Kansas City University of Medicine and Biosciences

Research Symposium
KCU-Kansas City
2019 Abstracts

Basic Sciences

BMS1: Study of Xpna Anemic Mice Suggests Existence of a Novel Factor Impacting Erythropoiesis

BMS2: Generation and Validation of a Novel Endothelial Cell-specific SMAD3 Knockout Mouse Strain

BMS3: ScaRNAs Biochemically Modify Components of the Spliceosome Leading to Alternative Spicing of mRNA which Helps Regulate Heart Development

BMS4: Smad3 Deficiency Alleviates Cardiac Damage Caused by Doxorubicin

BMS5: Discovery of Novel Non-nucleoside Small Molecule Inhibitors of DNMT1

BS6: Potential Treatment of Duchenne Muscular Dystrophy: Expression of Retinal Dystrophin Transgene in Muscle

BMS7: Methylation at Nucleotide C62 in Spliceosomal RNA U6 Alters mRNA Splicing which is Important For Embryonic Development

BMS8: Depth Transitions of the Frontal Branch of Facial Nerve: Implications in SMAS Rhytidectomy

BMS9: The Expression Level of Small Noncoding RNA snord94 Directly Influences Methylation Levels in Spliceosomal RNA U6 (snU6)

BS10: Promoter Identification and Activation of Dp260 Dystrophin Isoform

BMS11: Transdifferentiation of Mesenchymal Stem Cells into Insulin-Secreting Cells for Transplantation to Restore Insulin Secretion and Regulation in Companion Animals

BMS12: Anatomic variation of short gastric artery in relationship to splenic blood supply

BMS13: Vascular Defects in Doxorubicin Treated Mouse Hearts: Focus on Capillaries

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Clinical Sciences

CS1: The Effects of Macronutrient Composition on Glycemic Control in Adolescents with Type 1 Diabetes

CS2: The Impact of CHF on Short-Term In-Hospital Outcomes in Patients undergoing Endovascular Coiling for Ruptured and Unruptured Cerebral Aneurysms

CS3: Osteochondral Allograft in a Large OCD Lesion in a Young Patient: A Case Report and Literature Review

CS4: scaRNA1 Level Directly Influences Pseudouridylation Level in Spliceosomal RNA U2

CS5: The Impact of Chronic Obstructive Pulmonary Disease and Hospital Teaching Status on Mortality, Cost, and Length of Stay in Elective Total Hip Arthroplasty Patients

CS6: Vertical Rectus Partial Tenotomy for Correction of Small-Angle Vertical Strabismus

CS7: Comparison of Two Different MRI Elastography Post-Processing Techniques to Assess Liver Stiffness in Pediatric Patients

CS8: The Impact of Congestive Heart Failure on In-Hospital Outcomes of Patients Undergoing Radical Pancreaticoduodenectomy

CS10: Aberrant Right Coronary Anatomy Causing Anginal Symptoms in a Young Male

CS11: Conflicts of Interest in the Ophthalmic Devices Panel Open Public Hearing Speakers

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CS13: Case Report: Spinopelvic Dissociation Injury in a Pediatric Patient

CS14: Pediatric Cardiac Catheterization Radiation Exposure Analysis: Examination of the IMPACT Database

CS15: Epigenetic Age Acceleration and Metabolic Syndrome in the Coronary Artery Risk Development in Young Adults Study

CS16: Impact of Diabetes Mellitus on Short-Term In-Hospital Outcomes in Total Hip and Total Knee Arthroplasty Procedures

CS17: Differentiating Short-Term In-Hospital Outcomes in Uterine Fibroid Interventions

CS18: Identification of Factors Contributing to Adverse Wound Healing Following Dermatologic Surgery with an Initial Emphasis on Wound Dehiscence

CS19: Increasing Human Papillomavirus Vaccination Rates among Early Adolescents with Low Socioeconomic Status

CS20: Navicular Tuberosity Avulsion Fracture after External Rotation/eversion foot injury: A Case Report

CS21: Formulation Development of Z-Endoxifen

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Health Service Psychology

HSP1: To Test or Not to Test? The Cognitive Question

HSP2: Culturally Competent Substance Use Disorder Treatments in Native American Populations

HSP3: Medical Marijuana and Chronic Pain: A Research Proposal

HSP4: The Treatment Implications of the "Chemical Imbalance" Theory for Depression

HSP5: Examining Internal Educational Resources for Minority Students in Medical School: A Needs Assessment

HSP6: Personality and Music Re-examined Proposal

HSP7: Religiosity of Adoptive Parents

HSP8: The Effects of Collaborative Care on Mild Stages of Dementia: A Research Proposal

HSP9: An Analysis of the Relationship between Thinspiration and Purging Behavior

Medical Education

ME1: Assessment of Student Attitudes towards Interprofesional Education

ME2: Self-Reflections after an SP Encounter

Oral Presentations

10:10 - 10:25am: OMT in the Diagnosis and Treatment of an Atypical Migraine

11:00 - 11:30am: Death of Dopaminergic Neurons in Parkinson's Disease: Is Calcium the Culprit?

2:10 – 2:25pm: scaRNA1 Levels Alter Pseudouridylation in Spliceosomal RNA U2 Affecting Alternative mRNA Splicing and Embryonic Development

2:35 – 2:50pm: Platelet Proteolytic Machinery in Alzheimer's Disease: A Comparative Analysis

3:25 – 3:40pm: Impact of Congestive Heart Failure on Short-Term In-Hospital Outcomes for Patients with Acute Traumatic Brain Injury

Basic Sciences

BMS1: Study of Xpna Anemic Mice Suggests Existence of a Novel Factor Impacting Erythropoiesis

Cheyennae Barbee, B.S., M.S. Candidate, Amber Wiggins-McDaniel, B.S., Keanon Swan, B.A., M.S. Candidate, & Robert White, M.S., PhD

Discovery of key factors that impact erythropoiesis has been fundamental in treating and managing patients with anemia. Using the mouse model Xpna (X-linked pre-and neonatal anemia) may lead to the discovery of a novel factor responsible for erythropoiesis. Neonatal Xpna mice symptoms include low hemoglobin, low red blood cell number and low hematocrit. This anemia is transient and these symptoms resolve by 3 weeks of age but are accompanied by hypoplastic bone marrow and splenomegaly with extramedullary erythropoiesis in adult Xpna mice. Previously, we found this anemia to be a result of a splicing error of Gata1 which encodes GATA1 protein, a critical erythroid transcription factor that mediates maturation of precursor hematopoietic cells. The splicing mutation results in the short lived production of a protein called GATA1-short associated with Acute Megakaryoblastic Leukemia (AMKL) as seen in patients with Down Syndrome. Using the red blood cell marker Pgk1 we have shown that clonal selection of normal bone marrow cells is not likely the compensatory mechanism responsible for the rescue of Xpna mice. Results surprisingly show that GATA-negative bone marrow cells in Xpna mice produce circulating erythrocytes. We are setting out to identify the protein that is responsible for the compensatory rescue seen in Xpna mice. We will be using an innovate approach to produce Xpna mice with circulating, nucleated RBC's. RNA collected from these cells will be used for RNA-Seq to discover the novel factor. This discovery may lead to treatment of patients with bone marrow failure, anemia and AMKL leukemia.

BMS2: Generation and Validation of a Novel Endothelial Cell-specific SMAD3 Knockout Mouse Strain

David Bassily, BSc; Melissa Cobb, MA; Shixin Tao, PhD, MS; Eugene Konorev, PhD, MD

Introduction: Animal knockout models are an invaluable tool for the elucidation of the roles of particular genes in the development and progression of disease. Given our interest in the role of TGF beta in endothelial damage, there exists a need to develop a mouse strain wherein Smad3 is knocked-out solely in endothelial cells. Research Design: The Cre-Lox system was used to selectively knockout Smad3 in endothelial cells. The following mouse strains were used in the project: homozygous for LoxP sequences flanking the Smad3 locus, and the Cdh5-Cre strain that expressed Cre recombinase under the control of an endothelial specific Cdh5 promoter. These strains were crossed to produce CDH5-Cre x Smad3-LoxP progeny. The progeny were

genotyped using quantitative and end point PCR to evaluate Cre copy number and the genotype of floxed alleles, respectively. Results: To validate the Smad3 knockouts, cardiac endothelial cells were isolated using magnetic-activated cell sorting targeting CD31, an endothelial cell specific surface antigen. The cells were then cultured and Smad3 expression was evaluated by isolating total RNA and by immunoblotting protein extracts, both of which demonstrated knocked-out expression of Smad3. Western blotting of mouse strains containing two Cre copies showed negligible differences in Smad3 knockout as compared to strains with one Cre allele. Smad3 was not knocked out in mice having a floxed Smad3 gene and no Cre alleles. Conclusion: A strain of endothelial cell-specific Smad3 knockout mice was successfully created and validated. One Cre allele was shown to be sufficient in producing significant Smad3 downregulation.

BMS3: ScaRNAs Biochemically Modify Components of the Spliceosome Leading to Alternative Spicing of mRNA which Helps Regulate Heart Development

Abudu Bello Natalia Kibiryeva, Michael Filla, Jennifer A. Marshall, James E. O'Brien Jr., & Douglas C. Bittel

The heart is the first functional organ to develop during gestation. It starts to beat at around day 20, emphasizing the critical nature of the heart. A complex integrated series of biochemical processes help ensure the heart develops into a fully functional organ. Nearly every human mRNA transcript is alternatively spliced, and this is an important mechanism for generating transcriptional diversity and regulating gene expression. Preliminary evidence suggests that network of genes that regulate heart development are alternatively spliced, and the pattern is dynamic. We hypothesize that scaRNAs help regulate mRNA splicing through their function of biochemically modifying spliceosomal RNAs. This study seeks to establish that scaRNA1 is differentially expressed at different stages of heart development, which directly impact on pseudouridylation of U2, and, alternative splicing of mRNA necessary for heart development. We are analyzing RNA extracted from the right ventricle of fetal heart tissues at five different time points of development. We expect to see a difference in the expression level of scaRNA1 at the different time points and a corresponding change in pseudouridine in U2. We will also analyze mRNA splicing patterns using RNA-Seq and correlate with y89 levels.

BMS4: Smad3 Deficiency Alleviates Cardiac Damage Caused by Doxorubicin

Kyle Campbell, James Yang, Melissa Cobb, Magdy Girgis, Jeryl Hauptman, Shixin Tao, Robert Vincent, Buddhadeb Dawn, & Eugene Konorev

Introduction: Cardiovascular disease is the leading cause of morbidity and mortality in long-term cancer survivors. Chemotherapy with doxorubicin and other anthracyclines is the most common cause of cardiac toxicity in treated cancer patients. These agents are used to treat both hematologic and solid-tumor malignancies. Cardiac manifestations often develop months to years after initial exposure, causing cardiomyopathy and heart failure. Research Design: Previous experiments have shown that doxorubicin causes cardiac endothelial cell damage that can be alleviated by selective inhibition of the TGFbeta signaling pathway. Smad3 is a transcription factor that functions in the canonical TGFbeta pathway. The study was designed to test a hypothesis that cardiac damage by doxorubicin will be reduced in Smad3-deficient mice. Wild type (WT), SMAD3+/-, and SMAD3-/- mice were treated with four doses of doxorubicin, 5 mg/kg each, for a total dose of 20 mg/kg. Results: Using transthoracic echocardiography, we detected depressed cardiac function in doxorubicin treated WT but not Smad3-deficient mice. Similarly, doxorubicin reduced total vascular area in WT but not Smad3+/- and Smad3-/- animals. There were no differences in capillary density, heart weight, and cardiac fibrosis area between saline- and doxorubicin-treated hearts. Conclusion: Doxorubicin-induced contractile and vascular defects were attenuated in Smad3-deficient mice, highlighting the importance of the TGFbeta pathway in development of cardiomyopathy. The inhibition of TGFbeta/Smad3 pathway is a feasible approach to alleviate doxorubicin-induced cardiotoxicity in treated cancer patients.

BMS5: Discovery of Novel Non-nucleoside Small Molecule Inhibitors of DNMT1

Jordan Clement, BS, Nathan Duncan, PhD, Michael Holmes, PhD, & Jonathan White, PhD

DNA methyltransferase 1 (DNMT1), is an important enzyme involved in epigenetic control of gene expression. Aberrant DNA hypermethylation of promoter tumor suppressor genes catalyzed by DNMT1 is commonly observed in cancer, making DNMT1 a target for investigation. While nucleoside DNMT1 inhibitors are known, efforts to develop non-nucleoside inhibitors is an active area of research since non-nucleoside inhibitors may offer many advantages while simultaneously minimizing treatment side effects, which are problematic with nucleoside-based inhibitors. Of particular focus is the potential treatment of medulloblastoma, the most common pediatric brain cancer, which displays hypermethylation. Our effort is to discover novel non-nucleoside inhibitors with the ability pass the blood brain barrier. Several novel small molecule scaffolds were designed and initially investigated through molecular modeling. Scaffolds that were shown to have potential binding affinity were then synthesized to generate a compound library. Compounds were subsequently screened using both a direct DNMT1 inhibition assay, as well as in vitro cell proliferation inhibition assays. The initial screening showed hits in both the DNMT1 inhibition assay as well as the cell proliferation inhibition assay. Further iterative design, both through computational studies and in vitro screening then lead to a 2nd generation series of compounds that showed enhanced inhibition in cell growth inhibition, but

not DNMT1 inhibition suggesting activity site constraints. These results have led to further design of compound which we postulate will improve upon the activity of our novel non-nucleoside compounds for DNMT1 inhibition. These results and future directions for the project will be discussed.

BMS6: Potential Treatment of Duchenne Muscular Dystrophy: Expression of Retinal Dystrophin Transgene in Muscle

Stephen Fulbright BS, MS Candidate; Amber Wiggins-McDaniel BS; Robert A. White MS, PhD

Duchenne muscular dystrophy (DMD) is a progressive lethal muscle disease for which there is no cure. Palliative care to improve quality of life is the main goal for DMD patients. Previously, we have shown that expression of human retinal dystrophin (from a transgene locus) in skeletal and cardiac muscle of DMD model mice rescues the disease phenotype changing it from a severe, progressive, lethal muscle disease to a viable, mild myopathy. Our objective is to determine if more human retinal dystrophin can be expressed in muscle further alleviating the DMD phenotype. A breeding strategy has been used to generate C57BL/6J mice carrying two copies of the transgene locus to determine if levels of human retinal dystrophin increased in muscle. PCR genotyping assays to detect wild type DNA vs. transgene insert have allowed for identification of mice with two copies of the transgene (Tg/Tg) vs. a single transgene (Tg/+). Muscle protein preparations have been generated from these mice for western blot analysis to determine if two transgene loci express more retinal dystrophin protein in cardiac muscle and skeletal muscle, respectively. Using results from this study, we will investigate whether increased expression of human retinal dystrophin improves phenotypic outcomes of DMD model mice. This is significant as a preliminary study for a therapeutic strategy expressing retinal dystrophin in muscles of DMD patients since the amount of expression is critical to the efficacy of this approach.

BMS7: Methylation at Nucleotide C62 in Spliceosomal RNA U6 alters mRNA Splicing which is Important for Embryonic Development

Allison Ogren, Nataliya Kibiryeva, MD, Jennifer Marshall, MPH, RN, RRT, CCRC, Jim O'Brien Jr., MD, FACS, & Douglas C Bittel, PhD

Understanding the regulation of development can help elucidate the pathogenesis behind many developmental defects found in humans and other vertebrates. Evidence has shown that alternative splicing of mRNA plays a role in developmental regulation, but we know little about the underlying mechanisms. Notably, a subset of small noncoding RNAs known as scaRNAs (small cajal body associated RNAs) contribute to spliceosome maturation and function through

covalently modifying spliceosomal RNAs by either methylating or pseudouridylating specific nucleotides, but the developmental significance of these modifications is not well understood. Our focus is on one such scaRNA, known as snord94 or U94, that methylates one specific cytosine (C62) on spliceosomal RNA U6, thus potentially altering spliceosome function during embryogenesis. We previously showed that mRNA splicing is significantly different in myocardium from infants with congenital heart defects (CHD) compared to controls. Furthermore, we showed that modifying expression of scaRNAs changes splicing in human cells, and zebrafish and quail cells and embryos. Here we present evidence that methylation at C62 in U6 is associated with altered splicing and CHD. The potential importance of scaRNAs as a developmentally important regulatory mechanism controlling alternative splicing of mRNA is unappreciated and needs more research.

BMS8: Depth Transitions of the Frontal Branch of Facial Nerve: Implications in SMAS Rhytidectomy

Joseph Pankratz, M.Sc., Jacob Baer, B.S., Catherine Mayer, B.S., Viren Rana, M.Sc., Robert Stephens, Ph.D., Larry Segars, Pharm.D., Dr. PH., F.C.C.P., F.A.C.E., B.C.P.S, & Christopher C. Surek, D.O.

BACKGROUND: Anatomy of the frontal branch of the facial nerve relative to the zygomatic arch and the superficial musculoaponeurotic system (SMAS) has been well described. The variability centers on the location where the frontal branch traverses from a deeper to more superficial plane in the SMAS. The goal of this study is to examine the depth transition of the frontal branch of the facial nerve relative to the zygomatic arch with hopes of pinpointing a caution zone for dissection to avoid nerve injury. METHODS: The frontal branch of the facial nerve was dissected in 36 hemi-facial fresh cadaver specimens. Pitanguy's line, the zygomatic arch, and temporal crest were marked. Measurements were taken from the zygomatic arch to the location where the frontal branch pierced the temporoparietal fascia. The locations of the superficial temporal artery, the frontal branch cross relative to the lateral orbital rim and frontalis muscle were also measured. RESULTS: In 94.4% (n=36) of the specimens the frontal branch was found to transition to an intra-SMAS plane approximately 0.96 cm above the zygomatic arch. In all specimens, the frontal branch transitioned to an intra-SMAS plane approximately 1.2 cm posterior to Pitanguy's line. CONCLUSIONS: This study describes a surgical "caution zone" centered on a point 0.96 cm above the arch and 1.2 cm posterior to Pitanguy's line, and related to the anterior branch of the superficial temporal artery. We hope this anatomical detail will help to decrease the likelihood of intraoperative injury to the frontal branch of the facial nerve.

BMS9: The Expression Level of Small Noncoding RNA snord94, Directly Influences Methylation Levels in Spliceosomal RNA U6 (snU6)

Jabrea Strickland, Mike Filla, Jennifer A. Marshall, James E. O'Brien, & Douglas C. Bittel

The small cajal body associated noncoding RNAs (scaRNAs) direct methylation of specific nucleotides in spliceosomal RNAs. We hypothesize that the level of the scaRNA influences the amount of methylation, which in turn, helps determine splicing patterns of mRNA. We have shown an association among scaRNA level, alternative splicing, and human, zebrafish and quail heart and embryonic development. My project entails modifying scaRNA level and evaluating the subsequent impact on the quantity of methylation at cytosine 62 (mC62) in the snU6. I will modify the amount of scaRNA present in human kidneys cells by transfecting into the cells an antisense siRNA specifically targeting snord94. I will then quantify the amount of snord94, followed by application of biochemical tools and quantitative RT-PCR to quantify the amount of mC62. I will then analyze the data to determine if there is a significant correlation between scaRNA level and methylation. Developmental regulation that is dependent on the level of biochemical modification (methylation) in spliceosomal RNAs is a new paradigm of regulatory control. My experiments will help us establish that there is a direct relationship between snord94 level and mC62.

BMS10: Promoter Identification and Activation of Dp260 Dystrophin Isoform

Keanon Swan B.A., M.S Candidate, Amber Wiggins-McDaniel, B.S., & Robert White, M.S., PhD

Duchenne muscular dystrophy (DMD) is an X-linked muscle degeneration disease characterized by lack of dystrophin protein, progressive muscle weakness, scoliosis and death at about 20 years of age. There is no cure for DMD but expression of the retinal dystrophin isoform in muscle may be a treatment for DMD. The mouse model of DMD is the mdx mouse which does not mimic DMD but has a normal lifespan possibly due to compensatory expression of utrophin. In contrast, double mutant mice (DM), deficient for both dystrophin and utrophin (mdx/Y, utrn-/-), present a model that resembles DMD. DM mice die prematurely by 4 months of age and exhibit severe muscle weakness and severe spinal curvature. The capacity of human retinal dystrophin (Dp260) to compensate for absence of muscle dystrophin was tested in DM mice. Outcomes were assessed in part by muscle histology and longevity. Muscle MCK promoter-driven transgenic expression of Dp260 in DM mice converted their severe, lethal muscular dystrophy to a viable, mild myopathy. We are identifying the mouse and human Dp260 promoter via Luciferase assay from retina-derived cells transfected with a reporter luciferase plasmid vector containing a putative promoter sequence. This is the first step in discovering a compound/drug (by high-throughput screening) that will induce activity of the retinal dystrophin promoter in muscle. This research has important clinical implications for possible

endogenous treatment of DMD that circumvents immunogenic complications that occur when using gene therapy approaches while applying osteopathic principles by allowing the body's own genetic machinery to cure itself.

BMS11: Transdifferentiation of Mesenchymal Stem Cells into Insulin-Secreting Cells for Transplantation to Restore Insulin Secretion and Regulation in Companion Animals

Amy Wysong, Dr. Lisa Stehno-Bittel, Dr. Lindsey Ott, Dr. Francis Karanu, Dr. Nataliya Kibriyeva, Michael Filla, & Dr. Douglas C. Bittel

Type I diabetes is characterized by the autoimmune destruction of insulin-secreting beta-cells in the pancreas. Current therapies for treating Type I diabetes are inadequate. The biotech company, Likarda, is developing protocols to derive insulin-producing cells directly from adipose stem cells without de-differentiation into embryonic-like cells. Likarda's business model is to do clinical trials in companion animals, namely the feline model of type 2 diabetes, to demonstrate proof of concept prior to adapting the process for human application. This study will characterize the differentiation process using biomarkers that should appear as mesenchymal stem cells (MSC) differentiate into islet cells. Adipose tissue is harvested from felines undergoing the spaying process, and then the MSCs are exposed to a 3-stage protocol incorporating growth factors that encourage differentiation into insulin-secreting cells. Using qRT-PCR, biomarkers, including Sox17, Gata-6, Gata-4, Pou5f-1, Sox-2, Foxa2, PDX-1, and insulin, will be used to assess the differentiation cycle. Our objective for this study is to monitor the differentiation process and confirm whether or not MSCs can become functional insulin-producing cells. We hypothesize that glucose regulation can be restored in the feline diabetic animal model using bioengineered insulin-producing cells. This will provide a foundation for adapting the process for human application.

BMS12: Anatomic Variation of Short Gastric Artery in Relationship to Splenic Blood Supply

James Yang, Andrew Langille, Seth Larsen, Eugene Ismailov, & Sarah Keim

Introduction - With increasing prevalence of GERD and obesity, Nissen fundoplication and sleeve gastrectomies are becoming commonly performed surgeries. Due to anatomic variations of short gastric arteries that extend from the stomach to the spleen, surgeries that ligate the gastro-splenic ligament carry the risk of splenic infarction. This can cause several post-operative complications such as abdominal pain and splenic abscesses. This study aims to analyze the variations of short gastric artery. Research design - Thirty cadaveric abdominal cavities were accessed by making incisions from the xyphoid process to the suprapubic region and from ASIS to ASIS to allow for greater exposure. The gastrosplenic ligament was dissected to visualize

arteries extending between the stomach and the spleen. The GI contents from gastroesophageal junction to the rectum were then removed. The splenic vasculature was further dissected to identify and confirm anatomic variations. Results - 60.7% (17 of 28) of the cadavers were found to have a short gastric artery that extended from the stomach to the spleen. Of these, 35.3% (6 of 17) were supplemented with an anastomosing branch from the splenic artery. Overall, 39.3% (11 of 28) of the cadavers had an isolated short gastric artery extending from stomach to spleen. Conclusion - Our study shows that a significant portion of the population possesses variations of the short gastric artery. Awareness of the prevalence of this will allow surgeons to more accurately assess the operative risks associated with ligation of the gastro-splenic ligament and improve patient counseling regarding possible complications.

BMS13: Vascular Defects in Doxorubicin Treated Mouse Hearts: Focus on Capillaries

James Yang, Kyle Campbell, Melissa Cobb, Shixin Tao, & Eugene Konorev

Introduction: Improvements in cancer diagnosis and treatment have led to increased numbers of cancer survivors. While chemotherapy has benefited many patients, it has also increased the number of patients living with severe adverse effects of these life-saving medications. Specifically, doxorubicin is known to cause dilated cardiomyopathy in treated patients. Prior experiments demonstrated human endothelial cell detachment and reduced expression of alpha6 integrin in doxorubicin treated cultures. Alpha6 integrin is an adhesion protein that is critical for attachment of cells to the basement membrane. Research design: We set out to test a hypothesis that doxorubicin will cause endothelial cell loss in hearts of treated with doxorubicin mice. Mice were treated with four doses of doxorubicin, 7.5 mg/kg each, for a total dose of 30 mg/kg. Mouse hearts were harvested and examined using immunofluorescence microscopy. Results: We detected reduced capillary density in doxorubicin treated hearts using endothelial specific marker staining. We currently examine cardiac sections for areas of endothelial cell loss by utilizing basement membrane protein collagen IV staining and Z-stack imaging. Additionally, we have initiated analysis of cardiac alpha6 integrin expression in an attempt to elucidate the mechanism of endothelial cell loss in the hearts of treated animals. Importantly, we did not detect cardiac wasting or fibrosis in doxorubicin treated hearts. Conclusion: Doxorubicin treatment caused cardiac capillary rarefaction that has occurred prior to other known manifestations of cardiomyopathy, cardiac wasting and fibrosis. Understanding of mechanisms of cardiac toxicity will help design interventions to prevent or reverse cardiovascular complications of doxorubicin therapy.

Clinical Sciences

CS1: The Effects of Macronutrient Composition on Glycemic Control in Adolescents with Type 1 Diabetes

Allison Blomdahl & Mark Clements MD, Ph.D.

Background: The composition of protein, fat, and carbohydrates within meals can alter the blood glucose levels in persons with Type 1 Diabetes. In youth with T1D specifically, knowing the impact of meal composition on their blood glucose levels is essential to the monitoring and management of their disease. However, the exact manner and degree to which meal composition impacts adolescent's overall glycemic variability (after controlling for physical activity and sleep) remains unknown. We hypothesize that higher levels of protein and fat content and lower levels of carbohydrates within the diet will be associated with less glycemic variability. Subjects and Methods: This is a longitudinal study involving 45 adolescents with T1D (12 and 17 years old) using insulin pump therapy. Participants complete a daily food diary, as well as wear two accelerometers and a continuous glucose monitor (CGM) in order to quantify macronutrient content of meals, physical activity, sleep patterns, and glycemic variability. Data are collected continuously from each of these devices during the 14-day study. During the follow-up visit participants complete an interview and questionnaire assessing their experiences and perceptions of physical activity. Conclusion: From this study we hope to define the impact of protein and fat composition in meals on glycemic variability in adolescents with T1D. We will control for meal carbohydrate content, insulin exposure, recent physical activity, and sleep quantity, enabling investigators to develop specific diet guidelines. We anticipate our data contributing to the development of safe and effective management techniques used within future patient-centered interventions for adolescents.

CS2: The Impact of CHF on Short-Term In-Hospital Outcomes in Patients undergoing Endovascular Coiling for Ruptured and Unruptured Cerebral Aneurysms

Tatum Colburn, M.S. Karen Tong, BS, Angela Wang-Selfridge, BS, & Barth Wright, PhD

Background: One procedure to treat ruptured and unruptured cerebral aneurysms (CA) is endovascular coiling (EC). Previous studies have explored clinical outcomes for this intervention. This study aims to further investigate short-term outcomes of patients after EC by looking at the impact of CHF. Methods: This retrospective cohort study utilized data from the Nationwide Inpatient Sample (NIS) to identify adult patients (18+) from 2012-2014 with diagnosis of CA who underwent EC. ICD-9 codes identified these patients, specifically patients with CHF. Any patients missing important clinical identifiers (age, gender, cause of death) and patients without EC intervention were excluded. Data analyses assessed hospital length of stay

(LOS), inpatient charges, average age of admission and mortality rate. Results: Of the 5,459 encounters with CA's that underwent EC, 160 patients had CHF. • LOS in patients undergoing EC was significantly increased (11.94 days, CHF group vs. 8.16 days, No-CHF, p = 0.001). • Total charges were significantly increased ($240,557.19 CHF vs. $194,804.23, No-CHF p =0.019). • Mortality rate was significantly increased (5.4%, CHF vs. 2.8%, No-CHF, p = 0.016). • Mean age was significantly increased (64.74 vs 56.87 years, p < 0.0001). Conclusion: Patients with CHF with diagnosis of CA that undergo EC have longer LOS, increased total charges and mortality rate. This study aims to provide physicians with information in the management of patients with CHF who undergo EC. One limitation of this study is the inability to determine CHF severity. Peri-procedural optimization of symptomatic patients is one potential avenue for lowering LOS, in-hospital charges and mortality.

CS3: Osteochondral Allograft in a Large OCD Lesion in a Young Patient: A Case Report and Literature Review

Logan J. Cooper, DO; Kenneth Kim, OMSIII; David W. Dugan, DO

Background: Articular cartilage damage in young patients has historically been a difficult problem to treat due to intrinsically low healing potential and poor long term outcomes. With more modern treatment options available, however, we have seen an improvement in the overall prognosis of such lesions. Treatment algorithms have now been established to guide treatment based on the size and location of the lesion. We present a current literature review and a case report pertaining to the algorithm for treating osteochondral defects (OCD) lesions in the young population. Case: A 20 year old male presents with 1 week history of traumatic left knee pain. Radiographic findings, including x-ray and MRI, demonstrate a large (3 cm x 3 cm) OCD lesion of the lateral femoral condyle. Following current guidelines for a large OCD, we elected for an osteochondral allograft of the defect utilizing a cadaveric hemicondyle. The patient initially did well but returned to surgery 6 weeks later for arthroscopic loose body excision. At that time, the second look at the recent osteochondral allograft demonstrated good fixation and integration into the surrounding tissue. At the time of 1 year follow up, the patient was asymptomatic and scored a perfect 60/60 on the Oxford Knee Score. Conclusion: OCD lesions in young patients has historically carried a poor prognosis with limited treatment options. Modern surgical techniques, however, have improved outcomes and increased longevity of the native joint. This case exemplifies the treatment algorithm and the possibility of a favorable outcome when followed.

CS4: scaRNA1 Level Directly Influences Pseudouridylation Level in Spliceosomal RNA U2

McKenzie Davis, Mike Filla, Jennifer A. Marshall, RN, James E. O'Brien, PhD, & Douglas C. Bittel, PhD

The small cajal body associated noncoding RNAs (scaRNAs) direct pseudouridylation of specific nucleotides in spliceosomal RNAs. We hypothesize that the level of scaRNA influences the level of pseudouridine (y), which in turn, helps determine alternative splicing of mRNA. We have shown an association among scaRNA level, alternative splicing, and human, zebrafish and quail heart and embryonic development. My project entails modifying scaRNA level and evaluating the subsequent impact on the quantity of pseudouridine in the spliceosomal RNA. I will modify the amount of scaRNA present in human kidneys cells by transfecting into the cells an antisense siRNA specifically targeting scaRNA1. I will then quantify the amount of scaRNA1, followed by application of biochemical tools and quantitative RT-PCR to quantify the amount of y. I will then analyze the data to determine if there is a significant correlation between scaRNA level and pseudouridine. Developmental regulation that is dependent on the level of biochemical modification (y) in spliceosomal RNAs is a new paradigm of regulatory control. My experiments will help us establish that there is a direct relationship between scaRNA level and pseudouridine.

CS5: The Impact of Chronic Obstructive Pulmonary Disease and Hospital Teaching Status on Mortality, Cost, and Length of Stay in Elective Total Hip Arthroplasty Patients

Cameron Hanson, BS; Kyle Barner, BS; Zakary Renaeu, BS; Michael Kortz, BS; Andrew Brevik, BS; Barth Wright, PhD

Introduction: Total Hip Arthroplasty (THA) is a frequently performed surgery. Chronic Obstructive Pulmonary Disease (COPD) is one of the most prevalent diseases in the United States. The purpose of this study was to examine the clinical and economical impact of COPD on mortality, cost, and length of stay undergoing THA and the effect of hospital teaching status on these outcomes. Methods: This retrospective cohort study identified adult patients utilizing information from the Healthcare Cost and Utilization Program Nationwide Inpatient Sample (NIS) from 2001 to 2011 undergoing elective THA using ICD-9 codes. Mortality, cost, and length of stay was assessed. The COPD cohort was further analyzed by hospital teaching status, including teaching (TH), non-teaching (NTH) and rural. Results: A total of 7,652 patients with COPD and 768,000 patients without undergoing THA were identified. Average age of admission for those with COPD and those without were 68.24 and 64.92, respectively. COPD was associated with higher mortality rates (0.7% vs 0.1%) longer lengths of stay (4.06 vs 2.97), and total charges ($65,978 vs $55,585). Hospital status did have an impact in the COPD cohort. Between TH and NTH, chronic conditions were higher in teaching, yet total charges were lower. Between TH and rural, LOS was longer in rural however all other variables were not different.

Between NTH and rural, both number of chronic conditions and LOS was longer in rural, but costs were less than NTH. Age and mortality rates were not significantly different between teaching statuses.

CS6: Vertical Rectus Partial Tenotomy for Correction of Small-Angle Vertical Strabismus

Zachery J. Harter, M.S. & Justin D. Marsh, M.D.

Purpose: To evaluate the effectiveness of a vertical rectus partial tenotomy procedure for small-angle vertical deviation correction and resolution of symptomatic vertical diplopia. Methods: The medical records of patients who underwent a single vertical rectus muscle procedure for correction of vertical strabismus at Children's Mercy Hospital between 2009 and 2018 were retrospectively reviewed. We divided continuous patients with small-angle (≤10Δ) vertical deviation into one of two groups based on surgical procedure performed. Percentage of tendon tenotomy, pre- and post-operative measurements, ocular surgical history, and resolution of diplopia were analyzed. Results: A total of 15 patients undergoing single partial tenotomy of the vertical rectus muscle for small angle (≤10Δ) vertical strabismus were included in the study. Of these, 6 (40%) underwent a partial tenotomy procedure only (Group A), and 9 (60%) underwent a partial tenotomy procedure plus a concomitant strabismus procedure for horizontal deviation (Group B). All patients presented preoperatively with diplopia. Mean age at time of surgery was 46 years (range, 12-84). Total patient mean preoperative vertical deviation in far gaze was 4.3Δ ± 1.5Δ (SD) compared to 0.7Δ ± 1.9Δ (SD; $p<0.001$) postoperatively. Resolution of diplopia upon initial postoperative visit was achieved in 100% of patients. Conclusion: Vertical rectus partial tenotomy appears to be an effective treatment option for correction of diplopia in patients with small-angle vertical strabismus at our institution. This procedure is minimally invasive and is especially beneficial for patients who do not desire prism spectacles and/or do not wish to undergo conventional resection/recession strabismus surgical procedure.

CS7: Comparison of Two Different MRI Elastography Post-Processing Techniques to Assess Liver Stiffness in Pediatric Patients

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Background: The prevalence of liver disease in children is increasing, particularly due to a rise in non-alcoholic fatty liver disease. Detection and staging of hepatic fibrosis are critical in the management of patients with chronic liver disease. The gold standard assessment of liver fibrosis is histological analysis from core needle biopsies. However, liver biopsy only samples a

small portion of the liver and may be subject to sampling error. In recent years, MR elastography has been shown to correlate to hepatic fibrosis by biopsy. Our primary objective in this study is to compare two different post-processing techniques for MR elastography images and see if there is a difference in the summary values between the two techniques. Methods: We will test two MR Elastography datasets acquired from Nationwide Children's Hospital and Children's Mercy Hospital. We will process both datasets using two methods: mean values over 5 slices and mean values by anatomic liver segments. We will use statistical tests to quantify variability of elastography results to determine the differences between the two methods. Anticipated Results: We anticipate finding no significant difference between the two processing techniques.

CS8: The Impact of Congestive Heart Failure on In-Hospital Outcomes of Patients Undergoing Radical Pancreaticoduodenectomy

Eugene Ismailov, B.S., Andrew Dang, B.S., Zakary Rose-Reneau, M.S., Derek Schirmer, B.A., Russell Arellanes, B.S., Tatum Colburn, M.S., & Barth Wright, Ph.D.

Introduction Radical pancreaticoduodenectomy (PD) is a complex procedure that carries a high risk of complications. It is indicated in cases of a neoplasm or trauma in the region of the pancreatic head. Patient selection can be complicated by various factors, and there is some evidence that PD is underused for cases of resectable pancreatic cancer. This study aims to examine effects of congestive heart failure (CHF) on in-hospital outcomes in patients undergoing PD. Methods This retrospective cohort study utilized data from the Nationwide Inpatient Sample (NIS) to identify adult patients (18+) from 2012-2015 who had a listed diagnosis of CHF and those who underwent PD. ICD-9 codes identified these encounters. Encounters missing age and mortality data were excluded. Hospital length of stay (LOS), total inpatient charges, and inpatient mortality were assessed. Results There were 7,205 encounters identified with a procedure code for radical PD. Of these, 198 had a diagnosis of CHF. LOS and total charges were analyzed, with LOS being significantly longer in patients with CHF (15.49 vs 12.12 days p=0.001) and total charges being higher for patients with CHF as well ($193,835.74 vs $140,959.63, p=0.000). Mortality was higher in patients with CHF (4.0% vs 3.0%) but this was not statistically significant. Conclusion Inpatient LOS and total charges were higher in CHF patients undergoing radical PD. Mortality differences were not significant in this dataset. While causal relationships cannot be inferred, we hope that these results help improve selection of candidates for PD and guide further research in this area.

CS10: Aberrant Right Coronary Anatomy causing Anginal Symptoms in a Young Male

Brian Kenny, OMSIV & Claire DeLong, OMSIII

Aberrant coronary artery is a condition where the ascending aorta gives rise to malformed coronary arteries. In this patient's case, he had a singular coronary artery (right). This artery provided a communicating branch which formed into the left coronary artery and its distal branches. This condition can be benign or present with symptoms of ischemia due to decreased blood flow to the left heart. A middle-aged man presented with several months of anginal symptoms with exertion. He had hypertension but didn't have any common risk factors associated with coronary artery disease. After his hypertension was treated, he continued to have substernal chest pain with exertion. The patient had cardiac catherization which showed a singular coronary artery branching off the ascending aorta. The single coronary artery gave rise to a communicating branch forming the left heart branches. The communicating branch off of the RCA traveled posteriorly around the heart, in between the pulmonary trunk and the heart. During high flow states, the expansion of the pulmonary trunk compressed this communicating branch, limiting blood flow, contributing to decreased perfusion of the left side of the heart. Aberrant right coronary artery malformation can present with signs of ischemia due to the physiological decrease of blood flow through the artery, limiting perfusion to the left side of the heart. Secondarily, depending on how the communicating branch from the right coronary artery forms the left sided vessels, this can present with different symptoms. Cardiac catherization is the gold standard for diagnosing atypical coronary artery anatomy.

CS11: Conflicts of Interest in the Ophthalmic Devices Panel Open Public Hearing Speakers

Nicholas Kinder, BS, Michael Weaver, MS, Cole Wayant, BS, & Matt Vassar, PhD

Introduction: Open Public Hearing speakers of the Ophthalmic Devices Panel (ODP) of the Food and Drug Administration allow a unique perspective which is important to the panel's final decision to approve or reject devices. This study evaluated the presence of conflicts of interest (COI) in speakers of the open public hearing and whether or not the speakers gave positive or negative feedback on the device being evaluated. Methods: We reviewed publicly available transcripts of all ODP meetings from February 2009 to March 2017. For each public speaker, information was extracted in a blinded fashion using a pilot tested Google Form. Results: Of the 55 speakers identified, 24 (43.6%) reported COIs and 1 (1.8%) was found to have an undisclosed COI after review of the Open Payments Database. Of the 25 speakers with COIs, 17 (68.0%) received travel reimbursement and 3 (12.0%) were clinical trial investigators. The proportion of speakers with a COI that gave positive statements about the drug was significantly higher than those without a COI ($P < .0001$). Discussion: Nearly one half of Open Public Hearing speakers at Ophthalmic Devices Panel meetings had COIs involving the device

sponsor. These speakers were significantly more likely to speak positively regarding ophthalmic devices. This finding is similar to those reported in other FDA Advisory Committee meetings. We recommend the Ophthalmic Devices Panel require full disclosure of COI information, allowing the panel to fully understand the context of the public speakers' comments, allowing them to determine the comments' validity.

CS12: Branching Patterns of the Mental Nerve

Sarah King, OMSIII; Russell Arellanes, OMSIII; Victoria Gordon OMSII; Tony Olinger, PhD

Purpose: The purpose of this study is to analyze the branching patterns of the mental nerve and to determine the clinical relevance of the variety of patterns. We aim to expand on the findings by Kyung-Seok et al in their paper Branching Patterns and Intraosseous Course of the Mental Nerve from 2007. Materials and Methods: We dissected 119 mental nerves from 60 cadavers from the Kansas City University anatomy lab. We used the paper by Kyung-Seok et al to guide our branching pattern classifications. Results: We determined the distributions of the mental nerve using the five patterns that Kyung-Seok et al found (Types I-V) and found three additional patterns that were not previously documented (Types VI-VIII). We found one anatomical anomaly that could not fit into any of the described patterns. Type I was the most common at 21.01% found, closely followed by Type IV at 20.17%. Type II, which was the most common finding in previous research, represented only 10.08% of our specimens. Type II was the third least common in our findings. Type VII, one of the newly identified branching patterns, represented 12.61% of our data. Conclusions: These findings can help providers predict the location of the mental nerve and its branches when performing dental or mandibular procedures and surgeries.

CS13: Case Report: Spinopelvic Dissociation Injury in a Pediatric Patient

Donald Lao DO & Nigel Price MD

Spinopelvic dissociation injuries are rare but reported injuries in the literature. There has been an increased incidence in complex sacral fractures due to injuries sustained from explosive devices in military conflicts. Different surgical treatment options have thus far yielded promising results in the adult population, but spinopelvic dissociation injuries are rare in the pediatric population. We present a case of a sacral u-type fracture in a 13-year-old female who presented with neurological deficits. The injury was treated surgically with sacral nerve root decompression and posterior spinal fusion with instrumentation from L4 to pelvis. The initial neurological deficits had nearly resolved four months postoperatively.

CS14: Pediatric Cardiac Catheterization Radiation Exposure Analysis: Examination of the IMPACT Database

Anthony McKeiver, MPH, Douglas Bittel, Ph.D., Natalie Jayaram, MD, MSB, FACC, Jennifer Marshall, MPH, RN, RRT, CCRC, Richard Stroup, & Stephen Kaine, MD

Statement of Purpose: Cardiac catheterization is a common procedure used to both evaluate intracardiac hemodynamics and/or treat congenital heart disease (CHD). Methods: A thorough literature review will be performed in order to assess current best practices in pediatric catheterization, including dosing of radiation during the procedure. We will examine all current research, as well as compare a single institution's experience to that of all centers participating in the IMPACT registry (Improving Pediatric and Adult Congenital Treatment: https://cvquality.acc.org/NCDR-Home/registries/hospital-registries/impact-registry). IMPACT has collected data from pediatric patients with CHD undergoing diagnostic and interventional catheterizations from centers throughout North America. We will compare mean fluoroscopy time exposure as well as the cumulative Air Kerma mGy as reported by a single center compared to national cumulative reported data. Findings: We have noted that our center exposes patients and staff to a significantly lower amount of radiation when compared to national averages reported in the IMPACT database (mean fluoroscopy exposure times of 14.2 minutes locally, 19.7 minutes nationally; mean cumulative Air Kerma of 115.8 mGy locally, 254.0 mGy nationally). We will examine the clinical practices and equipment used at our center to identify potential areas that were most beneficial at reducing exposure, in order to offer potential ways in which other centers can replicate our decreased exposure levels. Conclusion: Through the analysis of current best practices as well as real-world data already gathered through IMPACT, new guidelines and recommendations can potentially be created and/or tested, in order to improve quality and health outcomes for CHD patients.

CS15: Epigenetic Age Acceleration and Metabolic Syndrome in the Coronary Artery Risk Development in Young Adults Study

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The metabolic syndrome (MetS) is a collection of metabolic disturbances that can lead to various cardiovascular diseases. The association of epigenetic biomarkers of age with MetS, or vice versa, remains elusive. We therefore investigated the associations between epigenetic age acceleration and MetS severity score and incident MetS in a subset of study participants with available whole blood at examination years 15 and 20 from the Coronary Artery Risk

Development in Young Adults Study who underwent epigenomic profiling using the Illumina MethylationEPIC Beadchip (~850,000 sites). Intrinsic and extrinsic epigenetic age acceleration (IEAA and EEAA) were calculated from DNA methylation levels. The MetS severity score was positively associated with IEAA at years 15 (P = 0.016) and 20 (P = 0.016) and EEAA at year 20 (P = 0.040) in cross-sectional analysis. IEAA at year 20 was significantly associated with incident MetS at year 30 (OR = 1.05 [95% CI: 1.00, 1.10], P = 0.036). To our knowledge this is the first report of the longitudinal relationships between epigenetic age acceleration and MetS. These findings suggest that a higher MetS severity score is associated with accelerated epigenetic aging and such aging may play a role in the development of metabolic disorders, potentially serving as a useful biomarker of and early detection tool for future MetS.

CS16: Impact of Diabetes Mellitus on Short-Term In-Hospital Outcomes in Total hip and Total Knee Arthroplasty Procedures

Zak Rose-Reneau, MS., Derek Schirmer, BA., Russell Arellanes, BA., Tatum Colburn, MS., & Anthony Olinger, PhD.

Diabetes Mellitus and the drugs associated with treatment of Diabetes Mellitus (DM) have been shown to delay the healing process. With rapidly increasing incidences of DM in our population, the effects of delayed wound healing are more prevalent and concerning. In this study we looked at the impact of having DM without chronic complications and with chronic complications on the length of stay (LOS), total charges, and mortality rates of patients who underwent Total Hip Arthroplasty (THA) and Total Knee Arthroplasty (TKA). This retrospective cohort study utilized data from the Nationwide Inpatient Sample (NIS) to identify adult patients (18+) from 2012-2014 who underwent a THA or TKA procedure. International Classification of Diseases, 9th edition (ICD-9) codes identified patients with a history of Diabetes Mellitus with and without chronic complications. Patients missing important clinical identifiers (age, gender, death) were excluded. Data analyses assessed hospital LOS, inpatient charges, and mortality rate. Of the 604,743 patients identified to undergo a THA or TKA, 455,320 patients had DM without chronic complications while 10,303 patients had DM with chronic complications. Patients without DM had a mean mortality rate of 0.003% and mean total hospital charges of $54,328.69. Total hospital charges and mortality rate for patients with DM without chronic complications and patients with DM with chronic complications were $56,774.14 and $62,812.65 ($p \leq 0.001$). , respectively, and 0.1% and 0.2%, respectively (($p \leq 0.001$). LOS for patients without DM was a mean of 2.68 days and patients with DM without chronic complications and DM with chronic complications was a mean of 3.08 and 3.58 ($p \leq 0.001$) days, respectively. Patients with DM suffer from longer LOS, more expensive hospital costs, and increased mortality rate when undergoing THA or TKA. Physicians should consider prophylactic therapy to the medications of patients with controlled DM or controlling the DM in patients

with uncontrolled DM prior to the operation. Both options could decreased the delayed wound healing caused by DM or the drugs associated with the treatment of DM.

CS17: Differentiating Short-Term In-Hospital Outcomes in Uterine Fibroid Interventions

Derek Schirmer BA, An-Qi Wang BS, Karen Tong BS, & Barth Wright PhD

Studies have previously explored the short-term in-hospital outcomes in patients undergoing an intervention for Uterine fibroids (leiomyomas). This study aims to further examine the short-term in-hospital outcomes in patients by focusing on three common surgical interventions: hysterectomy, myomectomy and uterine artery embolization. This retrospective cohort study utilized data from the Nationwide Inpatient Sample (NIS) to identify adult patients (18+) from 2012-2014 who were diagnosed with fibroids and who underwent one of three procedures; hysterectomy, myomectomy or uterine artery embolization. Patients missing important clinical identifiers (age, gender, death) were excluded. Data analyses assessed hospital length of stay (LOS), inpatient charges, inpatient mortality, and average age at admission. 141,911 patients were identified with uterine fibroids. Of these, 68,507 underwent hysterectomy, 13,342 underwent myomectomy and 1,835 underwent uterine artery embolization. Higher inpatient charges were observed in all patients undergoing an intervention. Uterine artery embolization cost the most ($41,161 vs. $31,670, $p<0.0001$). Decreased LOS was found in patients undergoing hysterectomy and myomectomy (2.45 and 2.78 vs. 3.92 days, $p<0.0001$). A hysterectomy is the most favorable procedure for patients seeking treatment for uterine fibroids when considering length of stay post-op and percent mortality. However, given the radical nature of a hysterectomy, a myomectomy may be more favorable among patients of child-bearing age. Based on the data, any of these three procedures would be a reasonable choice of treatment for uterine fibroids. Further research should determine if a given procedure is more favorable with a given set of comorbidities.

CS18: Identification of Factors Contributing to Adverse Wound Healing Following Dermatologic Surgery with an Initial Emphasis on Wound Dehiscence

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BACKGROUND: Wound dehiscence describes separation of wound edges due to mechanical failure of a healing wound. Factors contributing to wound dehiscence following cutaneous excision in dermatologic surgery are poorly characterized in the current literature. This study seeks to address this gap through data mining of EMR within the nation's largest dermatology practice. METHODS Advanced Dermatology and Cosmetic Surgery (ADCS) sees nearly 1.5

million distinct patients yearly, performing over 55,000 cutaneous excisions of pathologic lesions. All procedures are documented in a uniform manner within the single EMR used by the practice. The consistency of data coupled with vast sample sizes provides a unique environment suited to elucidate relatively rare phenomena such as wound dehiscence. This retroactive surgical outcome analysis of the clinical note entries describing cutaneous excisions and subsequent follow-ups performed within an eight-month period will be extracted from the ADCS EMR database, obfuscated, and then analyzed in aggregate to elucidate factors contributing to wound dehiscence. RESULTS: Initial data collected from January through February 2019 will be presented. CONCLUSION: We hypothesize that surgical site, diabetes, immunosuppression, smoking, anticoagulation therapy, suture material and method, and the presence of infection will be correlated with wound dehiscence. Such clarification would allow for the development of actionable strategies to improve patient outcomes and provide insight into a novel data-mining research methodology, which has profound implications for quality assurance processes. Population-based care and evidence-based interventions will ultimately improve cost effective clinical outcomes.

CS19: Increasing Human Papillomavirus Vaccination Rates among Early Adolescents with Low Socioeconomic Status

Kim Pham, BS, Somi Singh, MS, & Meera Varman, MD

Almost 43,000 people in the United States have an HPV-associated cancer each year in various sites, including the vagina, cervix, penis and anus. Most of these cancers can be prevented by the 9-valent human papillomavirus (HPV) vaccination, which is currently recommended by the Advisory Committee on Immunization Practices (ACIP). Unfortunately, the rate of individuals who have been fully vaccinated against HPV in the United States is below 50%. The first goal of our study was to analyze vaccination rates of patients between 9- and 15-years-old at the Catholic Health Initiative (CHI) Pediatrics Clinic in Omaha, Nebraska, which was providing fewer than the recommended number of HPV vaccinations. The second goal of this study was to conduct two provider-focused interventions. Prior to the intervention periods, we provided a lunch-and-learn session for PCPs and healthcare staff to discuss the importance of HPV vaccination. In the first intervention, we evaluated daily schedules to decrease missed opportunities. In the second intervention, we sent weekly reminder emails to PCPs. Results indicated that immunization rates were significantly higher during the first intervention and maintenance period following the intervention, compared to baseline. Furthermore, rates during the second intervention and maintenance periods were significantly higher than in the first. That said, the baseline immunization rate was significantly lower in 2018 than it was in 2017. Rates during the second intervention period in 2018 were higher than in 2017 when no intervention was in place, however, this is the only time-period which differs significantly from its 2017 counterpart.

CS20: Navicular Tuberosity Avulsion Fracture after External Rotation/Eversion Foot Injury: A Case Report

Angela Walker, DO; Blake Stepanovich, DO

Fractures of the navicular bone rarely involve the tuberosity in an avulsion type pattern. Most of the cases described in the literature involve fractures of the navicular body or stress fracture patterns. Navicular tuberosity avulsion fractures are rarely described in the literature. To our knowledge, surgical fixation of acute navicular tuberosity fractures has never been described. We present the case of a patient who sustained an avulsion fracture of the proximal pole of her navicular bone from an external rotation type injury. Due to the size of the fracture fragment as well as location in relation to the posterior tibialis tendon, we employed principles used in sports management for fixation of the fracture. This surgical technique can be used safely and effectively to restore normal anatomy and function after this injury.

CS21: Formulation Development of Z-Endoxifen

Oran White, Bill Sherman, Nathan Duncan, Ph.D., & Jonathan White, Ph.D.

Endoxifen is a selective estrogen receptor modulator (SERM), structurally related to tamoxifen and the tamoxifen metabolite, 4-hydroxytamoxifen. While tamoxifen has been used successfully for the treatment of estrogen-dependent breast cancer, acceptance of tamoxifen for breast cancer prevention by women at high risk has been low. This is possibly due to the known increased risk of developing endometrial cancer as a side effect of tamoxifen treatment. However, breast cancer prevention requires only that the breast be exposed to the drug; systemic exposure is both unnecessary and potentially harmful. Thus, the development of a topical/transdermal formulation would be ideal. As described in the literature, endoxifen exists as the potently anti-estrogenic (Z)-isomer and the lesser known (E)-isomer. The (E)-isomer of 4-hydroxytamoxifen has been found to be estrogenic or weakly anti-estrogenic, while the (Z)-isomer is a potent antagonist. It is assumed that (E)-endoxifen, structurally related to (E)-4-hydroxytamoxifen, will have similar pharmacological properties and therefore efforts to minimize the amount of (E)-endoxifen are important. As such, the purpose of this study is to develop a pharmaceutically stable, transdermal delivery strategy for (Z)-endoxifen. Efforts to synthesize (Z)-endoxifen as well as formulation development concepts to generate a stabilized version of (Z)-endoxifen will be described.

Health Service Psychology

HSP1: To Test or Not to Test? The Cognitive Question

Sheri L. Brown, PsyD Student

With an increase in the aging population, neurocognitive disorders (NCDs) have become more prevalent. It is known that changes in the brain occur long before cognitive deficits are detected; hence screening tools that provide for earlier detection allow for earlier intervention. Medicare's annual wellness visit provides for assessment of cognitive functioning via direct observation, reports from others, and the use of a cognitive assessment tool if deemed appropriate by the physician. Although a variety of assessment tools are available, it is not known under what conditions the cognitive tools are used or how a physician chooses the assessment instrument. Practical concerns, lack of knowledge, and fears of misdiagnosis and stigma are some reasons physicians do not provide a structured assessment, while stigma and fear of potential negative consequences are reasons patients refuse testing. It is unknown how primary care physician demographic factors relate to the use and type of cognitive tests and the rate at which positive scores result in a referral to a specialist. The aim of this study is to determine physicians' beliefs and actions regarding NCD screening and assessment. A survey addressing physicians' decisions regarding use and choice of assessment tools, referrals to specialists, and demographic characteristics will be sent to a variety of primary care practices. A greater understanding of the factors driving physicians' decisions to formally assess cognitive functioning in older adults may result in more consistent and effective screening procedures.

HSP2: Culturally Competent Substance Use Disorder Treatments in Native American Populations

Noah Cole, PsyD Student

Substance Use Disorder is a problem within society, but it affects Native Americans disproportionately. Native Americans have higher rates of alcoholism, use of illicit drugs, and overall mental health issues than the majority population. There are many factors that contribute to Substance Use Disorder in Native Americans, such as physiological and social factors and historical trauma. The historical trauma makes Native Americans hesitant to trust white researchers which may decrease treatment effectiveness. Native Americans view substance use as a communal problem while Western populations view substance use as a problem with the individual. The goal of this study is to show the effectiveness of a culturally based substance use treatment compared to a 12-step program. Participants will be matched into one of three groups (talking circle,12-step program, or wait list control group) based on DSM-5 criteria for Substance Use Disorder and their scores on the Severity of Dependence Scale

(SDS). The duration of the treatment will be 6 months and then a post-test will be conducted to determine which treatment is more effective. It is hypothesized that the talking circle will be significantly more effective than the 12-step program in treating substance use disorder among Native Americans. This study could outline a treatment for Substance Use Disorder in Native populations, and show mental health professionals that Native American culture needs to be considered when treating this minority group.

HSP3: Medical Marijuana and Chronic Pain: A Research Proposal

Anthony DiRenna, PsyD Student

Medical Marijuana and massage therapy are effective alternatives for chronic pain patients and could replace opioids or anti-inflammatory drugs in certain treatment plans. Marijuana has not been studied to its full capacity because of its legal status, but has shown to be an effective option for pain and nausea in patients with cancer and multiple sclerosis. The most common treatment method for chronic pain is the use of opioids or anti-inflammatory drugs, which have the potential for significant side effects. This study aims to determine if massage therapy or the use of medical marijuana could be an effective treatment for chronic pain symptoms as compared to treatment as usual. Participants in this study will be randomly assigned to one of three different treatment groups and then complete a pain survey before and after their treatment. The three experimental groups will use medical marijuana, massage therapy, or treatment as usual group (i.e. continued use of opioids or anti-inflammatory drugs). It is hypothesized that the use of medical marijuana will provide the greatest amount of pain relief in chronic pain patients. This may be a better option for patients because of the different dangers of opiates. Medical marijuana may provide patients with the greatest relief compared to opioids depending on the patient's preferences, circumstances, or characteristics. This treatment method can benefit the patient and minimize the addictive symptoms that could come about with the presence of opioids.

HSP4: The Treatment Implications of the "Chemical Imbalance" Theory for Depression

Abigail Geiger, B.A. Psychology & B.A. Chemistry

Many clinicians and laypersons alike look to make psychiatric disorders like depression more concrete and biological in nature in order to better understand and possibly cure these diseases. The proposed research will explore the treatment implications of the "chemical imbalance" theory for depression in the clinical context of individuals diagnosed with Major Depressive Disorder (MDD). Participants diagnosed with MDD will be randomly assigned to either receive a multicausal etiology for depression or the "chemical imbalance" theory for

depression via one-page vignettes after baseline testing. A three-part survey will then be administered in order to examine (1) the type of clinician participants would seek, (2) the type of treatment participants would seek (i.e., pharmacological and/or psychological), and (3) specific beliefs regarding the etiology of depression. It is hypothesized that individuals who are offered the chemical imbalance (simplistic) explanation will be statistically more willing to seek a form of treatment involving a pharmacological agent via a family physician or a psychiatrist in concordance with a neurochemical perspective on the disorder. This research offers much discussion and direction toward an integrated approach in the primary care setting, along with further investigation into the etiological explanations offered to patients diagnosed with MDD.

HSP5: Examining Internal Educational Resources for Minority Students in Medical School: A Needs Assessment

Sarah E. Getch, PhD; Esperanza Anaya, PhD; Robert Walker, PhD

Objectives: The American Osteopathic Association's Commission of Osteopathic Accreditation (COCA) recognizes that diversity in medical education is imperative both for academic excellence and long term success in the field of medicine. Despite this requirement, nearly half of all medical schools in the United States have been cited for lacking diversity. In order to promote an inclusive and diverse educational experience, what resources are necessary for diverse students to be successful. This research study intends to conduct a needs assessment survey with COM and COB students to help understand the student's view of what barriers currently exist as well as what resources are necessary for academic success. Method: A survey examining the student view of what barriers currently exist as well as what resources are necessary for academic success will be administered via email. Quantitative data analyses will be conducted using descriptive statistics. Qualitative responses will be examined to identify common themes in responses. Results: We expect students to cite a lack of student and faculty diversity as well a lack of mentorship as barriers to success. We expect students will report that increased mentorship, events that create an inclusive environment, increased scholarship opportunities, and an increase in academic resources (i.e., tutors, writing coaches, learning specialists) are necessary to promote student success. Conclusions: Medical schools are well aware of the need to increase diversity among their student body. Providing additional resources, as identified by medical students themselves, may improve the academic success of minority students and promote enrollment of minority students.

HSP6: Personality and Music Re-examined Proposal

Demetria Johnson, PsyD student

Despite the growing interest and concern between music and human behavior, there has been limited research analyzing the relationship between music and personality. As a result, many people listen to music without knowing the role personality may have in choosing their favorite genres. The investigation of these factors may lead to a better understanding of the role music and personality play in everyday life, particularly in boosting one's self confidence and mood. This proposed study will revisit and elaborate on the results of a previous study that found a relationship between Energetic/Rhythmic music and extroverts, as well as between Reflective/Complex music and Conscientious personality types. This study will examine the effects of matched and mismatched musical preference based on personality type on self-confidence and mood. The study will involve four groups of participants; two for each personality type. Two of the groups will listen to music which matches their Conscientious or Extroverted personality traits for five minutes, and the other two groups will listen to mismatched music. It is hypothesized that music will have a positive effect on mood of its matching personality traits and that self-confidence will be improved as well. If the results support the hypothesis, then it is possible that music can be used as an aiding factor in boosting negative moods and self-confidence. Furthermore, if the hypotheses are supported, this could be a simple and affordable way for people to boost their moods and self-confidence.

HSP7: Religiosity of Adoptive Parents

Tanesa Hill, PsyD Student

There are currently 100,000 children in the United States in need of an adoptive parent. Despite a large population of capable adults, most of those children will never get an adoptive home. While the government continues to incentivize adoptions by way of subsidies, tax breaks and paid insurance benefits for children adopted from the foster care system, there remains a lack of research on individuals that make the decision to adopt a non-relative child. The current study will investigate the relationship between adoptive parents in non-relative adoptions and their religious preferences, as well as their political affiliation. Survey items will also include a primary reason for why the participants chose to adopt, such as infertility or health reasons. Via social media, researchers will send electronic questionnaires to adoptive parent groups based in the Midwest and in the Washington DC area, due to demographic diversity, along with a request to share the survey with other adoptive parents known to the participants. This study aims to determine the demographic characteristics of those who adopt and the primary reason for adopting a non-relative child. The current study will fill a void in an area where little research exists by providing detailed demographic information about adoptive parents. This

information may be utilized to recruit potential adoptive parents that may otherwise be overlooked.

HSP8: The effects of Collaborative Care on Mild Stages of Dementia: A Research Proposal

Marla Moss, PsyD Student

Neurocognitive disorder (dementia) is a clinical diagnosis characterized by the progressive deterioration of cognitive functions. Along with this deterioration are many neuropsychiatric symptoms, such as depression that can lead to decreased treatment outcomes. Depression can lead to apathy and a lack of interest in doing things that are mentally and physically stimulating and believed to combat dementia. A patient's ability to complete daily activities may also decline. In order to effectively treat the symptoms of dementia holistically, collaborative care is the most advantageous course of treatment. An experimental approach will be used to investigate depression symptoms and activities of daily living (ADL's) in collaborative care settings compared to occupational therapy and psychological services alone. Participants who meet the criteria for mild cognitive impairment will be randomly assigned to one of the three groups (occupational therapy alone, psychological service alone, or a collaborative approach). Each participant will complete pre- and post- measures of depression, cognition, and ADL's. The collaborative care model will encompass a primary care physician, and occupational therapist, and a psychologist. It is hypothesized that individuals in the collaborative care group will perform significantly better in ADL's and exhibit a decrease in depressive symptoms compared to the individual discipline groups measured at a 6-month duration. Together, the knowledge and results from this study is complementary and innovative in psychosocial and behavioral interventions, which in turn may strengthen the healthcare delivery system.

HSP9: An Analysis of the Relationship between Thinspiration and Purging Behavior

Matthew Stewart, M.A.

Previous research suggests that exposure to online content that promotes meeting certain unrealistic body ideals, often termed thinspiration, is linked to low self-esteem, body dissatisfaction, and negative affect. However, there has been little research conducted that identifies the influence thinspiration has on disordered eating symptomatology, specifically in anorexia nervosa (AN). The purpose of the study is to assess the risk that thinspiration material poses on individuals suffering from disordered eating. The present study intends to collect data through the use of a self-report survey where participants who have been clinically diagnosed with AN will detail how much time they spend consuming thinspiration material and how often they participate in unhealthy weight loss practices, specifically purging behavior. It is

hypothesized that participants who indicate higher amounts of time per week spent consuming thinspiration material will also report a significant increase in the reported number of times they purge per week. If the hypothesis is supported by the findings of the study, it will undoubtedly have an impact on how therapeutic treatment is conducted for individuals who suffer from AN. That is, support will be added to the growing body of evidence-based practice that clinicians should spend time with their patients discussing the need to reduce and eventually eliminate their time spent on pro-anorexia (pro-ana) websites as it contributes to their disorder.

Medical Education

ME1: Assessment of Student Attitudes towards Interprofesional Education

Damalye Debi, MA, Luke Mike OMS II, Pamela Payne, Zafina Ahsan, Anna Venardi OMS II, Robynne Lute, PsyD, Marissa Roffler, PhD

As medical knowledge expands and treatment modalities for disease increase, an integrative approach towards healthcare is not only beneficial but essential to providing patients the best quality of care possible. Interprofessionalism is a feature of health professions training and practice that provides disciplines opportunities to collaborate through an integrated and cohesive approach to patient care. Interprofessional Education (IPE) is an approach used for preparing students from different health and social disciplines to work together in their professional training to prepare them to work in a collaborative team environment. The aim of this study is to evaluate attitudes toward IPE at Kansas City University (KCU). The interprofessional education assessment study will be sent via internal email distribution lists to all students on both KCU campuses. The Readiness for Interprofessional Learning Scale will be administered and participants will be given the opportunity to respond to open-ended questions about their knowledge, interest, and attitudes towards IPE. Analyses will seek to determine differences in readiness for interprofessional learning between different demographics groups (i.e. gender, year in program, program type, and specialty interest). Open-ended questions will be evaluated for themes by two or more raters. By assessing attitudes and readiness for IPE, future activities and educational opportunities can be developed at KCU. Furthermore, the study provides an avenue for students to give recommendations and feedback about what types of IPE opportunities they would like to see on campus.

ME2: Self-Reflections after an SP Encounter

Cindy Schmidt, Ph.D., Joseph Eickmeyer, D.O., Meghan Henningsen, D.O., Alex Weber, D.O., Amanda Pleimann, D.O., & Seth Koehler, D.O.

Most American physicians do not attend to the religious and spiritual needs of their patients. A key tenet of osteopathic medicine, most patients want their physicians to integrate their mind-body-spirit well-being. This qualitative study looked at first-year allopathic medical students' written self-reflections after having discussed a religious issue during a Standardized Patient (SP) encounter. Methods: Using content analysis, we identified themes and subthemes relating to any impact of the students' own religion on their comfort with this discussion; whether their comfort changed during the discussion; and what they learned from the encounter. Results: Most students said that being religious positively impacted their comfort with this discussion, regardless of their own religious tradition. Twelve percent of students were uncomfortable,

however, and some of them indicated it was due to their own lack of religiousness. Twenty percent of students experienced a change in their comfort (i.e., became uncomfortable) while discussing the religious issue, and 5% became more comfortable. In terms of their overall learning, most students said the encounter improved their communication skills overall, and their listening skills, in particular. Discussion Personal religious beliefs among these medical students contributed to their comfort with discussing a SP case's religious issue, though the beliefs did not need to bear similarity to those of the SP case. In addition to this specific learning about discussing a religious issue, students' reflections indicate a more general learning that the SP encounter helped them improve their listening skills.

Oral Presentations

10:10 - 10:25am: OMT in the Diagnosis and Treatment of an Atypical Migraine

Nicole Fremarek, MBA, OMS-IV & Kevin Treffer, DO, FACOFP

Migraines, an extremely prevalent and burdensome diagnosis, affect one in six Americans. Migraines can be genetic, idiopathic, or iatrogenic in nature, have a variety of presentations, and are often broken down into two categories: with and without aura. Patients' complaints include, but are not limited to: generalized pain, photophobia, phonophobia, numbness, tingling, weakness, ENT symptoms, and neck tension. Current treatments for migraines include lifestyle modifications, avoidance of triggers, over the counter medications, and prophylactic and/or symptomatic pharmacologic treatments. In addition, some alternative medicine options are recommended like acupuncture, massage therapy, or vitamin and mineral supplementation; however, osteopathic manipulative treatment is often overlooked as an option. This case report demonstrates the benefit of integrating osteopathic practices and principles into the management of migraine patients' care. By decreasing somatic dysfunction, osteopathic manipulative medicine can reduce the severity and frequency of migraines, alleviate symptoms, and improve the overall quality of life in migraine sufferers.

11:00 - 11:30am: Death of Dopaminergic Neurons in Parkinson's Disease: Is Calcium the Culprit?

Asma Zaidi, PhD, Sidrah Sheikh, Shaneisha Williams, & Paul Ramlow, MS

Parkinson's disease (PD) is associated with a selective loss of dopaminergic (DA) neurons in the subtstantia nigra (SN). Although the mechanisms underlying cell death remain unclear, disruption of neuronal Ca2+ homeostasis has been strongly implicated. DA neurons possess a unique spontaneous firing activity which brings in extracellular Ca2+. The high affinity Ca2+ transporter called the plasma membrane Ca2+-ATPase (PMCA) counteracts this influx by pumping Ca2+ out of neurons and maintaining a 106 - fold gradient across the plasma membrane, crucial for neuronal survival. Our previous studies demonstrated a significant decline in the activity and protein levels of the synaptic PMCA with increasing age. In the current study, we assessed the biochemical characteristics of PMCA in post-mortem human brain samples from PD patients and age-matched controls (n = 12). Our results show statistically significant region-specific differences in PMCA between the SN, frontal cortex (FC), and cerebellum (CBM). Endogenous PMCA activity in SN was significantly lower (61%, $p<0.002$) compared to FC and (65%, $p<0.002$) compared to CBM. The PMCA protein levels in SN were less (25%, $p <0.02$) compared to FC and CBM. Further reduction in PMCA activity and protein levels were observed in the SN from PD samples compared to age-matched controls (45% less activity,

p<0.02 and 15% less protein, p<0.007). Low levels of endogenous PMCA in DA neurons and further decline in the diseased brain coupled with hyperactive Ca2+ influx is likely to predispose DA neurons to high risk for Ca^{2+}- overload and subsequent toxicity and cell death.

2:10 – 2:25pm: scaRNA1 Levels Alter Pseudouridylation in Spliceosomal RNA U2 Affecting Alternative mRNA Splicing and Embryonic Development

Chloe K. Nagasawa, Douglas C. Bittel, PhD, Nataliya Kibiryeva, MD, Jennifer A. Marshall, & James E. O'Brien, MD

Vertebrate embryonic development is complex and dynamically regulated, yet only partially understood. Over the last few years there has been a growing interest in understanding the role alternative mRNA spicing plays in regulating developmental and pathological processes. Messenger RNA splicing is carried out by a multimegadalton ribonucleoprotein complex, the spliceosome, composed of 5 snRNAs (small nuclear RNAs) and multiple proteins. Small noncoding cajal-body specific RNAs (scaRNAs) biochemically modify (i.e. pseudouridylation, methylation) snRNAs and are essential for proper spliceosomal function. Our previous research suggested biochemical modifications directed by scaRNAs altered mRNA splicing and significantly impacted development. One of those scaRNAs, scaRNA1, is responsible for pseudouridylating nucleotide U89 of snRNA U2. Pseudouridylated nucleotides are highly conserved across species and located in functionally important areas of the spliceosome, suggesting that they are essential for proper mRNA splicing. Here, we present evidence that changes in scaRNA1 expression are accompanied by altered levels of pseudouridylation, leading to changes in mRNA splicing and altered development. These experiments support a new model in the regulation of embryonic development that is unappreciated and needs further investigation.

2:35 – 2:50pm: Platelet Proteolytic Machinery in Alzheimer's Disease: A Comparative Analysis

Roy Muriu B.S., Jessica Sage B.S., & Abdulbaki Agbas, MSc., Ph.D.

The protein proteolytic systems (PPS) that include the ubiquitin-proteasome system and double membrane-mediated autophagy have been reported as essential for quiescent or activated platelet hemostasis and thrombotic activity. Since the rising interest of biomarkers in Alzheimer's Disease (AD), there's a determined positive correlation of elevated Tar DNA/RNA binding Protein-43 (TDP-43), formerly found post mortem, in AD brain tissue samples and platelet homogenates. Therefore, we hypothesize that the accumulation of TDP-43 is associated with a functional and quantitative flux in PPS of age-matched AD and healthy (control) subjects. By implementing a case-control study of the two groups, we have quantified

their respective autophagy markers and plan to complete a functional assay for the proteasome. In regard to autophagy, platelet supernatant proteins are examined using SDS gel electrophoresis (4-20%) coupled with a standard Western blot and densitometric analysis. but for proteasome activity, Enzyme Linked Immunosorbent Assay results will be obtained. The final data indicates an increase of selected autophagy induction proteins, microtubule-associated light chain 3- (LC3)-βII, LC3-βI, p62, ATG 5, and Beclin-1, from AD samples (n=9) compared to the healthy (control) samples (n=9). On the contrary, preliminary proteasome data reveals a suppressed system. The significant protein changes could be an indefinite attempt to eliminate the unwanted, hyperphosphorylated proteins (i.e TDP-43, etc.) once the proteasome mediated degradation is suppressed. These results further elucidate a connection between platelet proteostasis and development of Alzheimer's Disease.

3:25 – 3:40pm: Impact of Congestive Heart Failure on Short-Term In-Hospital Outcomes for Patients with Acute Traumatic Brain Injury

Andrew Dang, BS, Derek Schirmer, BA, Russell Arellanes, BS, Eugene Ismailov, BS, Tatum Colburn, MS, Zakary Rose-Reneau, MS, & Barth Wright, PhD

Background: Congestive heart failure (CHF) is associated with impaired neurocognitive recovery in acute traumatic brain injury (TBI) patients. Previous studies have explored predictors of poor outcomes post-acute TBI. However, there is sparse amount of literature that exists reporting the impact of CHF on patient outcomes in this population. This study aims to further investigate the effect of CHF on short-term in-hospital outcomes for patients after acute TBI. Methods: This retrospective cohort study utilized the Nationwide Inpatient Sample to identify patients (18+) from 2012-2015 with a primary diagnosis of acute TBI. ICD-9 codes were used to identify patients with concomitant CHF and to exclude any patients with prior history of TBI, diabetes insipidus, or missing identifiers (age, gender, death). Data analyses assessed length of stay (LOS), total hospital charges, age of admission and mortality. Results: Of the 26,628 with a primary diagnosis of acute TBI, 1,319 patients were pre-disposed with CHF. In comparison to patients without CHF, significant increases were observed in the CHF group: • Increased LOS (4.39 vs. 5.41 days,$p<0.0001$) • Increased total charges ($53,335.44 vs. $62,489.30,$p<0.0001$) • Increased mortality (1.0% vs. 4.9%,$p<0.0001$). • Increased age at admission (50.5 vs. 76.9 years,$p<0.0001$). Conclusions: Patients with concomitant CHF who are diagnosed with acute TBI suffer from increased LOS, total charges and mortality. The results of this study can aid clinicians in making clinical decisions within this population. Limitations include inability to determine severity of CHF. Peri-procedural optimization of symptomatic patients is one potential avenue to reduce LOS, total charges, mortality and improve patient outcomes.