the survey to other healthcare practitioners, creating an educational tool for healthcare providers, and creating a needs assessment for patients with CHF in order to design the most useful telehealth program to fit their needs.

Cerebellar Mutism Syndrome: current approaches to Minimize Risk of CMS

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OBJECTIVE: Cerebellar mutism syndrome (CMS) is a postoperative syndrome that consists of decreased speech production, emotional lability, ataxia, and hypotonia. It can occur following posterior fossa surgery in pediatric patients. There is no clear method used to decrease the incidence of the syndrome. However, previous research has shown some statistically significant pre-operative, perioperative, and post-operative factors that may contribute to development of CMS in the setting of patients with medulloblastoma. In this paper, our goal is to investigate these pre-, intra- and post-operative factors with regards to a larger set of patients with different pathologies of posterior fossa tumors.

METHODS: For 306 patients, a retrospective chart review was conducted to include demographic and surgical data. Chart review focused on tumor-specific information as well as surgical factor, including surgical and postoperative data. The data was collected in a double blinded method concealing the demographic and surgical data from the patients who developed CMS.

RESULTS: The data will be analyzed for correlations to the risks of developing CMS. Data analysis is currently ongoing.

DISCUSSION: From previous research regarding medulloblastomas, the Institution made an effort to reduce the incidence and severity of CMS by adopting surgical practices that minimize tissue trauma and mitigate post-operative edema. It is critical to identify the factors involved in a wider population in order to apply similar techniques in order to reduce the risk of development of CMS

Screening for Social Determinants of Health in an Outpatient Pediatrics Clinic Serving High-Risk Families in East Harlem, NY

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INTRODUCTION: Social determinants of health (SDH) are the environmental and social factors that impact health, and overall, it is estimated that 80% of factors influencing health are non-clinical. SDH play an integral role in pediatric health, and by integrating SDH screenings into primary care visits, we can identify unaddressed social needs and connect families to resources in their communities. Furthermore, because each clinic is unique, screening systems must be continually evaluated, updated, and improved.

OBJECTIVE: This study reviews the first year of SDH screening at Pediatric Associates, an outpatient pediatric clinic in East Harlem, a historically underserved neighborhood in New York City.

METHODS: Screening questions were adapted using existing tools, content experts, and caregiver focus groups. Trained team members administered the screener to caregivers waiting for the doctor in exam rooms. When a caregiver screened positive for a social need, they were referred to a local community-based organization (CBO) and/or given an educational resource in paper or electronically. Results of the screener were analyzed using Excel.

RESULTS: Over a 12-month period, 663 caregivers were screened, 62% screened positive for one or more social needs, and an average of 1.2 social needs were identified per family. The most common social needs identified were home environmental concerns including mold and/or pests (35%), second-hand smoke (21%), and food insecurity (16%). 83% of caregivers with identified social needs accepted at least one referral to a CBO, when applicable.

CONCLUSION: The SDH survey identified a high variety and percentage of social needs, and most patients accepted referrals to community-based resources. To work towards a more consistent, communicated, and accessible screening process in the future, a follow-up study with caregivers is in progress, and the screener will be integrated into the clinic's electronic medical record beginning Fall 2019.

Transport Blood Pressure Variation: Outcomes of Emergency Patients with Intracranial Hemorrhage

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BACKGROUND: Patients with spontaneous intracranial hemorrhage (sICH) and suspected elevated intracranial pressure are usually transferred to quaternary care centers with neurosurgical capabilities. Because cerebral perfusion pressure is related to systolic blood pressure, patients are susceptible to blood pressure variations. Studies have shown that blood pressure variability (BPV) is associated with increased mortality and adverse outcomes. It is unclear whether management by the transport team affects patient outcomes. We hypothesized that BPV and care intensity during transport may be associated with acute kidney injury (AKI).

METHODS: We conducted a retrospective study of adult patients with sICH who received extra ventricular drainage during hospitalization from 01/01/2011 through 9/30/2015. The primary outcome was any AKI during hospitalization by creatinine criteria from Kidney Disease Improving Global Outcomes (KDIGO). We performed multivariable and ordinal logistic regressions to measure associations between clinical factors and AKI.

RESULTS: We included 154 patient charts in our analysis. Mean age was 59 (SD 13), mean successive variation of blood pressure (BPSV) during transport was 15 (SD 9), and mean standard deviation of blood pressure (BPSD) was 11 (SD 8). Mean number of total interventions during transport was 2 (SD 2)/patient. Common interventions were anti-hypertensives (26%) and sedation titrations (27%). 46 patients had AKI. In multivariable regressions, BPSV during transport was associated with increased risk for AKI during hospitalization (OR 1.07, 95% CI 1.001-1.15). Each additional intervention was associated with a 23% decreased risk between AKI stage (OR 0.77, 95% CI 0.59,0.99).

CONCLUSIONS: BPV during short time of transport was associated with risk of AKI while more interventions were associated with decreased risk of AKI. Transport team personnel should monitor patients closely and treat patients proactively.

Egg Consumption, Skeletal Health, and Cognition in Obese and Normal Weight Children: Phase 2 Randomized-Controlled Feeding Trial

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INTRODUCTION: Obesity is associated with adverse outcomes related to cognitive and skeletal health, including decreased memory and executive function, lower BMD development, and an increased risk of fractures. Puberty represents a period of significant skeletal growth and brain plasticity that may be an optimal target for new forms of intervention, such as increasing healthy food consumption through the development of more palatable foods. We propose a whole-foods approach to reduce inflammation and mitigate its potential effects in obese and normal weight children. Whole eggs are rich in nutrients related to bone growth and egg intake is associated with decreased inflammation in higher-risk obese adults and a reduction in negative cortical bone outcomes in children. In collaboration with the UGA Food Product Innovation and Commercialization Center (Phase I), we have developed several products, rich in whole eggs, for this purpose.

OBJECTIVE: To determine if feeding egg-rich formulated meal products for 9-months to obese and normal weight children will: 1. enhance cortical bone strength, 2. improve cognitive function, and 3. reduce pro-inflammatory-related markers, and if these effects are due to a reduction in inflammation.

METHODS: 180 children, ages 9-13 at Tanner stages 2 or 3, were sorted into the egg or placebo treatment arms and classified as obese or normal weight via BMI/age percentile. Measurements taken at 0, 4.5, and 9 months included: markers of body composition and bone strength calculated using DXA/pQCT imaging, markers of inflammation quantified via the Luminex xMAP system, and cognitive measures assessed with the NIH toolbox. Dietary intake and physical activity were assessed as potential covariates using questionnaires.

DISCUSSION: We have completed recruitment and testing is ongoing. If effective, our products could be incorporated into school meal programs as a cost-effective lifestyle intervention to combat the incidence of childhood obesity.

Insurance Reform for Gender-Affirming Healthcare

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INTRODUCTION: In May 2014, the U.S. Department of Health and Human Services (HHS) overturned the previous decision to deny transsexualism treatments. We evaluated the evolution of insurance coverage of gender affirming care.

METHODS: We selected the largest and most popular insurance companies based on enrolment data and market share. We then identified insurance policies for gender affirming care through a web-based search. When available, policy revision histories were documented and analyzed.

RESULTS: Eighty-eight insurance companies were surveyed, and 4 companies did not have a policy. One third of insurance companies (n=28) held policies prior to the 2014 HHS decision, 47 (56%) insurance companies established new policies, and 9 (11%) insurance companies had policies with unknown origination date. Nearly half of the insurers (49%, n=41) had policy revision histories. There was a total of 204 policy revisions, with the majority made following the 2014 decision (n=157, 77%). After the legislation, a significantly higher proportion of policy revisions were related to coverage of procedures (48% vs 11%, $p<0.0001$). Strikingly, revisions to add or alter existing medical necessity criteria to meet international standards decreased (28% vs 57%, $p=0.0003$), whereas addition or alteration of criteria not related to international standards sharply increased (13% vs 0%, $p=0.0089$). Furthermore, removal of existing criteria significantly decreased (11% vs 32%, $p=0.0004$).

CONCLUSION: Following the transformative legislation in 2014, an increasing number of insurance companies established gender reassignment policies. Additionally, more revisions were dedicated to coverage status which may reflect the continually changing attitudes to gender affirming procedures, such as facial feminization. As more patients are seeking gender affirming care, insurers are deviating international guidelines and creating additional benchmarks which may act as a barrier to care.

A case of Reversible Cerebral Vasoconstrictive Syndrome

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Reversible vasoconstriction is a rare condition with segmental vasoconstriction of cerebral arteries. Most patients present with thunderclap headache.

45 year old female presented with very severe intermittent throbbing frontal headaches. Headaches started during defecation lasting minutes to about an hour. Headaches were associated with photophobia, nausea and vomiting. They were also precipitated by sexual activity and orgasm. She uses marijuana.

She had normal neurologic exam. CT head and MRI head showed subarachnoid hemorrhage in several sulci of right frontal lobe, no hemorrhage in basilar cisterns. There was no aneurysm or arteriovenous malformation on CT and MR angiogram of head. Urine toxicology was positive for barbiturates and tetrahydrocannabinol. Headache had resolved by day 3 of admission and she was discharged on Nifedipine 30mg daily. She had similar headaches with defecation 4 years prior with unremarkable LP, MRI and MRA brain.

Conclusion

RCVS is the most common cause for cortical surface subarachnoid hemorrhage in people under 60. Hemorrhage if present is typically on cortical or convexal surfaces like in this patient. Infarcts may be present in watershed regions of cerebral hemispheres or cortical-subcortical junction. Diagnosis is confirmed by segmental vasoconstriction of cerebral arteries, with resolution within 3 months. CTA and MRA may be normal.

Precipitants of RCVS including stress, valsalva, coughing, sexual activity, defecation, marijuana and vasoactive agents like ergots, NSAIDs, amphetamines, cocaine and LSD.

Mainstay treatment is calcium channel blockers

Pheochromocytoma Multisystem Crisis Mimicking Interstitial Pneumonia

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Pheochromocytoma multisystem crisis (PMC) is a rare and life-threatening disease that often mimic other respiratory, cardiac or neurologic conditions. PMC requires a high index of suspicion for prompt diagnosis and treatment to prevent mortality.

A 44-year-old female presents with 2-days of worsening breathlessness, vomiting, abdominal pain, cough and hemoptysis. She reported episodes of headache, palpitation, diaphoresis and unintentional 30 lbs. weight loss over the past 6-months. On admission, she was tachycardic, tachypneic, hypotensive and saturating at 70% on room air. Lung examination revealed crackles and diminished breath sounds bilaterally. Chest computed tomography (CT) scan showed bilateral unevenly distributed ground-glass and consolidative opacities consistent with interstitial pneumonia. There was also an incidental 9.6x9.8 x10.5 cm right adrenal mass. We suspected PMC on the basis of these findings and confirmation was made by presence of severely elevated urinary and plasma catecholamines. She was started on perioperative doxazosin and she later underwent right adrenalectomy with subsequent resolution of symptoms within few weeks.

A Rare Case of Sympathetic Empyema secondary to *Peptostreptococcus prevotelli*

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Sympathetic Empyema Thoracis is an extremely rare condition that results from translocation of organisms from a sub-diaphragmatic source of infection. Most cases of empyema result from complications of parapneumonic effusions. Physicians should have a high index of suspicion for empyema in patients with worsening respiratory status in the setting of intra-abdominal infection.

A 58-year-old man with history of heroin abuse presented to our institution with a four-day history of abdominal pain and vomiting. Upon arrival, he was found to be tachycardic and febrile, otherwise hemodynamically stable. Physical examination revealed abdominal distension with marked tenderness in the epigastrium and decreased bowel sounds. CT scan showed partial SBO, possible PUD/gastritis with presence of fluid collection in the gastrohepatic space.

Initially, he was managed conservatively with NG tube and IV fluids. He was also started on ceftriaxone and metronidazole for presumed abdominal sepsis. On the second day of admission, he developed respiratory distress and desaturated into the mid-80s. He was placed on 2 L of oxygen via nasal cannula. CXR demonstrated bilateral pleural effusions. Over the ensuing 48 hours, he began to spike fevers with max of 100.6 °F. Repeat labs revealed leukocytosis with neutrophilia and bandemia. Blood cultures showed no growth. Additionally, he had worsening abdominal pain and distension.

A repeat CT scan of the abdomen was ordered which showed a loculated fluid collection in the gastrohepatic space with interval increase in bowel wall thickness. There were also moderate left sided and mild right sided pleural effusions noted. Diagnostic and therapeutic left sided thoracentesis was done. This revealed frank pus with a pH of <6.7, LDH >1200. Pleural fluid culture grew *peptostreptococcus Prevotelli*. A thoracostomy tube was placed. Subsequently, he underwent percutaneous drainage of his intra-abdominal abscess. Culture grew polymicrobial organisms with predominant *Streptococcus constellatus*.

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