RUSH

Trainee Research Day

Thursday, March 16, 2023

Revised 03/09/2023

Trainee Research Day

Agenda-at-a-Glance

Thursday, March 16, 2023

Time & Location	Sessions
9 a.m. - 12:15 p.m. Room 539 AAC	Oral Presentation Awards
12:20 - 1 p.m. Room 539 AAC	Lunch Break
1 - 2 p.m. Room 540 AAC	Elevator Speech Finalists' Competition
2:30 - 4:30 p.m. Searle Conference Center	Poster Presentations • **Odd poster numbers**: 2:30 - 3:30 p.m. • **Even poster numbers**: 3:30 - 4:30 p.m.
5 - 6:30 p.m. Room 500, Main Lounge	Award Ceremony Reception *Pizza and drinks will be served.*

Poster Number: 1

Session: Poster Presentation

Category: Cancer

Trainee Rank: Rush Student GC: PhD

Jasmin Acosta, B.S. Biology

Jasmin C. Acosta (Rush University), Amy K. Stasik (Rush University), Janice M. Bahr (UIUC), Animesh Barua (Rush University)

Ovarian tumors escape anti-tumor function of NK cells by inducing cytokine inducible SH2-containing protein (CISH) expression and its inhibition prevents tumor progression

INTRODUCTION:Ovarian cancer(OVCA), a lethal malignancy of women, disseminates locally in the peritoneal cavity and local immune responses play important roles in inhibiting progression. Although NK cells recognize and exert anti-tumor immune responses, tumors progress to late-stages by inducing inhibitory receptors and cytokines. IL-15 stimulates NK cell function and persistent exposure induces CISH, an inhibitory receptor and a marker of NK cell exhaustion. It is unknown if ovarian tumors use this in their favor as tumors secrete enhanced levels of IL-15. Furthermore, dietary supplementation with root powder of Ashwagandha (ASH), a natural herb and anti-stress compound has shown to decrease the rates of OVCA metastasis and enhance intratumoral frequency of NK cells in a preclinical model. However, it is unknown if ASH supplementation improves NK cell frequency by inhibiting CISH. Goal:To examine if OVCA progresses by inducing CISH-expression in NK cells and if ASH supplementation reduces NK cell exhaustion by decreasing CISH expression. METHODS:Study 1-Exploratory study with clinical specimens including normal ovaries(n=5) and ovarian HGSC at early-and late-stages(n=5,each). Study 2-Prospective study using the laying hen model of OVCA supplemented with or without 2% ASH root powder for 90-days(n=7). Hen normal and tumor ovarian tissues were collected and both clinical and hen specimens were used for immunohistochemistry, immunoblotting and gene expression assays to determine the frequency of CISH-expressing NK cells and intensity of GRP78 expression(cellular stress marker). Data was analyzed and considered significant when $P<0.05$. RESULTS:CISH-expressing NK cells were localized in normal and tumor ovaries in women and hens. Compared with normal ovaries, frequency of CISH-expressing NK cells was significantly higher in tumors at early and late-stages in patients and hens. Similarly, strong expression of CISH was detected in tumor tissues and positively correlated with expression of GRP78. Compared with untreated, ASH supplementation reduced tumor progression in 5 of 7 hens and significantly decreased the frequency of CISH-expressing NK cells and GRP78 ($P<0.001$). CONCLUSION:The results of this study suggest that expression of CISH by NK cells and GRP78 were associated with OVCA progression and ASH supplementation reduced NK cell exhaustion by decreasing CISH and GRP78. Support:NIH-CA187309 and Swim Across America. Abstract previously presented at the AACR-2022 annual

Poster Number: 2

Session: Poster Presentation

Category: Cancer

Trainee Rank: Rush Student RMC: M2

Luciarita Boccuzzi, Biological Sciences

Shirlene Paul (Rush), Chelsea McPeek (Rush), Rosalinda Alvarado (Rush), Lisa Stempel (Rush), Mia Levy (Rush).

UPTAKE OF MRI AND ABUS IN PATIENTS WITHOUT A PERSONAL HISTORY OF BREAST CANCER (PHBC) CLASSIFIED AS "HIGH RISK"

INTRODUCTION: The American Cancer Society (ACS) recommends annual screening MRI in addition to mammography in patients without a personal history of breast cancer (PHBC) who are ages 25-75 with a Tyrer-Cuzick (TC) score greater than 20%. ABUS is also recommended for women with dense breasts. Here, we evaluate the uptake of supplemental MRI or ABUS in these high-risk patients. METHODS: Data was extracted from the EMR of an academic medical center for patients (ages 25-75) with a mammogram between 07/20/2020 and 07/19/2021 and a TC>20%. We assessed differences in demographics, access to healthcare, BIRAD score, breast density, and Tyrer-Cuzick (TC) in the patient populations that opted for supplemental MRI. A chi-squared analysis will be used to compare the groups: 1) No supplemental screening, 2) MRI supplemental screening, or 3) ABUS supplemental screening, or 4) Both MRI and ABUS. RESULTS: Of the 1144 patients with a TC>20%, 54% (n=618) underwent supplemental screening with either MRI (n=187), ABUS (n=311), or both (n= 120). 526 (46%) patients did not undergo supplemental screening. Patients with a high-risk breast cancer provider (HRBC) were more likely to undergo MRI (59%) compared to those without a HRBC (44%). Those who did not have an HRBC mostly underwent ABUS (90%). Patients with a HRBC most frequently underwent combined MRI and ABUS supplemental screenings (68%) (p-value <0.001). CONCLUSIONS: Over 50% of women without a HRBC who are at high-risk for breast cancer underwent some form of supplemental breast cancer screening. Access to a HRBC may be a contributing factor to choosing supplemental MRI versus ABUS. Patients with a HRBC provider were more likely to undergo MRIs, and combined imaging studies of MRI and ABUS compared to ABUS alone. Patients may still be faced with challenges, including having access to a HRBC, having adequate insurance coverage, and language barriers.

Poster Number: 3

Session: Poster Presentation

Category: Cancer

Trainee Rank: Rush Student CHS: Masters

Kelsey Bognar, B.S. Community Health, B.S. Dietetics

Kelsey Bognar (Rush); Heidi O'Brien (Rush); and Daniel Vela (Rush)

THE PREVALENCE OF MALNUTRITION AMONG ADULT CANCER PATIENTS AT RUSH UNIVERSITY MEDICAL CENTER

INTRODUCTION Cancer-related malnutrition (CRM) has been shown to negatively affect performance status, clinical outcomes, and immune function. The prevalence of CRM ranges from 20% to 80%; however, it is often not assessed upon diagnosis or evaluated during treatment. This study aims to investigate the prevalence of malnutrition in patients with different types of cancer at Rush University Medical Center (RUMC). METHODS A retrospective analysis of 2406 adult patients treated for cancer in 2021 was conducted. Data was collected from the RUMC Cancer Registry and Epic. Demographics and primary tumor site were collected from the Cancer Registry. Malnutrition was determined through documented Subjective Global Assessment (SGA) score and/or ICD-10 malnutrition diagnosis code. A frequency distribution was used to determine the prevalence of malnutrition among patients at RUMC with different types of cancer. RESULTS The mean age of the study population was 61.82 (SD±14.8), with 43.1% males (n=1037), 56.9% females (n=1368), and 0.0% trans (n=1). The mean body mass index (BMI) was 28.91 (SD±7.3). Of all, 28.6% were found to have malnutrition (n=688), which was higher among males (34.9%) than females (23.8%). Among patients with gastrointestinal cancer (n=331), 53.5% had malnutrition, while 50.3% of patients with head and neck cancer (n=151) had malnutrition. Of individuals with cancer classified as other (n= 36), 50% had malnutrition. Among adults with hematological cancer (n=236), 43.6% had malnutrition. Individuals with thoracic cancer (n=327), consisting of primarily lung cancer, 38.2% were diagnosed with malnutrition. Patients with gynecological (n=176) and urological cancers (n=343) had relatively similar malnutrition rates, 19.3% and 18.1%, respectively. The rates of malnutrition among those with neurological (n=72) and musculoskeletal (n=63) cancer were also comparable, 34.7% and 28.6%, respectively. The lowest rates of malnutrition were observed among patients with endocrine (n=80), breast (n=493), and skin (n=98) cancers, 8.8%, 7.7%, and 5.1%, respectively. CONCLUSION Malnutrition rates vary among the RUMC patient population. Patients categorized as having head and neck and gastrointestinal cancers had the highest rates of malnutrition, while those with endocrine, breast, and skin cancers had the lowest rates of malnutrition. This data may inform the need for prioritizing nutrition interventions among high-risk cancer primaries.

Poster Number: 4

Session: Poster Presentation

Category: Cancer

Trainee Rank: Rush Student CHS: BS

Neil Buac, BS

Gayathri Vijayakumar, BS, Emma M. Steffer, BA, Neil P. Buac, BS, Matthew W. Colman, MD, Steven Gitelis, MD, Alan T. Blank, MD, MS Author Affiliations Department of Orthopedic Surgery, Division of Orthopedic Oncology, Rush University Medical Center; Chicago, Illinois

EVALUATION OF ABSOLUTE NEUTROPHIL COUNT IN THE PERIOPERATIVE SETTING OF SARCOMA RESECTION

INTRODUCTION Limb salvage surgery (LSS) is the preferred surgical treatment of bone sarcomas. Preoperatively, many patients receive chemotherapy and may develop neutropenia. No study has evaluated the effect of low preoperative absolute neutrophil count (ANC) on postoperative outcomes following LSS. METHODS This was a retrospective review of 114 patients who underwent LSS for bone sarcoma from 2010 to 2020. Preoperative lab values were analyzed by logistic regression to identify the risk of developing surgical complications within 30 days, surgical site infection (SSI), and reoperation. RESULTS Three (2.6%) patients experienced a surgical complication within 30 days. Twelve (10.53%) patients experienced postoperative SSI. Twenty-nine (25.4%) required reoperation. Preoperative ANC was not a significant predictor of surgical complications within 30 days, SSI, or reoperation. The only independent predictor of worse overall survival was the presence of pathologic fracture at time of surgery. CONCLUSIONS This is the first study to evaluate preoperative ANC on postoperative outcomes following LSS. We report no significant differences in surgical complications within 30 days, SSI or reoperation with low preoperative ANC. Future studies with larger cohorts of neutropenic patients are needed to evaluate these outcomes as our cohort had very few neutropenic patients due to selection bias.

Poster Number: 5

Session: Poster Presentation

Category: Cancer

Trainee Rank: Rush Student RMC: M2

Joshua Condon, B.S Biochemistry, M.S Biomedical Sciences

J Condon, DJ Gulizia, B Khalili, R Rehan, D Tabriz, K Madassery, UC Turba, B Arslan, and J Tasse. All affiliated with Rush University.

Y90 RADIOEMBOLIZATION OF FIBROLAMELLAR HCC: EXPANDING TREATMENT ALGORITHMS

PURPOSE: Fibrolamellar hepatocellular carcinoma (flHCC) is a rare primary liver malignancy most commonly found in young patients without a history of underlying liver disease. Transarterial radioembolization (TARE) using Yttrium-90 (y90) has robust data and widespread usage as a targeted therapy of both primary and metastatic liver tumors. To date, few studies have evaluated the safety and efficacy of y90 in the management of the fibrolamellar variant of HCC. Here, we aim to report our experience in the management of flHCC with the use of y90 radioembolization. METHODS: This is a single-center retrospective review of patients with biopsy-proven primary FLHCC who underwent selective TARE of hepatic lesions at our institution between 2018-2021. The primary outcome measured was local tumor control, with secondary outcomes including overall survival, complication rate requiring intervention, and downstaging and conversion to surgical candidacy. RESULTS: A total of 8 patients underwent TARE for primary flHCC lesions over 10 separate procedures, each treating a unique lesion. Median patient age at treatment was 20.5 years (range, 9-36 years old). No patient had a history of underlying liver disease. To date, median length of follow-up is 496 days and a mean follow-up of 391 days (range, 27-1000). Of the 10 separate treatments, one lesion was excluded due to death of the patient unrelated to the treatment prior to adequate imaging follow up. By mRECIST criteria, 55.6% (5/9 lesions) showed complete response (CR), 22.2% (2/9 lesions) partial response (PR), 22.2% (2/9 lesions) stable disease (SD). Complete local control of disease was 100% (9/9 lesions), defined as lesions within mRECIST grades CR, PR, and SD. No immediate complications occurred. One patient developed a hepatic abscess 6 months after radioembolization which required percutaneous drainage catheter placement. Of the 8 patients treated, 2 were downstaged and converted to surgical candidates, undergoing liver resection at 104 and 432 days after radioembolization. Three patients have expired. CONCLUSION: Y90 embolization appears to be safe and may be an effective, adjunctive treatment option of unresectable flHCC lesions. It may also be an effective therapy to convert patients into candidates for surgical resection. More studies with larger patient cohorts are necessary.

Poster Number: 6

Session: Poster Presentation

Category: Cancer

Trainee Rank: Clinical Resident

Alison Coogan, MD

Alison Coogan (Rush), Lilia Lunt (Rush), Cristina O'Donoghue (Rush), Andrea Madrigrano (Rush)

Targeted Axillary Lymph Node Dissections Using Radar Reflector Localization Safely Placed Prior to Neoadjuvant Chemotherapy

INTRODUCTION Targeted axillary dissection (TAD) is a surgical strategy for breast cancer that involves staging the axilla through sentinel lymph node biopsy (SLNB) combined with the removal of a biopsy-proven positive lymph node identified by a clip. TAD reduces the false negative rate of SLNB alone in patients with clinically detected nodal metastasis who receive neoadjuvant chemotherapy (NAC) while avoiding axillary lymph node dissections (ALND). Radar reflector-localization (RRL) can be used to identify previously positive nodes and safely and effectively guide dissection. METHODS We performed an institutional retrospective chart review of breast cancer patients with clinical stage T1-3 and N1-3 disease treated with NAC from 2015 to 2020 who had a biopsy proven positive node and underwent TAD using RRL. The primary outcome was the retrieval of clipped node as documented by gross visualization or specimen radiography. Secondary outcomes included pathologic complete response rates and completion axillary lymph node dissections (cALND). RESULTS 79 patients were identified who fulfilled inclusion criteria. 32 (40.5%) had RRL markers placed prior to chemotherapy (mean 187 days prior to surgery) and 47 (59.5%) had RRL markers placed following the completion of chemotherapy (mean 7 days prior to surgery). The clipped node was retrieved in 77 patients (97.5%). 32 of the 34 ypN0 (i+) patients avoided an ALND; One underwent cALND due to inability to identify the Savi reflector or clip in the OR, and one due to inability to identify a lymph node by TAD although zero nodes were then found in the ALND specimen. There was no significant difference in clip recovery rates in the pre vs post NAC RRL groups (p=1.00). CONCLUSION RRL systems are an effective way to guide TAD with a high success rate in identifying and removing previously biopsied nodes. These markers can be placed prior to NAC without migration or deactivation.

Poster Number: 7

Session: Poster Presentation

Category: Cancer

Trainee Rank: Rush Student RMC: M3

Carter Do, MD

Carter Do, Kevin Toolan, Ankica Braun, Paolo Gattuso, Rosalinda Alvarado (all Rush)

Encapsulated Papillary Carcinoma without Concurrent Breast Cancer in an Axillary Lymph Node

Papillary carcinoma is a rare type of invasive ductal carcinoma that typically does not metastasize to the lymph nodes. Even rarer is the presence of papillary carcinoma in the axillary lymph node without concurrent breast carcinoma. Our case features components that are suggestive of epithelial rest playing a role in our patient's pathogenesis. Our patient is a 65-year-old female who presented to the breast surgeon for an evaluation of the right breast. The patient has a history of intraductal papilloma without atypia, found to be a benign lymph node with epithelial inclusion six years ago. She remained stable for four years until a slow growing lump was forming bringing her to the clinic. A core needle biospy of the axillary mass showed intraductal neoplasm with associated atypia. Immunohistochemical staining showed a loss of staining for cytokeratin 5 and smooth muscle actin, whereas estrogen receptor showed strong diffuse staining. This suggest a diagnosis of encapsulated paillary carcinoma arising in an intraductal papilloma with a lymph node.

Poster Number: 8

Session: Poster Presentation

Category: Cancer

Trainee Rank: Rush Student RMC: M2

Madeline Floodstrand, BA, MS

Shirlene Paul (Rush), Chelsea McPeek (Rush), Rosalinda Alvarado (Rush), Lisa Stempel (Rush), Mia Levy (Rush)

UPTAKE OF BREAST MRI SCREENING IN PATIENTS WITH PERSONAL HISTORY OF BREAST CANCER

INTRODUCTION: In 2018, the American College of Radiology (ACR) changed screening guidelines for patients with a personal history of breast cancer (PHBC). Prior to 2018, only PHBC patients with a known genetic mutation (KGM) were recommended supplemental MRI. Now, annual MRI is also recommended for PHBC patients diagnosed before age 50 and those with dense breasts. This change in screening recommendations will drastically increase the volume of patients eligible for supplemental screening with MRI. These new guidelines are expected to have positive implications for these patients, as MRI is a more sensitive screening modality which allows for the earlier detection of mammographically occult breast cancer. This project will evaluate the extent to which these new guidelines impact eligibility for supplemental screening in addition to what differentiating factors may affect the utilization of MRI in this newly eligible population. METHODS: Data from 07/20/2020 to 07/19/2021 was extracted from the EMR. Patients included were aged 25-75 with a PHBC and either dense breasts, diagnosis before age 50, or KGM. The data was grouped into cohorts based on demographics, risk qualification (breast density, diagnosis before age 50, or KGM), insurance type, high-risk provider, and screening location. MRI utilization for all cohorts was analyzed. Cohort-comparative utilization statistical analysis is in progress. RESULTS: Data from 929 patients were analyzed, of which 664 (71.5%) had dense breasts and 541 (58.2%) were diagnosed before age 50. Only 65 (7%) had a known genetic mutation, representing those that qualified for MRI before 2018 guidelines changes. Overall, this represents a 14-fold increase in the number of patients eligible for supplemental screening with MRI. 325 (35%) patients received the recommended supplemental MRI, while 604 (65%) did not. CONCLUSION: The population now eligible for supplemental screening with MRI as a result of the 2018 ACR guidelines has increased 14-fold. Differences in MRI uptake based on patient characteristics will guide future interventions that can increase utilization of this highly sensitive screening modality in order to increase early detection and treatment success of new or recurrent cancer in this high-risk population.

Poster Number: 9

Session: Poster Presentation

Category: Cancer

Trainee Rank: Rush Student GC: PhD

Eileena Giurini, MS

Eileena F Giurini (RUMC); Kajal H Gupta (RUMC)

BREAST CANCER CELLS SUBJECTED TO METABOLITE SCREENING EXHIBIT LIMITED CYTOTOXICITY AND CELL-CYCLE MODULATORY EFFECTS

INTRODUCTION Chemotherapy has presented a number of difficulties throughout the years despite being a staple in many cancer treatment plans. These obstacles include the cytotoxicity to non-cancerous tissue, the development of resistance to these treatments, and problems with drug transport brought on by the irregularities in the tumor-associated vasculature. Novel anticancer therapies need to be researched further to overcome these difficulties that are frequently encountered with conventional chemotherapy treatment. Here, the potential anticancer capabilities of seven small-molecule microbial metabolites were examined to mitigate the drawbacks of traditional chemotherapeutics. METHODS For cytotoxicity screening of the selected metabolites, murine triple negative breast cancer cells (TNBC) 4T1, human TNBC MDA-MB-231, and non-cancerous HEK cells were treated with 20 µM of various metabolites (C1-7), doxorubicin, or tamoxifen. All cells were treated for 24 or 48 hours, and lactate dehydrogenase release into the culture medium was subsequently measured using the CyQUANT LDH Cytotoxicity Assay (Thermo-Fisher). Metabolites were further analyzed to study their role in cell cycle regulation, 4T1 or human ER-positive cell line MCF-7 were treated with 20 µM of C3, C5, C7, or PBS and incubated for 24 hours. Cells were then stained with Vybrant DyeCycle Violet Stain (Invitrogen), as per manufacturer's instructions. RESULTS In 4T1, MDA-MB-231, and HEK cell lines, treatment with C1-C7 did not exert a cytotoxic effect at 24 or 48 hours of treatment compared to PBS-treated cells. As expected, however, doxorubicin demonstrated potent cytotoxic effect in all three cell lines, in a time-dependent manner. Tamoxifen treatment had marginal cytotoxicity in the TNBC cell lines. Though not cytotoxic, compound C3 significantly increased the percentage of 4T1 and MCF-7 cells in S-phase while decreasing the percentage of cells in mitotic phase compared to PBS, suggesting C3 may "halt" the cell cycle from proceeding. CONCLUSION From these studies, C3 appears to have the most promising potential as an anticancer agent, in that it does not demonstrate cytotoxic effects on non-cancerous cells yet modulates the cancer cell cycle in a manner that may position it as a cytostatic anticancer compound.

Poster Number: 10

Session: Poster Presentation

Category: Cancer

Trainee Rank: Rush Student GC: PhD

Waddell Holmes, MS

Waddell Holmes, Shreya Patel; Marcus Winogradzki; Ahmad Othman; Jitesh Pratap

THE NOVEL CONTROL MECHANISM OF THE TUBULIN CODE AND VESICULAR TRAFFICKING IN BREAST CANCER BONE METASTATIC CELLS

INTRODUCTION: Bone metastasis of breast cancer (BC) results in severe bone loss and death. The crosstalk between BC cells and bone resident cells increases osteoclast activity, resulting in the release of growth factors from the bone matrix that causes aggressive tumor growth. A potentially important aspect of this process is vesicular trafficking on microtubules (MTs) which can affect the output of signaling pathways and secretory activity of metastatic cells. MTs are composed of heterodimers (α- and β-tubulin). The tubulin isotypes and their variety of post-translational modifications (PTMs, such as acetylation) control the properties and functions of MT filaments, a concept known as the 'tubulin code'. Recent studies show a link between alterations of the tubulin code with poor prognosis of BC. Tubulin acetylation occurs via αTAT-1 and can be reversed by histone deacetylase-6 (HDAC6). MTs lacking acetylation are prone to breaks following repetitive bending during vesicular trafficking. However, the regulation of the tubulin code and its impact on vesicular trafficking are unknown. METHODS: We utilized western blots, immunoprecipitations (IPs), immunohistochemistry, and confocal microscopy to examine the protein levels and their subcellular distribution of endosomal vesicles in BC cells, primary and bone metastatic breast tumor samples. RESULTS: We found that HDAC6 interaction with α-tubulin is inhibited by a Runt-related factor (Runx2). We previously reported that Runx2 promotes bone metastasis. Our biochemical, mass spectrometry and IPs analyses of MTs revealed that loss of Runx2 can reduce (i) acetylation and stability of MTs, (ii) interaction of HSP90 with α-tubulin, and (iii) levels of β 2a-tubulin isotypes, (iv) subcellular distribution of early endosomal proteins. We found that loss of Runx2 sensitizes breast cancer cells to MT targeting chemotherapeutics and reduces the secretion of IL-6. CONCLUSION: These findings suggest (i) a novel control mechanism of MTs stability via Runx2-HDAC6 interactions that can impact trafficking and cell function, and (ii) that inhibition of Runx2 may sensitize tumors to MT targeting agents. Our studies show that Runx2 and MTs stability levels may serve as potential markers to help stratify patients and targets for effective treatment for bone metastatic disease.

Poster Number: 11

Session: Poster Presentation

Category: Cancer

Trainee Rank: Rush Student RMC: M2

Laura Kasper, MPH

Laura Kasper MPH, Alison C Coogan MD, Lilia G Lunt MD, Andrea Madrigrano MD, Matthew Dixon MD, Cristina O'Donoghue MD MPH Rush University Medical Center, Chicago IL, USA

COMPARING THE LIKELIHOOD OF RECEIVING NEOADJUVANT CHEMOTHERAPY FOR BREAST CANCER ACROSS THE URBAN-RURAL CONTINUUM

INTRODUCTION: Neoadjuvant chemotherapy (NAC) has shown promise for certain types of breast cancer to improve outcomes and reduce recurrence of disease. This study seeks to determine whether differences exist in the rates that breast cancer patients receive NAC versus surgery first based on area of residence. METHODS: The National Cancer Database (NCDB) was queried for women with a diagnosis of breast cancer where NAC is considered (inflammatory breast cancer, node positive disease, HER2 positive with tumor stage >T1c, triple negative with tumor stage >T1c, stage III ER positive) between 1 January 2004 - 31 December 2019. Analyses were stratified according to histopathologic subtype and geographic location as defined by the NCDB. RESULTS: Of the 385,396 NAC-eligible patients with known treatment, 43.76% received NAC and 56.24% had surgery prior to any additional therapies. In rural areas, patients were more likely to have received surgery first (60.91%) as opposed to NAC (39.09%), which was statistically significant ($p<0.0001$). In large metro areas, there was a greater proportion of patients receiving NAC than surgery first in all subtypes except for those with node positive disease. Cases with any node positive disease, HER2 positive with tumor stage >T1c, triple negative with tumor stage >T1c, and stage 3, ER positive cancer were all found to have statistically significant ($p<0.0001$) difference in treatment across the urban-rural continuum. The likelihood of receiving surgery as opposed to NAC increased in those with triple negative breast cancer with >T1c tumors as location became farther from a metro center (55.67% large metro, 61.16% urban adjacent to metro, 62.67% rural). A similar trend was also observed in patients with HER2 positive breast cancer with >T1c tumors (60.85% large metro, 61.16% urban adjacent to metro, 68.35% rural). There was no difference in receipt of NAC for inflammatory breast cancer. CONCLUSIONS: Patients with breast cancer who are eligible for NAC treatment receive it at a lower proportion in rural areas than those in metropolitan cities. Future studies are needed to determine whether this treatment difference influenced clinical outcomes of the patients.

Poster Number: 12

Session: Poster Presentation

Category: Cancer

Trainee Rank: Clinical Resident

Sarah Keshwani, MD

Sarah Keshwani, MD (Rush) - presenting/first author Alison Coogan, MD (Rush) Andrea Madrigrano, MD (Rush)

ANALYZING REASONS FOR DELAY IN TIME TO TREATMENT FOR BREAST CANCER

INTRODUCTION: Delays in breast cancer treatment are associated with poorer outcomes and decreased overall survival. The goal of this study was to analyze clinical factors impacting the time to treatment in breast cancer patients. METHODS: After IRB approval was obtained, a retrospective chart review was performed of 245 female patients who met the inclusion criteria with stage I-III breast cancer at a single institution from 2015-2020. Delay in treatment was defined as greater than 60 days from diagnosis to surgery or neoadjuvant chemotherapy. Basic statistical analysis was utilized. RESULTS: Mean time to treatment was 90.9 days, median was 77 days, mode was 62 days. Top three reasons for delay among all patients were: seeking second opinion (48.9%), need for additional imaging (11.8%), and ongoing medical issues requiring immediate care (11.4%). Patients were categorized based on time before treatment: 60-89 days (67.8% of patients), 90-119 days (21.2%), 120-364 days (11%), and >1 year (0.8%). The top reason for delay in treatment in every group was because they were seeking a second opinion. Other reasons for delay in the 60-89 days group were need for additional imaging (13.9%) and insurance approval or difficulties with transportation (9.6%). In the 90-119 days group the next most common reasons for delay were ongoing medical issues (21.1%) and financial/insurance issues (11.5%). In the 120-364 days group, the second most common reason for delay was because the patients were unable to decide on their treatment plan (18.5%). The third major reason was ongoing medical issues (11.5%). There were only two patients who were treated after one year; one patient had concurrent CNS lymphoma that required treatment first and the second patient went on an extended vacation after her diagnosis. CONCLUSION: Patients who come from an outside institution seeking a second opinion is the most common reason for delay in cancer treatment as it takes time for review of outside exams and insurance authorization. Additionally, need for further imaging, other ongoing medical issues, and financial/insurance issues cause more postponements. Delays in treatment are multifactorial but understanding the reasons can help institutions become more cognizant and expedite the process.

Poster Number: 13

Session: Poster Presentation

Category: Cancer

Trainee Rank: Rush Student RMC: M2

Bobak Khalili, MS

D Gulizia, C Velagapudi, J Condon, B Khalili, R Riaz, D Tabriz, K Madassery, UC Turba, B Arslan, and J Tasse Interventional Radiology, Rush University Medical Center, Chicago, IL

Comparing Future Liver Remnant Growth Following Double Vein Embolization in Patients who are Surgically Naïve Versus those that have Undergone Prior Partial Left Hepatectomy

INTRODUCTION: Double vein embolization (DVE) of the liver is an emerging technique that induces hypertrophy of the future liver remnant (FLR) in patients with planned right/extended right hepatectomy for the treatment of primary or metastatic tumors to the liver. DVE is performed by embolizing both the ipsilateral right portal and hepatic veins prior to planned hepatectomy. In some instances, a smaller 1st stage resection involving resection +/- ablation of the left hepatic lobe tumors is required prior to DVE, with right/extended right hepatectomy occurring after DVE and appropriate FLR growth. We are investigating whether the staged approach insults the liver parenchyma and hinders FLR hypertrophy. METHODS: All patients who underwent DVE at our institution between 2017 and 2022 were reviewed. Liver volumetry was evaluated by CT or MR prior to and following DVE. Subsequent growth of FLR was calculated and compared between those who underwent liver resection only after DVE and those who underwent a surgical resection prior to liver embolization. RESULTS: A total of 18 patients underwent DVE. Thirteen patients received DVE prior to any liver resection, and five patients underwent a partial left hepatic tumor resection +/- thermal ablation prior to DVE. Mean patient age was 57 years. Median follow up imaging to assess liver growth was 16 days after DVE. Mean FLR volume increase was 264mL surgical naïve patients and 204mL for patients who underwent resection prior to DVE. The mean percentage of FLR to total liver volume (TLV) rose from 23.1% to 33.9% after embolization for the DVE-first cohort, compared with a rise of 20.5% to 28.6% for the resection-first group. Finally, the kinetic growth rate was 6.0% per week compared with 4.4% per week, respectively. All 13 DVE-first patients underwent subsequent extensive liver resection at a median of 19 days after embolization. Only 2/5 patients underwent the planned 2nd stage extensive liver resection in the partial hepatectomy-first cohort. CONCLUSION: This data suggests a liver resection and/or ablation prior to DVE may decrease the efficacy of the embolization procedure and subsequent FLR hypertrophy. More studies with increased sample sizes are needed for further evaluation.

Poster Number: 14

Session: Poster Presentation

Category: Cancer

Trainee Rank: Clinical Resident

Vaishnavi Krishnan, MD, MPH

Vaishnavi Krishnan (Rush); Christopher W. Seder (Rush); Ethan M. Ritz (Rush); Gillian C. Alex (Rush)

NUMBER OF LYMPH NODES EXAMINED IS ASSOCIATED WITH SURVIVAL IN PRIMARY PULMONARY SARCOMA

INTRODUCTION: Primary pulmonary sarcoma (PPS) is a rare malignancy that accounts for only 0.5% of all reported primary malignancies. Existing literature regarding PPS has been relatively limited to case series and the impact of management decisions on overall patient survival. Prior retrospective studies suggest a survival benefit from anatomic surgical resection and higher rates of nodal involvement in PPS than those patients with sarcoma of the extremities. This study seeks to determine if the number of lymph nodes examined in patients with resected PPS is associated with overall survival. METHODS: All patients who underwent lung resection for PPS between 2004 and 2018 were identified from the National Cancer Database. Only PPS patients with nodal and survival data available were included in this study. Patient demographics, date of surgery, number of lymph nodes examined and date of death or last known follow up were recorded. A cutpoint analysis was conducted to identify the optimal grouping of patients by number of nodes examined that corresponded with the most significant relationship with survival. Cox proportional hazard analysis was used to assess the association between the number of lymph nodes examined and overall survival. RESULTS: A total of 181 patients met inclusion criteria. The population was 64.6% male (117/181), 90.1% white (164/181), with a mean age of 62.2 years (SD 15.1). Median time from surgery to last follow-up or death was 37.5 months. The mean number of nodes examined was 5.3 (SD 6.7). Despite having no difference in age, sex, race/ethnicity, facility type, insurance or year of diagnosis, patients with >2 nodes examined demonstrated a better overall survival than those with <2 nodes examined (median 768 days (95% CI 500-1421) vs. 307 days (95% CI 161-442); p=0.005). Overall, number of lymph nodes examined was associated with overall survival (HR 0.97 (95% CI (0.94-0.99), p=0.023). CONCLUSION: In patients with resected PPS, number of lymph nodes examined is associated with overall survival.

Poster Number: 15

Session: Poster Presentation

Category: Cancer

Trainee Rank: Rush Student RMC: M2

Samantha Levin, BS

Shirlene Paul (Rush), Chelsea McPeek (Rush), Rosalinda Alvarado (Rush), Lisa Stempel (Rush), Mia Levy (Rush)

EVALUATING THE IMPACT OF NURSE NAVIGATION ON HIGH-RISK BREAST CLINIC APPOINTMENT UPTAKE IN A CANCER RISK ASSESSMENT PROGRAM

INTRODUCTION: Patients in the breast imaging center are offered comprehensive cancer risk assessment (CRA) using validated risk assessment models (Tyrer-Cuzick 8, GAIL, and NCCN guidelines for genetic testing) at the time of screening mammography. All patients who receive a high-risk breast cancer score are recommended to follow-up at the high-risk breast clinic (HRBC) to determine a personalized management plan including MRI screening, genetic testing, and treatment options. Insufficient communication and patient education regarding breast cancer screening contributes to low HRBC appointment uptake. Nurse navigation (NN) was used to increase the HRBC appointment completion rate. This project aims to assess the effect of NN on HRBC appointment uptake in patients with a high-risk of breast cancer. METHODS: Data regarding NN and HRBC appointment uptake for all women at a breast imaging center with a high-risk breast cancer score between July 2021 and January 2022 was extracted from the EMR and grouped into cohorts to assess the impact of NN on HRBC appointment completion. Primary race, primary language, and insurance status were also extracted to analyze the relationship between demographics and HRBC appointment completion. A chi-squared analysis was performed to assess the significance of the results. RESULTS: NN contact and HRBC appointment completion of 4090 patients were analyzed. Of the 4090 patients, 1787 (43.69%) were successfully contacted by a nurse navigator. Patients with a family history of breast cancer were more likely to have contact with the nurse navigator ($p = 0.0223$) and the distribution of breast cancer risk assessment models was different between patients who had contact with the nurse navigator and patients who did not have contact with the nurse navigator ($p = 0.0052$). Of the 4090 total patients, 122 (2.98%) attended the HRBC. Of the 1787 patients contacted by a nurse navigator, 80 (4.48%) completed HRBC appointments ($p < 0.0001$). CONCLUSIONS: Coupling NN with a CRA program at the breast imaging center increased the number of qualified patients who completed HRBC appointments who would not have been identified prior to this program. As a result, more patients will receive recommended supplemental screenings and management from a multidisciplinary care team.

Poster Number: 16

Session: Poster Presentation

Category: Cancer

Trainee Rank: Rush Student GC: PhD

Elizabeth Paris, B.A.

Elizabeth A. Paris (Rush University), James T. O'Donnell (Rush University), Sanjib Basu (Rush University), Janice Bahr (UIUC), and Animesh Barua (Rush University)

EARLY DETECTION OF HIGH-GRADE SEROUS OVARIAN CARCINOMA

INTRODUCTION Ovarian high-grade serous carcinoma (HGSC) is the most prevalent and lethal form of ovarian cancer (OVCA) and may originate in the fimbria of the fallopian tube. Most ovarian HGSC cases are detected in late stages when the tumor may be accompanied by ascites, metastasis, and poor survival rates. An effective early detection test is urgently needed to increase patient survival rates. The objective of this study was to develop a panel of serum markers to use in association with transvaginal ultrasound (TVUS) to predict early malignant and pre-metastatic ovarian HGSC. METHODS (1) Exploratory studies: Clinical specimen: Healthy subjects undergoing risk-reducing surgery (ages 40-60), ovarian tumors from HGSC patients at early and late stages (ages 60-70). Laying hens (4-year-old): normal hens, hens with fimbrial tumors, and hens with late-stage OVCA. (2) Prospective Study: Flock of 4-year-old hens with no detectable abnormality were examined at baseline (week 0) and monitored by TVUS and immunoassay (ELISA) at 10-week intervals for 60 weeks or until tumor development. Statistical differences were considered significant at $P<0.05$. Serum cutoff values were calculated as the mean normal value plus 2 standard deviations. RESULTS Mass spectrometry yielded a list of potential proteins with explicitly increased expression in ovarian HGSC compared to healthy controls. A 5-biomarker panel was established which included nuclear, cytosolic, and cell surface markers. Archived patient samples showed expression of all markers increased in association with ovarian HGSC. In hen exploratory studies, the 5-marker panel similarly increased with progression of ovarian HGSC. In the prospective study, serum markers increased in hens which developed ovarian HGSC. Further, expression level of markers was increased in serum prior to detection by TVUS, signifying microscopic tumor development. Serum expression of markers in microscopic and solid tumors was above established cutoff values. CONCLUSION Results showed increased expression of serum markers in patients with ovarian HGSC. Increase in serum marker expression was similarly observed in hens developing HGSC in a prospective study. This suggests that the proposed panel of markers may be indicative of malignant transformation leading to HGSC and therefore may lead to use in the detection of OVCA.

Support: NIH R01CA210370 (AB)

Poster Number: 17

Session: Poster Presentation

Category: Cancer

Trainee Rank: Rush Student GC: PhD

Shreya Patel, IBS Ph.D

Shreya Patel (Rush University) (presenting/first author), Marcus Winogradzki (Rush University), Waddell Homles (Rush University), Ahmad H. Othman (Northwestern University), Ryan Ross (Rush University), Jitesh Pratap (Rush University)

DISCOVERY OF A NOVEL TUBULIN ISOTYPE SWITCH IN MICROTUBULE CYTOSKELETON IN BONE CELL DIFFERENTIATION.

INTRODUCTION Differentiation of osteoblasts (OBs) and chondrocytes (CHs) is a highly dynamic process that regulates the secretion of matrix proteins. An extensive network of microtubules (MTs) supports the intracellular trafficking of cargo during secretion. Our results and published reports show that disruption of MTs can impact the differentiation potential of OBs and CHs. MTs are composed of heterodimers of α- and β-tubulins. The tubulin isotypes and a variety of post-translational modifications control the properties and functions of the MTs network, a concept known as the 'tubulin code' for specific cell types and functions. However, the tubulin code regulating the differentiation of OBs and CHs is still unknown. METHODS Cell lines- mouse OBs, CHs, and mouse IDG-SW3 OBs differentiation models Techniques- qRT-PCR, western blot analysis, immunofluorescence. RESULTS • Robust increase in the protein levels of TUB β2A, TUB β4A, TUB α4A, TUB α8, while decreased levels of TUB β6, TUB β3, TUB β5 during differentiation of osteoblast cells. • Significant increase in acetylation levels of the α-tubulin subunit of MTs during differentiation. • We found that silencing of the master regulator Runx2 yielded over a two-fold increase in expression for most tubulin isotypes and a significant reduction in acetylation on lysine 40 of the α-tubulin subunit. CONCLUSION • Higher TUBB2 and lower TUBB3 levels suggest a requirement for MT stability during OB differentiation. • Our data suggest that the differential expression of tubulin isotypes and their integration into the MT lattice can affect the dynamics of MTs and regulate the interactions with MT-associated proteins. • Our results showing Rux2-dependent increased Acetylation levels of α-tubulin suggests a novel role of Runx2 in protecting MTs from mechanical aging, in which MTs lose their flexural rigidity following repetitive bending due to vesicular trafficking. • Specific changes in tubulin isotypes and PTMs (Acetylation) revealed a tubulin code of differentiation to facilitate subcellular trafficking of matrix proteins. • Taken together, our novel findings broaden the current understanding of the regulatory mechanism of differentiation via discovering a novel Runx2 Dependent tubulin code reprogramming of MTs cytoskeletal of differentiating OBs.

Poster Number: 18

Session: Poster Presentation

Category: Cancer

Trainee Rank: Rush Student GC: PhD

Jessica Ramirez, MS

Jessica Ramirez (Rush University), Elizabeth Paris (Rush University), Sanjib Basu (Rush University), Animesh Barua (Rush University)

AGE-ASSOCIATED MOLECULAR CHANGES MAY PREDISPOSE THE OVARY TO MALIGNANT TRANSFORMATION LEADING TO OVARIAN CANCER (OVCA)

BACKGROUND: OVCA is a fatal female malignancy commonly associated with postmenopausal women. Thus, age-associated changes in women may predispose them to malignancy. Persistent high levels of follicle-stimulating hormone (FSH) are features of aging and we have shown that aging was associated with increased expression of inflammatory cytokine interleukin-16 (IL-16) and glucose-regulated protein (GRP78), a marker of cellular stress. Age-associated IL-16 and GRP78 expression increases could be implicated in the production of mutagenic 8-OXO-2dG, or its cognate enzyme OGG1, and malondialdehyde (MDA), and moreover markers of DNA damage repair mechanisms. Goal: to determine mechanisms of age-associated malignant transformation in the ovary. MATERIALS/METHODS: Exploratory study: Archived tissue specimens were selected for immunohistochemical, immunoblotting, genomic studies, and immunoassays based on the review of their hematoxylin and eosin staining and final pathological reports. Specimens: normal premenopausal (30-50-year-olds) and postmenopausal (55-85-year-olds) ovaries and ovarian high-grade serous carcinoma (HGSC). In vitro study: Cytoplasmic/nuclear fractions of human ovarian surface epithelium (HOSE) cells treated with or without FSH for 24 hours, and OVCAR3 (HGSC cell line) cells were extracted. Expression markers of inflammation (IL-16), oxidative stress (SOD2, GRP78), DNA adducts (8-OXO-2dG/OGG1, MDA) and epigenetics (HDAC1, gH2AX) were examined. Significant differences in the expression of different markers among different age groups and ovarian HGSC and treated or control OVCAR3 cells were determined by ANOVA and t-tests. RESULTS: Compared with premenopausal women, expression markers of inflammation, oxidative stress, DNA adducts, and epigenetic changes were significantly higher (<0.0001) in a subset of postmenopausal women. Patients with ovarian HGSC had similar expression patterns. Nuclear expression of mutagenic DNA adducts (OGG1, MDA) and inhibitor of DNA repair mechanism (GRP78) enhanced during aging. Thus, age-associated inflammation and oxidative stress are predispositions to malignant transformation. This assumption is based on the discovery that FSH-treated HOSE cells resulted in enhanced expression of the aforementioned markers, as reported in OVCAR3 cells. CONCLUSION: Expression of IL-16, GRP78, SOD2, 8-OXO-2dG/OGG1, MDA and HDAC1 increased in ovary during aging. Results suggest that aging is associated with persistent inflammation and oxidative stress in ovarian tissues, thus predisposing tissues to malignant transformation leading to OVCA development.

Support: NIH/NCI: CA210370. Abstract/Poster previously presented at AACR Aging and Cancer.

Poster Number: 19

Session: Poster Presentation

Category: Cancer

Trainee Rank: Rush Student GC: Masters

Zoriamin Rivera, MS

Zoriamin Rivera (Rush); Mary Beth Madonna (Rush); Kajal H Gupta (Rush)

Identification of Cancer Biomarkers in Neuroblastoma Patients through RNA Sequencing

INTRODUCTION: Neuroblastoma (NB) is a form of cancer that arises in children under the age of 5 because of mutations in immature nerve cells called neuroblasts. Development of the resulting tumor begins near the adrenal glands, abdomen, chest, or nerve tissue near the spine, but may metastasize to other parts of the body including the lymph nodes, bone marrow, liver, skin, and bones. Analysis of samples taken from NB patients can identify important biomarkers and determine novel therapeutic targets. METHODS: Neuroblastoma tumor samples were obtained from a paraffin preserved slides. Tumor samples were extracted from the slides and RNA isolation was performed by standard kits. Purified RNA samples were sent for RNA sequencing at RUSH genomic core. The resulting data was sorted by relative fold change to determine the most relevant genes in terms of increases and decreases in expression of respective gene were studied in relation to control. From the 17,224 genes that were identified to have expression, the top 60 genes were analyzed to determine their role in development of cancer. RESULTS: Only one gene was discovered to be relative overexpressed in contrast to control among the 60 genes with the largest change in gene expression. The remaining 59 genes had lower levels of expression compared to controls. Additionally, it was discovered that 12 genes had anti-tumor effects, whereas 32 genes were shown to have pro-tumor effects in the development of a variety of cancers. It was discovered that the 16 additional genes did not contribute to the emergence of cancer. Analysis has revealed that numerous genes, including Ras (Rat Sarcoma Virus), FAK (Focal Adhesion Kinase), and mTOR (Mammalian Target of Rapamycin), have been connected to numerous cancer pathways. CONCLUSION: Pro- and anti-cancer genes have significantly been found to be upregulated and downregulated using RNA Seq in the neuroblastoma patients. The tumoral function of these genes has been demonstrated by pathway analysis, and they may serve as biomarkers in the development of novel therapies for NB and other malignancies that are connected to it.

Poster Number: 20

Session: Poster Presentation

Category: Cancer

Trainee Rank: Rush Student RMC: M2

Olivia Sandhu, Bachelor of Science

Alison Coogan MD, Lilia Lunt MD, Cristina O'Donoghue MD MPH, Olivia Sandhu BS, Yanyu Zhang MS, Andrea Madrigrano MD

SCREENING PRACTICES FOR BREAST AND NON-BREAST CANCERS IN HIGH-RISK MUTATION CARRIERS

INTRODUCTION: High-risk patients with pathogenic germline mutations have increased cancer screening guidelines. This study examines the current National Comprehensive Cancer Network (NCCN) screening practices for cancers in mutation carriers. METHODS: An institutional retrospective chart review of patients with known BRCA1, BRCA2, ATM, CHEK2, BARD1, BRIP1, PALB2 mutations were identified. Recommended screening based on NCCN guidelines for each mutation for breast and non-breast cancers were analyzed. RESULTS: Of 659 total patients analyzed, 253 had a BRCA2 mutation, 220 had a BRCA1 mutation, 58 had a PALB2 mutation, 51 had an ATM mutation, 48 had a CHECK2 mutation, 14 had a BRIP1 mutation, and 10 had a BARD1 mutation. Of eligible BRCA1 mutation carriers; 55% received at least half of recommended screening breast imaging. 27 of these patients had a family history of pancreatic cancer; of which only 2 (7%) were screened. Of eligible BRCA2 mutation carriers; 51% received at least half of recommended screening breast imaging. 54 of these patients had a family history of pancreatic cancer; 14 (26%) were screened. Of eligible ATM mutation carriers; 43% received at least half of recommended screening breast imaging. 12 of these patients had a family history of pancreatic cancer; 2 (16.6%) were screened. Of eligible CHEK2 mutation carriers; 57% received at least half of recommended screening breast imaging. 22 (73%) of these patients had a colonoscopy as recommended. Of eligible BARD1 mutation carriers; 60% received at least half of recommended screening breast imaging. Of eligible BRIP1 mutation carriers; 37% received at least half of recommended screening breast imaging. Of eligible PALB2 mutation carriers; 64% received at least half of recommended screening breast imaging. 13 of these patients had a family history of pancreatic cancer, 2 (15%) were screened. CONCLUSION: While recommended breast cancer screenings are being completed at higher rates, there is a need for more streamlined protocols for other cancers in this high-risk population.

Poster Number: 21

Session: Poster Presentation

Category: Cancer

Trainee Rank: Rush Student RMC: M4

Kayla Schmittau, BS

Kayla Schmittau, BS (Rush); Lisa Giordano, MD (Rush)

A CASE OF EPSTEIN BARR VIRUS-INDUCED PAROXYSMAL COLD HEMOGLOBINURIA IN A 17-YEAR OLD MALE

INTRODUCTION We report on a 17-year-old male who presented with acute hemolysis due to paroxysmal cold hemoglobinuria (PCH) secondary to Epstein-Barr Virus (EBV). Nearly all cases of PCH occur in children under 5 years of age after a viral infection, with a minority of cases occurring in adults with tertiary syphilis. The case we report on is unique given the patient's age and time of presentation in the warm month of July. METHODS Labs were serially drawn to assess hemoglobin, reticulocyte percent, total bilirubin, and lactate dehydrogenase and indicated ongoing hemolysis. Peripheral blood smear was negative for schistocytes. RBC G6PD Assay returned within normal limits at days 1 and 2 after admission and at outpatient follow-up. Direct Antiglobulin Test (DAT; Coombs Test) returned negative twice in the first two days of admission. EBV IgM was found to be positive, indicating acute mononucleosis infection. Rapid plasma reagin was negative. The patient was transfused six times for Hb <7 and was started on prednisone 50 mg BID as empiric immunosuppressive therapy to reduce the severity of hemolysis. Given ongoing significant hemolysis and active EBV infection, suspicion for PCH was high and an enhanced DAT and Donath-Landsteiner antibody were sent. Enhanced DAT resulted positive for CD3 and negative for IgG on Day 3, consistent with PCH. Donath-Landsteiner antibody test later returned positive as well, confirming the diagnosis of PCH. RESULTS (I will include graphs that trend hemoglobin, bilirubin, and LDH from day 0-75 after presentation). The patient was discharged on Day 6 of admission after multiple days without transfusions and stable hemoglobin levels. He was tapered off of prednisone after 5 weeks of therapy and serial outpatient labs were reassuring against ongoing hemolysis. CONCLUSION We have reported on a case of EBV-induced PCH in a 17-year-old male. This demonstrates that, although nearly all of the prior case reports and studies report on virus-induced PCH in children <5 years old, this disease process can occur in older pediatric patients as well. To our knowledge, this is only the second case report of virus-induced PCH occurring in a pediatric patient over 8 years old.

Poster Number: 22

Session: Poster Presentation

Category: Cancer

Trainee Rank: Rush Student CHS: Masters

Nagham Sheblak, Masters in Science - Clinical Research

Sheblaq N, Levy M, Kim T, Shirlene P Rush University

USING EMR INTEGRATED PHARMACY DISPENSING DATA AS AN ADHERENCE MEASURE OF ADJUVANT ENDOCRINE THERAPY IN BREAST CANCER PATIENTS

BACKGROUND: Adherence to Adjuvant Endocrine therapy (AET) reduces recurrence risk for hormone receptor (HR)-positive breast cancer (BC). Refill data accessed through electronic health records may provide an objective assessment. EMR (Electronic medical records) integrated pharmacy dispensing data (EIPDD) is a system that bridges the gap between pharmacies, clinicians, and patients by providing medication-dispensing data in the electronic health record. This study seeks to evaluate the completeness and timeliness of EIPDD for early detection of early and late-stage persistence to breast cancer adjuvant endocrine therapy. METHODS: A single- institution, retrospective study from Jan 1st, 2016 through December 31, 2021, was conducted. The primary aim was to assess the EIPDD data completeness by reviewing pharmacy dispensing data integrated into electronic health at 1, 2, 3, 4, and 5 years after a new prescription for adjuvant endocrine therapy, and the secondary aim was to identify the early and late-stage persistence to endocrine therapy. Descriptive models were used to assess the pattern of persistence. RESULT: A total of 853 women with a breast cancer diagnosis were identified as having at least one documented dispense and a refresh event within 365 days of the first order. In the first year of treatment 92% of the patientshad at least one refill within 180 days of the refill due date making them early-stage persistent, while only 8 % were non-persistent Late-stage persistence ranged from 71(8%) to 32(14%) for patient who have only one dispense. In contrast, those with two or more dispenses decreased from 782 (92%) to 133 (56%) over5 years. The EMR integrated pharmacy database is semi-complete with the date refresh rate decreasing from 91% in year 2 to 85% in year 5. Furthermore, the EIPDD was semi-adequate for timely detection of early-stage persistence in 86% of patients in year 1 of treatment. CONCLUSION: The common goal of all persistency measures should be to reflect the continuity of medication usage and to capture the timeliness and frequency of refilling. EIPDD presents an opportunity to provide cancer care teams with clinical decision support alerting them to patients at risk for non-persistence. KEY WORDS: adherence, adjuvant endocrine treatment, persistence, refresh rate, dispensing data

Poster Number: 23
Session: Oral Presentation
Category: Cancer
Trainee Rank: Rush Student GC: PhD

Monica Sheinin, MS
Monica Sheinin, Brian Jeong, Ramesh K. Paidi, and Kalipada Pahan

Lung tumor regression mediated by SARS-CoV-2 spike S1 in an NNK intoxicated mouse model

Lung cancer is the leading cause of cancer related deaths worldwide, with a relatively low 5-year survival rate. Although there are some therapies against lung cancer, new effective treatment options are urgently required. Recently during the COVID-19 pandemic, we have seen that SARS-CoV-2 binds to its receptor angiotensin-converting enzyme 2 (ACE2) via spike S1 to enter the cells. This study underlines the importance of SARS-CoV-2 spike S1 in inducing death in human lung cancer cells. Interestingly, we have seen that recombinant spike S1 treatment at very low doses led to death of human A549 lung cancer cells. On the other hand, boiled recombinant SARS-CoV-2 spike S1 remained unable to induce death, suggesting that the induction of cell death in A549 cells was due to native SARS-CoV-2 spike S1 protein. SARS-CoV-2 spike S1-induced A549 cell death was also inhibited by neutralizing antibodies against spike S1 and ACE2. Moreover, our newly designed wild type ACE2-interacting domain of SARS-CoV-2 (wtAIDS), but not mAIDS, peptide also attenuated SARS-CoV-2 spike S1-induced cell death, suggesting that SARS-CoV-2 spike S1-induced death in lung cancer cells depends on its interaction with ACE2 receptor. Similarly, recombinant spike S1 treatment also led to death of H1299 and H358 human lung cancer cells. Finally, 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK) intoxication led to the formation tumors in lungs of A/J mice and alternate day intranasal treatment with low dose of recombinant SARS-CoV-2 spike S1 from 22-weeks of NNK insult (late stage) led to induced apoptosis and tumor regression in the lungs. These studies indicate that recombinant SARS-CoV-2 Spike S1 protein may have implications in the treatment of lung cancer.

Poster Number: 24

Session: Poster Presentation

Category: Cancer

Trainee Rank: 2022 Summer Research Program Participants (Non-Rush matriculated students)

Sophie Stempel, BS

Presenting Author: Sophie Stempel Co-Authors: Mia Levy (Rush), Rosalinda Alvarado (Rush), Shirlene Paul (Rush), Chelsea McPeek (Rush)

EVALUATING INTERVENTIONS TO INCREASE THE UPTAKE OF NCCN GENETIC COUNSELING RECOMMENDATIONS

INTRODUCTION: Genetic counseling for hereditary breast cancer remains underutilized despite increased access. The lack of identification and/or referral of high-risk women for genetic counseling is the major contributor to the poor uptake. A cancer risk assessment program (CRA) utilizing NCCN guidelines was implemented in our breast imaging department to identify women at increased risk for breast cancer. We analyzed the impact of informing all women who get a screening mammogram of their genetic mutation risk and the effect of nurse navigation on increasing the subsequent uptake of genetic counseling. METHODS: To assess the effectiveness of these interventions, data from July 2021 to January 2022 was extracted from the EMR and grouped into cohorts based on nurse navigation contact and the completion of genetic counseling. A chi-squared analysis was performed to determine the significance of the results. RESULTS: A total of 22,915 patients participated in the CRA program during the study period. 2,704 (11.8%) patients qualified for genetic counseling based on NCCN guidelines. 439 (16.2%) of these patients completed a genetic counseling appointment. 415 of these patients received genetic testing (94.5%) and 19 (4.6%) had a pathogenic mutation found. The nurse navigator was able to reach 1,297 (48%) of the 2,704 patients (Cohort A). Of these patients, 322 (25.6%) completed genetic counseling appointments compared to 107 of the 1,407 (7.6%) patients who were not contacted by the nurse navigator (Cohort B). Statistical analysis determined there was a significant difference in uptake of genetic counseling between Cohort A and Cohort B ($p<.0001$). CONCLUSIONS: The implementation of the CRA program at the breast imaging center uncovered many patients who qualified for genetic counseling and testing based on NCCN guidelines. Genetic counseling uptake is significantly increased in patients who are reached by a Nurse Navigator. These interventions allowed for the discovery of unsuspected deleterious genetic mutations which require more aggressive screening to allow for the early detection of breast cancer and better overall prognosis.

Poster Number: 25

Session: Poster Presentation
Category: Cardiovascular/Pulmonary
Trainee Rank: Rush Student RMC: M2

Benjamin Dufour, BA

Benjamin P Dufour (Rush), Hannah M Duehren (Rush), Ashley Eaton England (Central Michigan University), Kevin Keuper (Rush), Thomas V Quinn (Rush), Raj C Shah (Rush), James Gerhart (Central Michigan University), Jared A Greenberg (Rush)

SURVIVAL PREDICTIONS AMONG PHYSICIANS AND SURROGATES OF MECHANICALLY VENTILATED PATIENTS AT TWO ICU TIME POINTS

INTRODUCTION Medical decisions recommended by physicians and surrogates of non-decisional ICU patients depend in part on their expectations for patient prognosis. Whether the accuracy of predictions among physicians and surrogates improves over the patient's ICU course is unknown. METHODS Patients receiving mechanical ventilation for at least seven days at Rush were prospectively screened from March 2018 - April 2019. One surrogate and ICU physician per patient were enrolled; on a Visual Analog Scales, participants indicated their agreement that the patient would be alive in 90 days from 0-100%. One week later, the same surrogate and physician were surveyed again for patients remaining in the ICU. Participating surrogates were contacted ninety days later to determine patient status. RESULTS Of the 73 patients with known vital status ninety days after ICU admission, 47 (64%) patients were alive and 26 (35%) were deceased. Upon enrollment, survival predictions among surrogates were 89% (95% CI 85-93%) and 76% (95% CI 67-85%), $p<0.01$ for patients who survived and died, respectively. Upon enrollment, survival predictions among physicians were 64% (95% CI 57-70%) and 51% (95% CI 40-62%), $p=0.03$ for patients who survived and died, respectively. From enrollment to the second time point, survival predications did not change on average: median change 0% [IQR -4 to 4%] vs. 0% [IQR -11 to 8%], $p= 0.60$ for difference among surrogates and physicians respectively. In a logistic regression model that included the initial survival prediction and the change in survival predictions, only the initial prediction was associated with patient outcome among surrogates: (OR 1.05, 95% CI 1.02-1.08, $p<0.01$) and (OR 1.01, 95% CI 0.98-1.04, $p=0.50$). In contrast, among physicians, both the initial survival prediction and change in survival predictions were associated with patient outcome (OR 1.04, 95% CI 1.01-1.07, $p<0.01$) and (OR 1.04, 95% CI 1.01-1.07, $p<0.01$). CONCLUSION Among patients who received one week of mechanical ventilation, surrogate and physician predictions for patient survival were associated with eventual outcomes despite surrogates being more optimistic than physicians. Adjustments in predictions over the following week were associated with patient outcomes only among physicians, suggesting a greater understanding of the implications of changes in the patient's condition.

Poster Number: 26

Session: Poster Presentation
Category: Cardiovascular/Pulmonary
Trainee Rank: Rush Student CHS: Masters

Jeremy Golon, MSc Physician Assistant Studies

JD Golon (Rush University), Tim Breider (Rush University), Dr. David Tabriz (Rush University)

A RETROSPECTIVE ANALYSIS OF PNEUMOTHORACES AS A COMPLICATION OF PERCUTANEOUS COMPUTERIZED TOMOGRAPHY GUIDED LUNG BIOPSY ACROSS QUARTERS OF THE YEAR

INTRODUCTION: Percutaneous computerized tomography-guided lung biopsy (CTLB) is a procedure performed by interventional radiology practitioners in the setting of suspicious pulmonary nodules to aid in the diagnosis and staging of lung cancer. Since 1976, when CTLB was first described, the technique continues to be refined to improve maximal benefit and minimize risk to patients (Haaga et al., 1976). Although all image-guided needle placement is a minimally invasive routine procedure that can be performed on an outpatient basis, with relatively low risk conveyed to patients relative to surgical interventions, these procedures are not without potential risk. The most common iatrogenic complication of CTLB is a pneumothorax, with the widest reported ranges of post-lung biopsy pneumothorax between 9% - 54% and approximately 2% - 15% requiring a chest-tube (Wiener et. al. 2011). These procedures are routinely performed by trainees at academic medical centers and notably there have been no longitudinal studies focused on July Effect associated with post-CTLB pneumothorax. METHODS: This retrospective cohort study of 266 patients that underwent CTLB at Rush University Medical Center (RUMC), department of Vascular and Interventional Radiology (VIR) was performed to compare the rate of post-CTLB pneumothorax to those rates reported in the literature. Odds ratio of post-CTLB pneumothorax requiring chest tube across quarters, corresponding to seasons of the year was also calculated. RESULTS: Post-CTLB pneumothorax rate and post-CTLB pneumothorax odds ratio (expressed as %) was 27.80% and 38.50% respectively. Post-CTLB pneumothorax requiring chest tube rate and post-CTLB pneumothorax requiring chest tube odds ratio (expressed as %) was 27.80% and 38.50% respectively. Post-CTLB pneumothorax requiring chest tube odds ratio was 0.151 from December to February, 0.109 from March to May, 0.099 from June to August and 0.051 from September to November. CONCLUSION: Post-CTLB pneumothorax rate and post-CTLB pneumothorax requiring chest tube rate is lower at RUMC compared to those rates reported in the literature. There is no July Effect associated with post-CTLB pneumothorax requiring chest tube odds ratio at RUMC. In future studies, we hope to identify modifiable and non-modifiable risk factors that led to the development of pneumothorax following CT-guided lung biopsy.

Poster Number: 27

Session: Poster Presentation
Category: Cardiovascular/Pulmonary
Trainee Rank: Rush Student RMC: M2

Leyla Herbst, BA

Leyla R Herbst BA (1), Joseph Eid MD (2), Maria Isabel Planek MD (2), Cicely Dye (2), Annabelle Santos Volgman MD (2) 1, Rush Medical College, Chicago IL 2, Rush Medical Center, Dept of Cardiology, Chicago IL

SYMPTOMATIC REFRACTORY VAGALLY MEDIATED BRADYCARDIA AND FUNCTIONAL SINUS NODE DYSFUNCTION IMPROVEMENT AND RESOLUTION WITH PREGNANCY

INTRODUCTION: Dysautonomia caused by increased parasympathetic activity can cause functional atrioventricular block (AVB) or sinus node dysfunction (SND) resulting in symptomatic bradyarrhythmias. This poses a dilemma since vagally mediated bradycardia (VMB) usually occurs in young patients. In women of childbearing age, there is concern about the impact of VMB on gestation and perfusion to the fetus, given worsening of bradyarrhythmias during labor. Pacemaker placement is the recommended treatment for congenital SND, though previous reports show pregnancy to exacerbate SND symptoms. This case highlights the nuances of individualized approach to pacemaker implantation in the setting of shared decision making. METHODS: A 25-year-old woman presented for evaluation due to episodes of progressive lightheadedness, shortness of breath, and fatigue for years. The patient received a thorough cardiac work-up that included ECG (Figure), ambulatory monitoring, chest x-ray, and echocardiograms. The patient had a structurally normal heart and no clear reversible cause for her SND. After a shared discussion, a decision was made to hold off on a pacemaker. The patient improved symptomatically over her two pregnancies. The patient remains asymptomatic at age 53 with sinus bradycardia with 1st degree AVB and no recurrence of the junctional escape rhythm. RESULTS: Her first ECG showed sinus node dysfunction, as indicated by the isorhythmic dissociation, which describes when the rhythm alternates between the atrial rate and the junctional rate. In the most recent ECG, the rhythm now shows sinus bradycardia. There is not a "one size fits all" approach for VMB, and treatment should be personalized to the individual patient. Although some patients may require a device it is not a completely benign decision given the risk of device infection and malfunction. CONCLUSION: This case highlights the need for a better understanding of symptomatic VMB and pregnancy to help improve selection of appropriate management strategies. It also underscores the need for for better understanding of the physiology of pregnancy as it pertains to management of arrhythmias.

Poster Number: 28

Session: Poster Presentation
Category: Cardiovascular/Pulmonary
Trainee Rank: Rush Student RMC: M3

Jonas Neichin, BA

Jonas Neichin, BA (Rush) Daven Patel, MD, MPH (Rush) John Bailitz, MD (Feinberg School of Medicine, Northwestern Memorial Hospital) Gary Peksa, PharmD, MBA (Rush) Simone Ymson, BS (Rush) Miranda Viars, BFA (Rush) Jack Tsintolas, BS (Rush) Leslie Martinez, BS (Rush) Fae Kayarian, BS (Rush) Faith Geevarghese (Rush) Michael Gottlieb, MD (Rush)

Effect of Pleural Depth and Width on the Accuracy of Lung Ultrasound for Detecting Pulmonary Edema

INTRODUCTION: Lung ultrasound is increasingly utilized for evaluation of pulmonary edema but it is unclear if patient-specific factors contribute to this assessment's accuracy. This study aims to identify if the depth to pleura and/or rib space width affected the diagnostic accuracy of B-line assessment with lung ultrasound. METHODS: This was a prospective, observational study of Emergency Department patients age ≥18 years with suspected pulmonary edema. Patients with active COVID-19 or interstitial lung disease were excluded. This study was IRB approved and all patients provided informed consent. One ultrasound fellow utilized the 12-zone technique (C1-5 ultrasound probe; preset depth 18cm; sagittal plane) to evaluate B-lines in real-time. A six-second clip was recorded for blinded post-hoc analysis by two independent expert physicians. Positive images demonstrated ≥3 B-lines or one large, dense B-line. Divergent interpretations were discussed to reach consensus. Using binary logistic regression modeling, we evaluated the predictive role of depth to pleura and rib space width on the accuracy. RESULTS: 71 patients (n=752 lung fields) were included. Real-time ultrasound fellow assessment was 85.4% accurate (95% CI 82.6-87.8%). Mean pleural depth was similar in the accurate (29.7 mm; 95% CI 28.8-30.7mm) vs inaccurate group (27.0mm; 95% CI 25.1-29.9mm). Rib space width was also similar in the accurate (22.8mm; 95% CI 22.3-23.4mm) vs inaccurate group (23.5mm; 95% CI 22.0-25.1mm). In the regression analysis, pleural depth had an odds ratio of 1.02 (95% CI 1.01-1.04) and rib space width had an odds ratio of 1.00 (95% CI 0.97-1.02). The model was not statistically significant ($p = 0.07$) with a beta-error probability <0.1. The model explained 1.3% of the variance in b profile agreement. The Hosmer-Lemeshow goodness-of-fit was $p = 0.92$ with an area under the receiver operating characteristic curve of 55.9% ($p = 0.05$). The model correctly classified 85.4% of cases with 0% specificity and 100% sensitivity. CONCLUSION: Lung ultrasound accuracy for diagnosing pulmonary edema is not significantly affected by pleura depth or rib-space width.

Poster Number: 29

Session: Poster Presentation
Category: Cardiovascular/Pulmonary
Trainee Rank: Post-Doctoral Research Fellow

Yuriana Oropeza-Almazán, Ph.D.

Yuriana Oropeza-Almazán (RU) and Lothar A. Blatter (RU)

Mitochondrial Ca uniporter complex, ROS, and CaT alternans

INTRODUCTION Atrial calcium transient (CaT) alternans is defined as beat-to-beat alternation in CaT amplitude and is causally linked to atrial fibrillation. Aberrant Ca sequestration caused by impairment of the mitochondrial Ca uniporter complex (MCUC) is a determinant for CaT alternans development and can lead to an increase in mitochondrial reactive oxygen species (ROS) production that compromises the cellular antioxidative capacity. The mechanisms through which mitochondrial Ca uptake and ROS production determine the susceptibility of atrial cells to develop CaT alternans are poorly understood. METHODS Single left atrial myocytes were enzymatically isolated from male rabbit hearts and studied with fluorescent microscopy (CaT alternans alone: fluorescent indicator Cal-520AM; simultaneous measurements of ROS and CaT alternans: CM-DCFDA and Cal-590AM). CaT alternans was induced by increasing the pacing frequency until stable CaT alternans was observed. CaT alternans was quantified as the alternans ratio (AR = 1 − S/L, where S/L is the ratio of the small to the large amplitude of a pair of alternating CaTs). Data are presented as mean±SEM and statistical analysis was determined by ANOVA or paired Student's t-test. RESULTS An exogenous oxidative challenge with tert-butyl H2O2 (tBHP) increased the CaT AR by 140%. In contrast, the strong reducing agent dithiothreitol (DTT) decreased AR by 39%. Moreover, DTT minimized CaT alternans previously enhanced by tBHP. In addition, the anion superoxide (O2.-) scavenger quercetin decreased CaT AR by 96%, and the superoxide dismutase mimetics tempol and MnTBAP significantly lowered CaT AR by 79% and 46%, respectively. Furthermore, ROS rate production during CaT alternans was increased by 29% compared to control (0.5 Hz). We also determined that mitochondrial Ca uptake modulates CaT alternans. Exposure of atrial myocytes to the MCUC inhibitor Ru360 increased the AR by 86%. However, the subsequent stimulation of mitochondrial Ca uptake with the MCUC activator spermine (Spm) decreased AR by 79%, and at elevated pacing frequencies (1-2 Hz) Spm decreased ROS production rate. CONCLUSIONS An oxidizing environment is a determinant for the development of CaT alternans and involves mitochondrial ROS formation (O2.-). MCUC activity modulates CaT alternans through mitochondrial Ca buffering and maintenance of the redox environment.

Poster Number: 30

Session: Poster Presentation
Category: Cardiovascular/Pulmonary
Trainee Rank: Rush Student RMC: M2

Vasilios Stefanis, Bachelors of Science in Chemistry, Biology

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IMPACT OF OBESITY IN A MURINE MODEL OF PULMONARY ARTERIAL HYPERTENSION

INTRODUCTION: Pulmonary arterial hypertension (PAH) is a life-threatening progressive disorder, associated with abnormally elevated pulmonary pressure, pulmonary artery remodeling, and occlusion of small pulmonary arteries. Even with treatment, the prognosis of PAH is poor with a 1-year mortality of 15%, and despite there being specialized treatments for PAH, there is currently no cure. Furthermore, 38% of patients with PAH have comorbid obesity, but the effects of obesity on the pulmonary vasculature of PAH patients are poorly understood and understudied. Thus, we took advantage of the EHITSN-transduced intersectin-1s (ITSN) heterozygous mouse (EHITSN-K0ITSN+/-) model of plexogenic PAH, that closely recapitulates the human disease to test the overall hypothesis that PAH with comorbid obesity triggers a more severe pulmonary vascular pathology compared to PAH alone. METHODS: The heterozygous K0ITSN+/- mice, selected by genotyping, were fed a high fat diet to induce obesity. Their weights were monitored on a weekly basis. The experimental group of mice were subjected to retroorbital injections of EHITSN DNA via cationic liposomes, every 48 hours for 18 days, to induce PAH. At the end of the treatment, murine lung tissues were either collected and processed for routine histological analysis (hematoxylin/eosin staining) or subjected to measurements of pulmonary hemodynamics. For routine histology and morphometric analyses, images of the lung tissues were acquired and analyzed using the stereological software Stepanizer. Murine lungs of non-obese mice with PAH serve for comparison. RESULTS: Work-in-progress suggests increased muscularity in the small pulmonary arteries of obese male mice by comparison to the small pulmonary arteries of non-obese male mice with PAH. Results from female mice are pending. We are awaiting results of hemodynamic measurements to determine the Fulton index (the ratio of right ventricle weight to left ventricle + septum weight) and right ventricular hypertrophy. CONCLUSION: Upon receipt and review of the results, we anticipate that obesity will cause increased muscularization of the small pulmonary arteries, increased number of vascular lesions and an increase in the Fulton index in mice with PAH. The impact of obesity by sex will also be assessed. These results would demonstrate a need for targeted research of PAH patients with obesity.

Poster Number: 31

Session: Poster Presentation
Category: Cardiovascular/Pulmonary
Trainee Rank: Rush Student RMC: M2

Miranda Viars, BFA

Miranda Viars (RU); Daven Patel (RU); John Bailitz (Northwestern); Gary Peksa (RU); Simone Ymson (RU); Jack Tsintolas (RU); Jonas Neichin (RU); Leslie Martinez (RU); Fae Kayarian (RU); Faith Geevarghese (RU); Michael Gottlieb (RU)

ASSESSING PULMONARY EDEMA WITH LUNG ULTRASOUND: A COMPARISON BETWEEN ARTIFICIAL INTELLIGENCE AND REAL-TIME FELLOW ASSESSMENT

INTRODUCTION: Lung ultrasound can be utilized to assess pulmonary edema, but data suggest moderate inter-rater reliability across average users. Recent research shows that artificial intelligence (AI) may be implemented to increase accuracy of B line interpretation for novice users, which could standardize the approach to ultrasound evaluation of pulmonary edema. This study's objective was to compare AI versus real-time ultrasound fellow assessment for B lines. METHODS: This was a prospective, observational study of adult Emergency Department patients with suspected pulmonary edema - those with active COVID-19 infection or interstitial lung disease were excluded. This study was IRB approved and all patients provided informed consent. An ultrasound fellow performed thoracic ultrasound in the sagittal plane using the C1-5 transducer in lung preset at 18 cm depth. The fellow obtained six-second clips using the 12-zone technique, and provided real-time interpretation of positive (≥ 3 B lines or a large, dense B line) or negative (≤ 2 B lines and absence of a large, dense B line) for pulmonary edema. An AI program was used to determine if the clip was positive or negative, and the fellow was blinded to this assessment. Clips were independently reviewed by two expert sonographers (both with >10,000 ultrasound image reviews) who were blinded to initial determinations. They reviewed discordant values and reached consensus whether the field was positive or negative using the above criteria. Preliminary data are summarized and presented as descriptive statistics. RESULTS: 71 patients were included (56.3% female; mean BMI: 33.4 [95% CI 30.6-36.2]), with 88.3% (752/852) of lung fields adequate quality for assessment. Overall, 36.1% of lung fields were positive for pulmonary edema. The ultrasound fellow was 96.7% (95% CI 93.8%-98.5%) sensitive and 79.1% (95% CI 75.1%-82.6%) specific. The AI software was 95.6% (95% CI 92.4%-97.7%) sensitive and 64.1% (95% CI 59.8%-68.5%) specific. CONCLUSION: Both the ultrasound fellow and AI software were highly sensitive, though the ultrasound fellow was more specific. Future research should identify which factors are associated with increased diagnostic accuracy.

Poster Number: 32

Session: Poster Presentation
Category: Clinical Practice
Trainee Rank: Rush Student CHS: Clinical Doctorate

Brigid Bendig, OTD-S

Alison Kirk, OTD-S (Rush University) Kayla Robinson, OTD-S (Rush University) Daniela Ugalde, OTD-S (Rush University)

Children's Participation at School

INTRODUCTION: The International Classification of Functioning, Disability and Health (ICF) defines the health outcome of participation as 'involvement in a life situation.' For children with disabilities, life participation includes education, which may require support from related services of school-based occupational therapy practitioners (SBOT). Supporting child participation is seen as the role of SBOTs, yet little is known about the perspective of SBOT's understanding and practice related to childhood participation at school. PURPOSE: To understand the perspective of SBOTs related to their definition of participation at school, what participation in action looks like, and how SBOTs assess and intervene to support participation for children at school. METHODS: Qualitative exploratory design using semi-structured interviews. Participants were SBOTs (OT and OTA), working in school settings at least one year, at least 21 years of age, and English speaking. Methods: Data collection used virtual video interviews with a semi-structured script developed from literature and content experts review, and a demographic screener. Analysis used deductive coding of transcripts against the family of Participation-Related Constructs framework with data triangulation and coding saturation established by study staff. RESULTS: Participants' definition of participation was seen as both a process and outcome. Definitions, descriptions, assessment of and intervention of participation aligned best with the construct of attendance with less reported consideration of involvement. Internal factors related to activity competence were emphasized. CONCLUSION AND IMPACT: Elements of participation need to be more widely understood, guidelines for participation observations developed, and strategies for assessment and intervention operationalized to reduce emphasis on less evidenced-based practice and increase uptake of participation evidence for SBOT practice

Poster Number: 33
Session: Poster Presentation
Category: Clinical Practice
Trainee Rank: Clinical Resident

Miranda Bradley, MD

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BARRIERS TO REPORTING OF EMERGENCY DEPARTMENT VIOLENCE

INTRODUCTION Violence within Emergency Departments (ED) is rising. A 2022 American College of Emergency Physicians (ACEP) survey reported 85% of physicians believed ED violence increased during the last five years, and the effects negatively impacted patient care. We conducted a study to assess witnessed and experienced violent events towards ED staff and address potential barriers to reporting these events. METHODS An IRB-approved study was conducted where staff of both an urban department, Rush University Medical Center (RUMC), and community-based department, Rush Oak Park Hospital (ROPH), were surveyed on experiences of violence. The anonymous, online, ACEP validated survey was emailed to all ED employees. The survey consisted of 28 questions, mostly multiple choice or "check all that apply," as well as several free response questions. Descriptive statistical comparisons were made based on categorical data. RESULTS A total of 119 responses were recorded, with 71.4% being female, 26.1% male, and 2.5% nonbinary or prefer not to answer. 84.7% of responses were from RUMC, 15.3% from ROPH. The majority of responses were nurses at 33.9%, followed by attendings and residents at 21.2% and 18.6%, respectively. A total of 31.9% of respondents reported being physically assaulted while working in the RUMC or ROPH ED, with 90.7% incurring injuries. Additionally, 65.5% reported witnessing an assault at work. Of those who were assaulted, 31.3% did not report, 24.3% did, and 40.9% indicated "N/A." Regarding why the assault was not reported, 12.9% indicated they were not sure how to report, 59.1% indicated "N/A'' and 17.2% indicated "other." Lastly, 78% of respondents feel violence in the ED in the past five years has increased. CONCLUSION Preliminary data suggests ED staff experience both physical and verbal forms of assault. Multiple barriers exist to reporting, including educational issues as well as decreased confidence assaults will be followed up on by multiple modalities. Our data suggests the most common reason an assault was not communicated to administration was lack of knowledge regarding how to report. This information should be readily available within ED staff lounges and meeting areas. Further research is indicated to evaluate barriers to reporting and ways to continue monitoring this growing trend.

Poster Number: 34

Session: Poster Presentation
Category: Clinical Practice
Trainee Rank: Clinical Fellow

Jennifer Estanilla, DO, MEd

Jennifer M Estanilla (Rush University Medical Center), Jieun David (Rush University Medical Center), Aloka L Patel (Rush University Medical Center), Kousiki Patra (Rush University Medical Center)

NEURODEVELOPMENTAL OUTCOME AND HEALTHCARE UTILIZATION IN VERY LOW BIRTH WEIGHT (VLBW) INFANTS AFTER TREATMENT WITH BUBBLE CONTINUOUS POSITIVE AIRWAY PRESSURE

INTRODUCTION Bronchopulmonary dysplasia (BPD) in preterm infants is associated with an increased risk of poor neurodevelopmental (ND) outcomes and hospital readmissions. The risk for ND is greater with prolonged mechanical ventilation (MV). Use of nasal continuous positive airway pressure (CPAP) has been shown to reduce MV and BPD. Bubble CPAP (bCPAP) has physiologic properties that decrease lung injury, which may translate to better respiratory and developmental outcomes through potential prevention of BPD. However, to date, there is no study that reports the ND and health outcomes of infants treated with bCPAP. METHODS A retrospective cohort study of 234 infants in which 114 VLBW (birth weight <1500 grams) infants born in 2012-2014 who were treated with infant flow driver (IFD) CPAP were compared to 120 infants born in 2016-2018 treated with bCPAP. Outcomes included BPD severity, Bayley-III index scores at 20 months corrected age (CA), and use of hospitalizations, emergency room (ER), subspecialists (SS), and therapies at 1 and 2 years of life. Multiple regression analyses adjusted for the effect of social and neonatal risk factors on outcomes. Since there was a statistically significant interaction between treatment with bCPAP and birth weight <1000 grams, this interaction term was included to model possible variation in the effect of bCPAP on index scores in extremely low birth weight (ELBW) infants. RESULTS Although there were no differences in rates of BPD, infants in the bCPAP group had lower rates of intubation ($p=0.018$), nasal intermittent positive pressure ventilation use ($p<0.001$), and received less surfactant ($p=0.001$). Receipt of bCPAP was not significantly associated with hospitalizations, ER visits, or SS, but was positively associated with use of therapies by age two. In ELBW infants, treatment with bCPAP was predictive of higher cognitive scores at 20 months CA ($p=0.016$). CONCLUSION The use of bCPAP is predictive of a higher cognitive score at 20 months CA in ELBW infants. This finding was not seen for infants of birth weight >1000 grams. Further research comparing CPAP delivery systems and the rates of BPD and ND outcomes will inform treatment decisions that may lead to improved outcomes in VLBW infants.

Poster Number: 35

Session: Poster Presentation
Category: Clinical Practice
Trainee Rank: Rush Student RMC: M2

Joseph Hindi, Bachelor of Science

Joseph Hindi, Mohit Uppal, and Dr. Anjali Tannan ALL: Department of Ophthalmology, Rush University Medical Center, Chicago, IL

SECOND GLANCES: A LONG-TERM LOOK AT INTRAOCULAR LENS MEASURMENTS

INTRODUCTION: There is little consensus regarding the time interval during which intraocular lens (IOL) measurements appear to be reliable or consistent. If there is significant variability in measurements over time, utilizing outdated scans may lead to unanticipated refractive error postoperatively. However, if this longitudinal variation in measurements does not exist, unnecessarily recapturing measurements would waste patient and physician time and resources. This study aimed to determine the longitudinal variability of IOL measurements. METHODS: A retrospective study was conducted utilizing the Lenstar LS900 and Atlas Topography 9000 databases within University Ophthalmology Associates, an Ophthalmology clinic at Rush University Medical Center in Chicago, Illinois. Patients between the ages of 55 and 90 who had undergone 2 sets of ocular biometry and topography, at least 3 months apart, were included. Biometry variables, such as axial length, corneal thickness, aqueous depth, anterior chamber depth, lens thickness, flat meridian, and steep meridian, as well as topography variables, such as flat and steep keratometry, were included. Changes in recommended IOL power and theoretical postsurgical refractive error, calculated using the Hoffer Q, Holladay I, SRK/T, Olsen, Barrett, and Hill RBF formulations were also examined. A linear mixed effect model with random intercept was applied to determine if there were significant differences between the measurements RESULTS: A total of 100 subjects (200 eyes) were included in this analysis. When comparing the two sets of measurements captured by the Lenstar LS900 and Atlas Topography 9000, only a significant difference in lens thickness ($p = 0.026$) was appreciated. There were no significant differences observed in recommended IOL power or theoretical postsurgical refractive error using the Hoffer Q, Holladay I, SRK/T, Olsen, Barrett, and Hill RBF formulations. CONCLUSION: The conventional perspective warns against utilizing outdated IOL measurements for cataract extraction with IOL implantation. However, no significant differences exist in recommended IOL power or theoretical postsurgical refractive error between measurements captured at least 3 months apart. Thus, clinical significance of such principles is limited.

Poster Number: 36

Session: Poster Presentation
Category: Clinical Practice
Trainee Rank: Rush Student RMC: M2

Fae Kayarian, BS

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DIAGNOSTIC ACCURACY OF REAL-TIME ULTRASOUND FOR DETECTING PULMONARY EDEMA BY LUNG ZONE

INTRODUCTION: Lung ultrasound (LUS) is a tool for diagnosing pulmonary edema. LUS protocols vary in selection of where to obtain the images (i.e., lung zones). Research has demonstrated that inter-rater reliability in LUS measures can vary. Understanding which lung zones are more likely to be accurate can improve LUS protocols. Our objective was to identify the diagnostic accuracy of LUS for each lung zone. METHODS: This was an IRB-approved, prospective, observational study of Emergency Department patients (age ≥ 18 years) with suspicion of pulmonary edema. Patients with active COVID-19 or interstitial lung disease were excluded. Informed consent was obtained for each enrolled patient. Lung fields unable to be visualized were excluded. Using the C1-5 transducer in the lung preset at a depth of 18 cm in the sagittal plane, one ultrasound fellow performed thoracic ultrasound using the 12-zone technique. The fellow recorded one six-second video per region and reported real-time assessment of whether the lung field was positive (≥3 B lines or a large dense B line) or negative (<2 B lines and the absence of a large, dense B line) for pulmonary edema. The clips were then reviewed independently by two expert sonographers (>10,000 prior ultrasound image reviews) blinded to the initial determination by the fellow. The experts reviewed all discordant findings together and reached consensus on whether the field was positive or negative using the same criteria. We calculated the overall accuracy, sensitivity, and specificity with 95% CI for all lung zones that had at least 10 acceptable images. RESULTS: Seventy-one patients (n=752 lung fields) were included. We evaluated all lung zones except the left-anterior-inferior (insufficient images). The most accurate regions were the right-anterior-superior (91.2%; 95% CI 81.8-96.7%) and the right-posterior-superior zone (89.9%; 95% CI 80.2-95.8%). The least accurate regions were the left-posterior-inferior (78.9%; 95% CI 67.6-87.7%) and the left-anterior-superior zone (80.6%; 95% CI 68.6-89.6%). CONCLUSION: The accuracy of B lines assessment varied across lung fields, with some being more accurate than others. This may inform selection of lung fields when assessing for pulmonary edema using LUS.

Poster Number: 37

Session: Poster Presentation
Category: Clinical Practice
Trainee Rank: Rush Student RMC: M4

Erin Keizur, BS

Erin M. Keizur (Rush); Brett T. Boyer (Rush); Alice Burgess MD (Colorado); Girish Sharma MD (Rush)

Discharge Management of Pediatric Patients Admitted For Acute Asthma Exacerbations

INTRODUCTION Asthma is the most common chronic disease impacting pediatric patients in the United States. The National Asthma Education and Prevention Program (NAEPP) recommended in 2020 that patients be treated with inhaled bronchodilators and rescue steroids, along with preventative controller medications such as inhaled corticosteroids (ICS). Despite growing evidence about the efficacy of ICS following acute asthma exacerbations, controller medications are often not prescribed, resulting in poorly controlled asthma and recurrent exacerbations. METHODS We conducted a retrospective chart review using an Electronic Medical Record on patients less than 18 years of age who were admitted to Rush University Medical Center for asthma exacerbations between March 2019-March 2022. We recorded patient demographics including age, race, and ethnicity. We also recorded the frequency of ICS prescriptions that were provided and follow-up appointments with Pulmonology or Allergy and Immunology that were scheduled. RESULTS We evaluated 167 electronic patient charts. Fifty (30%) patients attended a follow up appointment after discharge. Nearly 40% of all patients had a repeat hospitalization or emergency visit for asthma exacerbation. The medical team provided an ICS prescription in 75% of all cases. Nearly every patient with moderate or severe persistent asthma classification received an ICS (96%), while only 54% of patients with unspecified asthma classification received an ICS. CONCLUSION One quarter of patients hospitalized with acute asthma exacerbations were not prescribed an ICS at discharge, which may have resulted in uncontrolled asthma symptoms and repeat exacerbations. Patients with an "unspecified" asthma classification at discharge were less likely to receive an ICS or attend follow-up appointments, however, they still had a high rate of repeat exacerbations. Accurate classification of asthma severity along with patient/provider education are important steps in ensuring that patients are discharged with appropriate education and support including rescue plans, medication scripts, and follow-up appointments. Children with uncontrolled asthma are at high risk for repeat exacerbations. Future prospective studies are needed to evaluate the positive impact that appropriate discharge education and medication management has on the rate of acute exacerbations.

Poster Number: 38

Session: Poster Presentation
Category: Clinical Practice
Trainee Rank: Rush Student RMC: M2

Nicholas Kosinski, Bachelor of Arts

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ICU SETTING AS A PREDICTOR OF POST-COMPASSIONATE EXTuBATION TIME TO DEATH

INTRODUCTION: Compassionate extubation (CE) is a medical procedure typically carried out in an intensive care unit (ICU) after comfort care is elected and death is expected. Different populations undergoing CE may exhibit different post-procedure survival outcomes. We hypothesize that patients in a neuroscience ICU (NSICU) will survive longer than patients in a medical ICU (MICU) after undergoing CE. METHODS : We conducted a single center retrospective observational cohort study to study patients who underwent CE in 2021. Patients were identified from a list of all patients in 2021 who had a CE order placed. Patients were included in the study if they underwent CE in either the MICU or NSICU and excluded if CE documentation was incomplete. Demographic characteristics and clinical data of the cohorts were recorded from manual chart abstraction. Statistics were run on SPSS (Version 26.0). A Mann-Whitney U test was used to compare length of stay (LOS) prior to CE and time to death (TTD) after CE, and $p < .05$ was used to define a statistically significant difference. RESULTS: Of 81 patients who had a CE order placed in 2021, 27 were in the MICU and 23 were in the NSICU. The median ages of patients in the MICU and NSICU were 69 and 67 years old, respectively, and 51.85% and 65.22% of the patients in the MICU and NSICU cohorts were male. The average BMIs in each of the cohorts were 29.07 and 28.16. Patients in the MICU cohort were most commonly either White (29.63%) or Hispanic/Latino (29.63%), while the majority (47.83%) of patients in the NSICU cohort were White. Patients in the MICU had a longer median LOS prior to CE than patients in the NSICU (9.63 days vs. 3.00 days, $p = .001$). Patients in the MICU experienced a shorter median TTD after CE compared to patients in the NSICU (25 mins vs. 195 mins, $p = .004$). CONCLUSIONS: In this single center observational cohort study, patients in the NSICU underwent CE after a shorter time in the ICU and survived longer afterwards than patients in the MICU. These findings may help guide end-of-life care discussions in the ICU.

Poster Number: 39

Session: Poster Presentation
Category: Clinical Practice
Trainee Rank: Clinical Fellow

Megan Kraemer, DO

Megan Kraemer (Rush), Tricia Johnson (Rush), Delaney Mulcahy (Rush), Leah Cerwinske (Rush), Kousiki Patra (Rush), Brad Appelhans (Rush), Jieun David (Rush), Katherine Bell (Boston Children's Hospital), Mandy Belfort (Boston Children's Hospital), Aloka Patel (Rush)

Steroid Exposure in the NICU is Associated with Decreased Fat-Free Mass in Preterm Infants at Discharge

BACKGROUND: Systemic corticosteroids are used to facilitate weaning respiratory support in the context of bronchopulmonary dysplasia (BPD) and the treatment of adrenal insufficiency in very preterm (VP) infants, despite known side effects. While it is known that corticosteroids increase fat mass in adults, their effect on body composition in very preterm infants has not been well-characterized. OBJECTIVE: To compare body composition, measured as fat free mass percentage (%FFM), at NICU discharge in VP infants exposed and not exposed to corticosteroids during hospitalization. METHODS: Prospective study of VP infants born at < 32 weeks gestational age (GA) or with a birth weight (BW) < 1500 grams and admitted to our NICU within 48 hours of life. Exclusion criteria: congenital gastrointestinal anomaly, intestinal perforation, necrotizing enterocolitis, congenital heart disease, and chromosomal abnormalities. We abstracted data from the medical record for anthropometrics, medications, type of feeding, respiratory support at 36 weeks' post-menstrual age, and infant and maternal demographics. BPD severity was stratified based on modified Jensen criteria. Body composition measurements were obtained using bioelectrical impedance analysis (BIA) with the BodyStat Quadscan 4000 within 72 hours preceding discharge. The BIA measurements were used in the Kushner equation to calculate %FFM for each infant. The %FFM in steroid-exposed and non-steroid-exposed cohorts was compared using Mann-Whitney U tests. RESULTS: 33 infants (79% male) were enrolled with mean BW 1019 ± 331 g and mean GA 28 ± 2 weeks with 9 (27%) steroid-exposed infants (Table 1). Bivariate analysis demonstrated that %FFM at NICU discharge was lower in the steroid-exposed cohort compared to the non-steroid-exposed cohort (74% vs. 91%, p= .043). CONCLUSION: Steroid exposure was associated with decreased %FFM percentage in VP infants. Steroids are most used in VP infants with BPD, these preliminary findings support continuing enrollment to account for potential confounding by severe BPD. Continued follow-up of these infants and repeat measurements of their body composition at standardized corrected ages will be important to account for differences in the cohorts' corrected ages at time of NICU discharge and to evaluate longitudinal trends.

Poster Number: 40

Session: Poster Presentation
Category: Clinical Practice
Trainee Rank: Clinical Resident

Megan Marshalla, MD, BS

Marshalla M, Kelly S, Bruck N, Dewdney S, Ahmed A, Stephan JM, Ladanyi A, Pytlowany E.

Effect of patient engagement platform on use of emergency medical services for patients recovering from laparotomy

INTRODUCTIOTN: Our objective was to determine whether use of a patient engagement platform for triage of postoperative symptoms reduces use of emergency medical services, hospital readmissions, and phone calls and electronic messages to staff. METHODS: Patients undergoing laparotomy with the Gynecologic Oncology Division are given free preoperative access to an interactive platform for monitoring and triaging postoperative symptoms. This is a retrospective cohort study comparing self-selected platform users with a randomized sample of non-platform users from 2018-2021. The primary outcome was number of emergency department (ED) visits in the first 30 days postoperatively. Secondary outcomes were phone calls to medical staff, electronic messages to staff, and hospital readmissions in the first 30 days postoperatively. Demographic data was compared between groups. Chi square, logistic regression models, Mann Whitney U test, and Spearman correlation were used to determine significance ($p<0.05$). RESULTS: A total of 224 patients were included in the study, 151 self-selected platform users and 73 non-users. Study groups had no difference in age, race/ethnicity, history of abdominal surgery, Charleston comorbidity index, BMI, attending physician, cancer type, cancer stage, year of service (before or after onset of COVID-19 pandemic), length of hospitalization, or estimated blood loss. The study groups only differed by length of surgery (185.32 minutes for platform users vs. 158.22 minutes for non-users, $p=0.0388$). There was no difference in the primary outcome when studied as mean number of ED visits per patient (0.15 vs. 0.15, for platform users and non-users respectively, $p=0.8354$) or as frequency within the study groups (12.58% vs. 13.70%, $p=0.8156$). There were no differences in phone calls (0.92 vs. 0.85 calls per patient, $p=0.387$), electronic messages to medical staff (0.25 vs. 0.19 messages per patient, $p=0.274$) or readmission rate (9.27% vs. 6.85%, $p=0.542$). When controlling for length of surgery, there was likewise no difference in ED visits, readmissions, calls and electronic messages to staff. Within the platform, 51% of patients utilized the software after enrolling. Of those patients, 42% of patients believed the platform helped them avoid a phone call, and 91% would recommend the platform to other patients. CONCLUSION: We found that patient platform use was not associated with a reduction in

Poster Number: 41

Session: Poster Presentation
Category: Clinical Practice
Trainee Rank: Rush Student CHS: Masters

Ahrianna Mitchell-Sodipe, BS

Presenting Author: Ahrianna Mitchell-Sodipe, BS (RUSH) Co-Authors: Sarah Peterson PhD, RD, LDN (Rush), Amanda Van Jacobs MS, RDN, CNSC, CCTD (Rush)

EXPLORING THE ASSOCIATION BETWEEN FOOD INSECURITY AND FRAILTY AMONGST WAITLISTED LIVER TRANSPLANT PATIENTS AT RUMG

INTRODUCTION Frailty, a clinical syndrome characterized by the decline in reserve and function of physiologic systems, has been identified as a risk factor for worse outcomes in patients with advanced liver disease. However, minimal information is available to describe how food access and intake influence frailty. The aim of this study was to examine the association between food insecurity and frailty among patients with liver disease at Rush University Medical Group (RUMG). METHODS A retrospective, cross sectional study design was utilized. Adult patients with liver failure who were evaluated for liver transplant in 2022 were included. The liver frailty index (LFI, includes hand-grip strength, chair stands and balance) was measured at the initial visit; patients with a LFI score of ≥4.5 were categorized as frail. Food security was assessed using three questions: within the past 12 months (1) we worried whether our food would run out before we got money to buy more, (2) the food we bought just didn't last and we didn't have money to get more, and (3) we couldn't afford to eat balanced meals. Patients were given the option to respond often true, sometimes true, never true, or don't know; any response of often/sometimes true was categorized as food insecurity. A Fischer's exact test was used to determine if there was an association between food insecurity and frailty. RESULTS A total of 56 patients were included; 73% were male with a mean age of 56 years, mean BMI of 29.0 kg/m2, and mean MELDNa score of 14.9. The mean LFI score was 4.1 and 29% were frail. A total of 6 patients were food insecure; no association was observed frailty and food insecurity (frail: 6% versus non-frail: 13%, p=0.662). Patients who were food insecure were younger (47 vs 57 years, p=0.01) and had a non-significantly higher BMI (30.5 vs 28.9 kg/m2, p=0.067) and MELDNa score (16.2 vs 14.8, p=0.59) compared to those who were food secure. CONCLUSION Only 11% of patients were food insecure. No association was found between food insecurity and frailty. Additional research is needed to corroborate these findings in a larger sample size.

Poster Number: 42

Session: Poster Presentation

Category: Clinical Practice

Trainee Rank: Rush Student CHS: Clinical Doctorate

Taylor Newmark, Occupational Therapy Doctorate

Becky Ozelie, DHS, OTR/L (Rush) Taylor Newmark, OTDS (Rush) Maggie Moeller, OTDS (Rush)

IMPACT OF VIRTUAL SIMULATION-BASED LEVEL I FIELDWORK ON LEVEL II FIELDWORK PERFORMANCE

INTRODUCTION. Fieldwork is an essential part of a student's education and development to become competent in entry-level occupational therapy skills (ACOTE, 2018). The pandemic coupled with staffing shortages and an increase in academic programs resulted in academic fieldwork coordinators competing for a limited number of spots (Bethea et al., 2014; Quail et al., 2016). The American Council of Occupational Therapy (ACOTE) integrated the use of simulation as an instructional method to meet Standard C.1.9 for Fieldwork I (ACOTE, 2018). METHODS. This study used a retrospective cohort design to determine the impact of virtual simulation-based Level I fieldwork on performance in Level II fieldwork. Thirty-seven students' Level II fieldwork performance evaluation scores were compared based on their placement in a traditional or simulation-based Level IA fieldwork. Nineteen students were reassigned to Simucase to complete their Level IA fieldwork due to the global pandemic, and the remaining eighteen completed their traditional setting as scheduled. All students then completed a traditional Level IB. The Fieldwork Performance Evaluation (FWPE) was utilized by the students' fieldwork educators to assess their performance. RESULTS. There was no statistically significant difference between the students that completed the simulation-based Level I fieldwork and the students that completed both Level I experiences in person in their Level IIA and Level IIB FWPE scores ($p=0.683$, $p=0.889$). Additionally, there was no statistically significant difference found between the subsections on the FWPE between the two groups. CONCLUSION. The results of this study advances the current literature regarding the use of simulation-based experiences in occupational therapy education by displaying a comparable alternative to the traditional fieldwork model.

Poster Number: 43

Session: Poster Presentation
Category: Clinical Practice
Trainee Rank: Clinical Fellow

Matas Orentas, DO

Matas Orentas (RUMC) Yanyu Zhang (RUMC) Joshlean Fair (RUMC) Aleksandra Bukiej (RUMC)

EOSINOPHILIC GRANULOMATOSIS WITH POLYANGIITIS CLINICAL MANIFESTATIONS AND OUTCOMES: A RETROSPECTIVE COHORT ANALYSIS OF 38 PATIENTS FROM RUSH UNIVERSITY MEDICAL CENTER

INTRODUCTION: This study characterized the clinical manifestations and outcomes of a cohort of Rush University Medical Center (RUMC) patients with eosinophilic granulomatosis with polyangiitis (EGPA). METHODS: Retrospective cohort analysis of EGPA patients at RUMC from 1/1/2010-12/31/2021. Clinical characteristics, treatment, and outcome were analyzed, using Fisher's Exact Test and Chi-Square Test to perform comparisons. RESULTS: This cohort included 38 patients with EGPA. 55% were female, 68% were Caucasian, and mean age at diagnosis was 57.7 (+/- 16.3). 95% had pulmonary involvement. 37% were anti-neutrophil cytoplasmic antibody (ANCA) positive. There was no statistically significant difference in clinical characteristics, treatment strategies, or outcomes when comparing ANCA positive to ANCA negative patients. CONCLUSION: This analysis describes the clinical characteristics, treatment, and outcomes of a cohort of RUMC patients with EGPA. Prevalence of pulmonary involvement and ANCA positivity was similar to that reported in the literature. Unlike previous studies which reported higher prevalence of neurologic and kidney involvement in ANCA positive EGPA patients our study did not find a statistically significant difference in characteristics of ANCA positive patients when compared to ANCA negative patients.

Poster Number: 44

Session: Poster Presentation
Category: Clinical Practice
Trainee Rank: Clinical Resident

Malina Patel, MD

Malina PateL (RUSH); Ellen Stephen (RUSH); Laura Laursen (RUSH), Sindhura Bandi (RUSH)

IMPLEMENTING A REFERRAL PROTOCOL FOR PENICILLIN ALLERGY TESTING OF PREGNANT WOMEN

INTRODUCTION: Recent American College of Obstetrics and Gynecology (ACOG) guidelines advocate for the safety of penicillin allergy testing in pregnant women. Penicillin allergy de-labeling allows for preferred peripartum antibiotic therapy for Group B Streptococcus (GBS) prophylaxis and reduces IV antibiotics and neonatal ICU (NICU) care for newborns. Yet, there remains widespread hesitance to perform penicillin allergy testing on pregnant women. METHODS: This is a prospective cohort study. We developed a single-academic center referral protocol for pregnant patients with penicillin allergy to be evaluated by allergy and immunology (A/I) prior to delivery. The primary endpoint is rate of penicillin allergy de-labeling. Secondary endpoints included use of intrapartum antibiotics for GBS prophylaxis in the mother and IV antibiotic use in the neonates. RESULTS: The study is ongoing, and to-date we have seen 41 pregnant women in A/I clinic for penicillin allergy evaluation. Twenty-four patients completed allergy testing. Of these, nineteen (76%) were de-labeled and two experienced positive amoxicillin oral challenge (one delayed rash and one immediate possibly IgE-mediated symptom). Eight de-labeled patients have delivered, three was GBS-positive and successfully received preferred penicillin (ampicillin) for intrapartum prophylaxis without event. CONCLUSION: Implementing a referral pathway directly from the obstetrics clinic for penicillin allergy evaluation is a streamlined method to potentially remove penicillin allergy labels in pregnant patients prior to delivery. In our study, the majority of patients were successfully de-labeled. Further data is needed to assess safety outcomes as well as use of alternative antibiotics and need for IV antibiotics in the neonate.

Poster Number: 45

Session: Poster Presentation
Category: Clinical Practice
Trainee Rank: Rush Student RMC: M2

Hayley Petit, BS

Hayley J. Petit (a), Gwyneth A. Sullivan (b), Ian M. Hughes (c), Katie L. Pittman (c), Jonathan A. Myers (b), Sarah M. Cocoma (d), Brian C. Gulack (e), Ami N. Shah (e) (a) Rush University Medical Center, Rush Medical College, 600 South Paulina Street Suite 524, Chicago, IL, 60612, USA (b) Rush University Medical Center, Department of Surgery, 1725 West Harrison Street, Professional Building Suites 810 and 818, Chicago, IL, 60612, USA (c) Rush University Medical Center, Environmental Sustainability, 1733 West Congress Parkway, Pavilion Building Suite 120, Chicago, IL, USA (d) Rush University Medical Center, Department of Anesthesiology, 1653 West Congress Parkway, Jelke 7, Chicago, IL, 60612, USA (e) Rush University Medical Center, Division of Pediatric Surgery, Department of Surgery, 1725 West Harrison Street, Professional Building Suite 710, Chicago, IL, 60612, USA

EXPLORING BARRIERS AND FACILITATORS TO REDUCING THE ENVIRONMENTAL IMPACT OF THE OPERATING ROOM

INTRODUCTION The operating room (OR) is a major contributor to greenhouse gas emissions both nationally and globally. Successful implementation of quality improvement initiatives requires understanding of key stakeholders' perspectives of the issues at hand. Our aim was to explore surgical, anesthesia, and OR staff member perspectives on barriers and facilitators to reducing OR waste. METHODS Identified stakeholders from a single academic medical center were interviewed to identify important barriers and facilitators to reducing surgical waste. Two team members with qualitative research experience used deductive logic guided by the Theoretical Domains Framework (TDF) of behavior change to identify themes within transcripts. RESULTS Nineteen participants including surgeons (n=3, 15.8%), surgical residents (n=5, 26.3%), an anesthesiologist (n=1, 5.3%), anesthesia residents (n=2, 10.5%), nurse anesthetists (n=2, 10.5%), nurses (n=5, 26.3%), and a surgical technologist (n=1, 5.3%) were interviewed. Twelve of the 14 themes within the TDF were discovered in transcripts. Barriers within these themes included lack of resources to pursue environmental sustainability in the OR and the necessity of maintaining sterility for patient safety. Facilitators included emphasizing surgeon leadership within the OR to reduce unused supplies and spreading awareness of the environmental and economic impact of surgical waste. CONCLUSION Interviewed stakeholders were able to identify areas where improvements around surgical waste reduction and management could be made at the institution by describing barriers and facilitators to sustainability-driven interventions. Future surgical waste reduction initiatives at this institution will be guided by these important perspectives.

Poster Number: 46

Session: Poster Presentation
Category: Clinical Practice
Trainee Rank: Rush Student CON: DNP

Carley Psik, Bachelor of Science in Nursing (currently completing the DNP-NNP program with expected graduation in April 2023)

Carley Psik, BSN, RNC-NICU Adelaide Caprio, MSN, APRN, ACCNS-S, RNC-NIC Laura Seske, MD, NICU Director of QI/PS

REDUCING TRANSFERS FROM 8 ATRIUM (MBU) to NICU for ASYMPTOMATIC HYPOGLYCEMIA MANAGEMENT

INTRODUCTION Despite a detailed screening algorithm for at-risk infants and the use of various evidenced based practices for neonatal hypoglycemia management, there continues to be a monthly average of 3-4 infants requiring transfer from the mother baby unit to the NICU at RUMC for management of asymptomatic hypoglycemia. In the month of October 2021 alone, 10 infants were transferred from MBU to the NICU solely due to asymptomatic hypoglycemia. The transfer of infants between units results in parental-infant separation, interrupted breastfeeding, increased length of stay for the infant, and increased healthcare costs secondary to use of a NICU bed and staffing for an otherwise healthy infant. Detailed chart audits of 20 out of the 40 infants transferred from MBU to the NICU in the year 2021 revealed that the current hypoglycemia screening algorithm and associated interventions are not consistently carried out as intended, highlighting an opportunity for improvement. METHODS Several interventions were implemented to improve patient care and reduce the need for neonatal transfers from MBU to NICU. These included an educational component consisting of a virtual learning module assigned to all RNs in L&D, MBU, & Float pool followed by in-services on the unit to review proper glucose gel administration and heel stick technique. New resources were also developed, which included a RN badge card for quick reference, a crib card to increase visualization for parents and staff, and a parental educational hand out to provide consistent and accurate information. RESULTS & CONCLUSION After a 10-week education period, 100% completion of the online learning module was obtained and 75% of staff completed the in-service. Go-live of the new resources took place on 12/12/22, with formal data collection taking place for 6 weeks (end date is 1/22/23). Data obtained thus far has been very promising with a total of 30 at-risk infants being cared for in MBU and only 2 infants requiring NICU admission (a decrease from previous trends). Additionally, staff compliance with key interventions in the hypoglycemia screening protocol has greatly improved post intervention implementation. Improving current practices via staff education and incorporation of new interventions is directly benefiting infants and their families.

Poster Number: 47
Session: Oral Presentation
Category: Clinical Practice
Trainee Rank: Clinical Resident

Sabrina Rabin, MD

Sabrina Rabin, MD (EM PGY1 Rush), Nicholas Cozzi, MD, MBA (Rush), Carolyn Clayton, MD (Rush), Edward Ward, MD (Rush), Yanina Purim Shem-Tov, MD (Rush), Miranda Bradley, MD (EM PGY2 Rush), Savannah Benko, MD (EM PGY2 Rush), Ololade Akinfemiwa, MD (EM PGY2 Rush), Sophia Redpath (M1 Rush), William Mati (M1 Rush), Prakriti Mehta (M2 Rush), Pam Manning (Rush)

PERCEPTION OF EMERGENCY DEPARTMENT VIOLENCE BASED ON ROLE

INTRODUCTION: Violence in the emergency department (ED) is commonplace. A variety of health care members with different roles work in the department, leading to varying interactions with patients and their families. This could lead to differing rates of violence and the perceived cause of violence by provider type. METHODS: An IRB-approved study using a validated ACEP survey reproduced with permission regarding perceptions of violence was emailed to members of the ED with responses being confidential and anonymous. Emails were sent to resident physicians, attending physicians, ED technicians, nurses, and other department staff (advanced practice providers, social workers, pharmacists, clerks, child life specialists, and additional staff). Our study was performed at an urban, large academic center and an affiliated community hospital. Survey questions asked the number of verbal or physical attacks and the hypothesized inciting factor stratified by provider role in the department. RESULTS: The survey had 119 responses, with 85% from the academic center and 15% from the community hospital. Respondents were 34% nurses, 21% attendings, 18% residents, 9% ED technicians and 18% other. 56% of nurses, 26% of attendings, 11% of residents, and 7% of ED technicians reported physical assaults. Except for pharmacists and child life specialists, each subgroup noted one incident of verbal assault, with 39% of nurses experiencing verbal assaults. Nurses and ED technicians cited boarding time as the most common trigger for assault, even more than psychiatric illness, and intoxication from drugs or alcohol. In contrast, both attendings and residents cited psychiatric illness and intoxication as the inciting cause of assault. After an assault 45% of ED technicians, 27% of nurses, 13% of attendings, and 0% of residents reported the assault. CONCLUSIONS: ED violence appears to be experienced differently based on role. Our data suggests nursing noted the highest rates of both physical and verbal violence. Physicians cited psychiatric illness and intoxication as precipitating factors to violence; however, ED technicians and nurses, who were most likely to be assaulted in the ED, cited boarding as the most likely source of verbal and physical violence. The data also suggest that the rate of reporting violence was also influenced by role.

Poster Number: 48

Session: Poster Presentation
Category: Clinical Practice
Trainee Rank: Rush Student RMC: M1

Sophia Redpath, BA

Sophia Redpath (M1) Nicholas Cozzi, MD MBA Carolyn Clayton, MD Edward Ward, MD Yanina Purim Shem-Tov, MD Dr. Miranda Bradley (EM PGY-2) Dr. Savannah Benko (EM PGY-2) Dr. Ololade Akinfemiwa (EM PGY-2) Dr. Sabrina Rabin (PGY-1) William Mati (M1) Prakriti Mehta (M2) Pam Manning

GENDER-BASED DIFFERENCES OF EXPERIENCED EMERGENCY DEPARTMENT VIOLENCE: A REVIEW

INTRODUCTION The American College of Emergency Physicians report an increase in violence within emergency departments (EDs) over the last five years. The purpose of this study is to determine the differences in violence based on gender, and is part of a larger study examining violence in the ED and potential solutions. METHODS An IRB-approved research study was initiated using an ACEP validated survey to poll ED staff regarding perception of safety and personal experience with verbal and physical assault.The majority of questions used a discrete answer format to enumerate the frequency of assault experienced in the ED and the correlation to other data points such as sex assigned at birth (SAAB), gender, role in the ED, type of assault, and perpetrator of assault. RESULTS Of the 119 responses obtained, 71.4% identified as women, 26.0% identified as men. Of the total surveyed staff, 31.9% reported being physically assaulted while on shift, and 65.5% reported witnessing a physical assault. Of the group that reported experiencing physical assault in the ED, 71.0% were women and 26.3% were men. Of the group reporting having witnessed assault, 75.6% were women and 20.5% were men. Of the total surveyed staff, 81.5% reported having been verbally assaulted while at work, and 62.2% reported witnessing a verbal assault. Of the group reporting being verbally assaulted, 71.1% were women and 25.7% were men. CONCLUSION Our preliminary work suggests that women are disproportionately the victims of both physical and verbal assault, while also witnessing more assaults than their male counterparts. There are several confounding factors that may be affecting the reported data, such as the differences in gender by role in the ED, positions more often experiencing assault, the difference in proportion of women vs men who took the survey, and the gender ratio of the ED staff. Therefore while the reported results are concerning, more research is necessary to make a broader conclusion about gender correlated violence in the ED.

Poster Number: 49

Session: Poster Presentation
Category: Clinical Practice
Trainee Rank: Rush Student CHS: Masters

Agne Siksnaite, B.S. - Nutrition & Dietetics

Sarah Peterson PhD, RD, LDN (Rush) & Amanda Van Jacobs MS, RDN, CNSC, CCTD (Rush)

PREVALENCE OF FRAILTY AND ASSOCIATED OUTCOMES AMONG PATIENTS WITH CIRRHOSIS UNDERGOING LIVER TRANSPLANT

INTRODUCTION Frailty is characterized by the loss of reserve and resistance to stress factors. The advancement of liver disease is associated with inflammation and decreased nutritional status that can lead to frailty in patients awaiting transplant. The aim of this study was to investigate whether patients with cirrhosis who are classified as frail have worse outcomes compared to those not classified as frail at Rush University Medical Group (RUMG). METHODS A retrospective, cross-sectional study design was utilized. Patients who were at least 18 years old, diagnosed with liver failure, and referred, evaluated, or listed for liver transplant between 2019 and 2021 were included. The liver frailty index (LFI, which includes assessment of hand-grip strength, chair stands and balance) was measured at the initial visit. The frail group was defined as having an LFI score of ≥4.5, and the non-frail group <4.5. Delisting from waitlist, death on waitlist, length of stay, liver transplant rejection episodes, readmissions, and death after transplant were recorded. Percentage and median (interquartile range) were used to describe categorical and continuous data; a Chi-Square and Mann-Whitney U test were used to examine outcomes among frail versus non-frail patients. RESULTS Of 212 cirrhosis patients, 63% were male, the median age and MELDNa score at initial visit was 58 years (51-65) and 14 (10-20). The median LFI was 4.3 (3.8-4.9), with 43% classified as frail. A total of 58 patients were transplanted, 27% of whom were frail. No difference in length of stay following transplant surgery; biliary issues at 3-months; rejection, hepatic artery thrombosis, number of readmissions, and death at 1-year was observed between the frail versus non-frail group. A non-statistically significant difference in the number of subjects who returned to the operating room post-transplant (52% and 18%, p=0.07) and death <3-years post-transplant (29% and 3%, p=0.07) was observed between frail and non-frail patients. CONCLUSION Frailty was not associated with worse outcomes following liver transplant. However, the results may be limited due to the small sample size. Further research is needed to assess whether the LFI tool is associated with worse outcomes among patients undergoing liver transplant.

Poster Number: 50
Session: Poster Presentation
Category: Clinical Practice
Trainee Rank: Rush Student RMC: M3

Mohit Uppal, BS

Mohit Uppal, B.S.; Terrence Murphy, M.D., M.P.H.; Kenya M. Williams, M.D. Department of Ophthalmology, Rush University Medical Center, Chicago, IL, United States.

WHO MAKES THE CUT: ANALYSIS AND STRATIFICATION OF THE TREATMENT OF TRAUMATIC EYELID INJURIES

INTRODUCTION While eyelid laceration repairs can be performed by many different specialties, no literature currently exists regarding the incidence of such repairs. We performed a retrospective chart analysis to determine the frequency of eyelid lacerations and respective treatment methods performed by different specialties. METHODS The electronic health record was queried using the International Classification of Diseases 9 and 10 codes to identify cases of eyelid laceration between 2011 and 2020 within the Rush University Medical Center healthcare system, what specialty was involved in the treatment, and the respective method of treatment of each case. The treatment method was classified into two categories: suture repair or non-suture repair. RESULTS Of the 468 total cases of eyelid laceration identified, 303 (64.74%) were treated by emergency medicine, 98 (20.94%) by ophthalmology, 27 (5.77%) by plastic surgery, 20 (4.27%) by primary care, 11 (2.35%) by pediatrics, and 9 (1.92%) by otolaryngology. Of the total number of cases, 310 (66.24%) were treated using sutures. Suture-treatment occurred during 181 (59.74%) of emergency medicine's total cases, 86 (87.76%) of ophthalmology's total cases, 26 (96.30%) of plastic surgery's cases, 6 (30%) of primary care's cases, 3 (27.27%) of pediatrics' cases, and 8 (88.89%) of otolaryngology's cases. Year of presentation significantly affected the number of cases that ophthalmology treated, with ophthalmology cases increasing over time (p=0.032). CONCLUSION All specialties besides primary care and pediatrics utilized sutures during treatment in the majority of cases. Although ophthalmology-involvement has increased throughout the years, ophthalmology was only involved in a minority of total eyelid laceration cases while emergency medicine was involved in most cases. According to the ACGME, only ophthalmology residents, opposed to residents of other specialties, are required to gain experience treating eyelid lacerations during their training. Despite this uniquely specialized training, ophthalmologist-involvement in eyelid laceration cases is relatively low compared to other specialties, warranting further studies to determine if differences in outcomes exist between specialties.

Poster Number: 51

Session: Poster Presentation
Category: Clinical Practice
Trainee Rank: Rush Student CHS: Masters

Maria Vargas, MS, RD

Maria Vargas, Sarah Peterson, and Sandra Gomez Department of Clinical Nutrition, College of Health Sciences

THE RELATIONSHIP BETWEEN SKELETAL MUSCLE AND INFLAMMATION IN PROSTATE CANCER

INTRODUCTION: Current studies have indicated that cancer patients with sarcopenia (low muscle mass), elevated visceral adipose tissue (VAT), and myosteatosis (low muscle quality) could have worse clinical outcomes, including increased drug toxicity and low survival rates. Excess systemic inflammation has also been associated with adverse outcomes in cancer populations. The combination of compromised skeletal muscle with high inflammation and visceral adipose tissue have been implicated worsen prognosis; however, this has to yet to be examined in men with prostate cancer (PC). Thus, the purpose of this retrospective study was to investigate the relationship between abdominal adipose tissue, skeletal muscle phenotypes, and inflammation in PC survivors at Rush University Medical Center (RUMC). METHODS: A retrospective, cross-sectional review of PC patients treated between 2014-2016 was conducted. Body composition parameters (skeletal muscle index [SMI], muscle attenuation, visceral adipose tissue index [VATI] and subcutaneous adipose tissue index [SATI]) were measured at the third lumbar (L3) region by computed tomography (CT). Sarcopenia, sarcopenic obesity, and myosteatosis were defined using established cut points. Inflammation was assessed by calculating the neutrophil to lymphocyte ratio [NLR] and defined as NLR>2.5. The prevalence of sarcopenia, sarcopenic obesity, myosteatosis, and elevated NLR was reported. Sphearman's Rho correlation was used to assess the relationship between ATI, SMI, myosteatosis, and NLR. RESULTS: A total of 61 patients were included, the mean age was 69.0 years and the mean BMI was 29.0 kg/m2. Prevalence of sarcopenia, sarcopenic obesity, and high NLR was 48%, 16% and 64%, respectively. Patients with sarcopenic had a higher, but not significantly different NLR compared to non-sarcopenic patients (4.66 vs 2.34, $p=0.064$). A significant, moderate correlation was observed between SMI and NLR ($r=-0.431$, $p<0.05$). CONCLUSION: There was a high prevalence of sarcopenia and elevated NLR. Sarcopenic patients presented higher NLR than non-sarcopenic patients. There was a significant association and moderate correlation between SMI and NLR. Future research studies should explore the relationship between adipose tissue, skeletal muscle phenotypes, and inflammation.

Poster Number: 52

Session: Poster Presentation

Category: Communication Health

Trainee Rank: Rush Student CHS: Masters

Claire Ely, Speech-Language Pathology

Anne Buffkin, RU Graduate Student

Using Sensory Tricks to Improve Speech Intelligibility in Oromandibular Dystonia

INTRODUCTION Dystonia is a movement disorder characterized by spontaneous, involuntary movements occurring in isolation or in combination with other disorders. Oromandibular dystonia, an idiopathic focal type of dystonia, impacts one area of the body including the jaw, tongue, or lips. It can lead to hyperkinetic dysarthria affecting speech intelligibility through disrupted articulatory coordination, hypernasality, and disrupted fluency, as well as a variety of consequences in communication participation. Treatment interventions can be used as compensatory strategies to manage the symptoms. This includes botulinum toxins and sensory tricks, which include the incorporation of a physical position to temporarily alleviate dystonic symptoms in the affected area. METHODS Patient is a 67-year-old female diagnosed with oromandibular dystonia with symptoms including involuntary tongue thrusting and lip pursing. Patient A was given a sensory trick using a tongue depressor, to impede dystonic movement during speech production by enforcing a spread lip posture. Patient A was also given buccal muscle and neck strengthening exercises to increase endurance and relaxation exercises to calm her physiologically and to reduce her anxiety regarding speaking. Phrasing strategies such as a slow pace with frequent pauses and light articulatory contact with words that require lip rounding were also used to reduce interruptions during speech production in order to achieve better speech intelligibility. RESULTS Following 18 weeks of treatment, the amount of dystonic movement while speaking decreased, intelligibility was 90% or higher, and her fluency improved in almost all areas. Her speaking rate increased to a more average speed with improved intonation and loudness. Patient A was in the process of being fitted for an orthodontic appliance as a more permanent solution to help stabilize her jaw without the use of the tongue depressor. She was receiving dual sessions with speech-language pathology and orofacial orthodontist to assess her speech during the orthodontic appliance trials. CONCLUSION In conclusion, oromandibular dystonia is a focal dystonia of movement disorder that can impact the speech mechanism and reduce speech intelligibility. Using sensory tricks may be used as treatment strategies in conjunction with muscle relaxation and muscle endurance training to improve speech intelligibility.

Poster Number: 53
Session: Oral Presentation
Category: Communication Health
Trainee Rank: Rush Student CON: DNP

Marissa Nicastro - DiGiorgio, DNP - FNP

Marissa Nicastro - DiGiorgio, DNP (Rush University); Masako Mayahara, PhD (Rush University), Katie Kean, BSN (Rush University Medical Center); Theresa Asai, BSN (Rush University Medical Center)

EVALUATION OF INTERPRETER SERVICE UTILIZATION AT AN INFUSION CLINIC

INTRODUCTION: The number of patients with limited English proficiency (LEP) in the U.S. is rapidly increasing. To ensure patients' understanding of their medical care, the Centers for Medicare and Medicaid Services mandates interpreter services be provided to patients with LEP. An infusion clinic at a large academic medical center in the Midwest primarily provides care to cancer patients with LEP. Policy at the infusion clinic indicates that by law, interpreter services must be provided to patients with LEP and when in-person interpreters are unavailable, virtual interpreters should be utilized. A retrospective chart review of patient visits (n=2790) for October 2021 revealed that despite the policy, only 22% of patients with LEP at the infusion clinic were offered interpreter services. PURPOSE: The purpose of this project was to improve adherence to the interpreter service protocol at the infusion clinic. METHODS: The clinic nursing staff were invited to participate in a survey to identify barriers to adherence to the interpreter service utilization policy. It was found that although iPads with a virtual interpreter service software were available at the clinic, nurses did not always utilize them because only two iPads were available for the seven-pod clinic. During September 2022, the nursing staff at the infusion clinic were provided education regarding interpreter services by using a quasi-experimental pre- and posttest study design. Additionally, in coordination with the IT and interpreter service departments, the infusion clinic was given five additional iPads for a total of seven iPads. RESULTS: A post-intervention chart review of patient visits (n=2563) for October 2022 resulted in 60% of patients with LEP being offered interpreter services. Data was analyzed by the statistical software, SPSS Statistics, as well as with Excel data analysis. CONCLUSION: Nursing education and resource allocation were effective in increasing interpreter service utilization at an infusion clinic serving cancer patients with diverse backgrounds. Use of interpreter services is critical to improving patient care because of the variety of treatment regimens and potential adverse effects. Further studies are needed to examine the effects that interpreter services have on emergency visits, hospitalizations, and patient outcomes.

Poster Number: 54

Session: Poster Presentation
Category: Communication Health
Trainee Rank: Rush Student CON: DNP

Stephanie Sluzinski, BSN

Stephanie Sluzinski (Rush), Dr.Sarah Ailey (Rush)

EVALUATION OF A COMMUNICATION PROTOCOL AIMED AT IMPROVING GOAL ACHIEVEMENT FOR INDIVIDUALS WITH INTELLECTUAL AND DEVELOPMENTAL DISABILITIES

Individuals with intellectual and developmental disabilities (IDD) have a higher mortality rate and reduced life expectancy due to insufficient screening practices and communication processes. The health risk screening tool's (HRST) generated health care level is strongly associated with risk of health destabilization and mortality of individuals with IDD. The inconsistent use of the HRST and lack of communication protocols regarding health issues has led to inaccurate documentation, delayed communication, and disjointed efforts to prevent resident health destabilization. PURPOSE: To evaluate the effectiveness of a newly implemented, standardized communication protocol at a state-funded community organization during an interprofessional experience (IPE) service-learning pilot program, in collaboration with a large, academic medical center, aimed at creating, working towards, and achieving wellness goals. FRAMEWORK: PRECEDE-PROCEED is used as the framework for this quality improvement project. SETTING: A community organization in the Midwest that provides intermediate care facilities (ICF) for individuals with IDD. PROGRAM: Based on a community assessment using PRECEDE, interprofessional student teams partnered with a resident with IDD and their staff to create wellness goals with action plans over three virtual visits from September-November 2022. PARTICIPANTS: Twenty interprofessional students made up seven teams who worked with pairs of seven ICF residents and their staff person. DATA ANALYSIS METHODS: Using PROCEED for evaluation, descriptive statistics are being used to analyze quantitative data obtained through pre-and post- intervention surveys, electronic chart review, and pre- and post- HRST health care level comparisons to evaluate the effectiveness of the communication protocol. Staff were also surveyed regarding their satisfaction of organizational communication regarding health information and wellness goals. Narrative analysis methods are being used to analyze qualitative data obtained through pre- and post- intervention surveys and standardized, serial interviews with participating staff after every IPE wellness visit. DISCUSSION: As of December 2022, five of the seven residents with IDD made progress towards their established wellness goal. Data analysis is currently in process; data being analyzed includes the difference in HRST health care levels pre- versus post-intervention, goal achievement in relation to consistency of communication protocol use, and staff satisfaction with bi-directional communication of health information.

Poster Number: 55

Session: Poster Presentation
Category: Community Health
Trainee Rank: Rush Student RMC: M3

Kai DeBus, B.S.

Kai DeBus (Rush); José Armando García (UNIBE); Charysmel Peña (UASD); Kate Dunckley (Rush); Ashok Jagasia (Rush)

Implementation of Pediatric Hearing Screening Program in the Dominican Republic

INTRODUCTION Early hearing screening is critical for minimizing developmental delays in language, communication, and cognitive development. However many countries, predominantly low and middle income countries, have no standardized, nationwide hearing screenings. As a result, national population data about pediatric hearing loss prevalence and otologic disorders is severely limited. The aim of this study was to report on the expansion of a pediatric hearing screening program developed in conjunction with a local NGO in the Dominican Republic, measure otologic health in school-age children and assess the extent of hearing loss in children who live in the capital Santo Domingo. METHODS This is a quantitative, descriptive study performed involving subjects from a K-12 school located in Santo Domingo. This study received NHSR acknowledgement and Rush IRB exemption. Hearing screenings were performed on 243 children between the ages of 3 to 17 years old. A 5-day long hearing screening was performed. All tests were conducted for free. The hearing screening included otoscopy, tympanometry, audiometry, and an otoacoustic emissions (OAE) test for each student. Testing was conducted in a quiet, isolated room in the back of the school library. First, otoscopy was performed in both ears. Audiometry confirmed screening thresholds at 25dB at 500 Hz, 1000 Hz, 2000 Hz and 4000 Hz. Patients then underwent an otoacoustic emissions test. Lastly, a tympanometer was used to record normal, negative, or flat pressure. RESULTS Of 243 patients (486 ears) screened in Santo Domingo, 41 children (16.9%) presented with abnormal otoscopic results. This included impacted cerumen, tympanic perforations, otitis media, and ear canal foreign objects. Tympanometric testing revealed 7 students (3.2%) with abnormal results, including no peak and negative pressure. Two students (0.8%) did not tolerate OAEs. Three students (1.2%) failed audiometric screening and were referred for a comprehensive audiological examination as possible hearing aid candidates. CONCLUSION The prevalence of hearing loss among the pediatric patients tested in Santo Domingo was 1.2%. Almost 17% of children presented with abnormal otoscopic results. Hearing screenings, developed in collaboration with local organizations, are critical for detecting hearing loss and otologic disorders in school-age children.

Poster Number: 56

Session: Poster Presentation

Category: Community Health

Trainee Rank: Rush Student CHS: Clinical Doctorate

Kristi Escobar, BS in Kinesiology with a minor in pyschology

Kristi Escobar, Rush University Megan Sebahar, Rush University Lilly Calvert, Rush University

OCCUPATIONAL THERAPY AND HOMELESSNESS: SERVICE UTILIZATION IN A COMMUNITY-BASED SETTING

OBJECTIVE: The aim of this research study is to understand occupational therapy service utilization at an urban community engagement center by people experiencing homeless (PEH). To address this aim, a thematic analysis was performed on occupational therapy documentation over the course of one month. Common themes regarding the type and quantity of therapy intervention were determined. METHODS: A thematic analysis was completed on occupational therapy documentation at an urban community site using steps from Braun and Clark (2006). Notes were reviewed for clients 18 years or older who received services at the center during August 2021. A maximum of 10 notes were reviewed for each client to accommodate saturation. A total of 178 therapy notes were reviewed from 37 participants. RESULTS: 10 themes across 178 treatment notes were identified. The most prevalent themes identified in documentation were life skills (93), resource access (98), mental health interventions (89), and health management interventions (81). CONCLUSION: Thematic analysis findings indicate that the greatest areas of need for PEH include development of life skills, access to resources, and mental and physical health management. These findings have implications for community-based settings, as PEH are seen to benefit from interventions and resources that support occupational wellness and engagement.

Poster Number: 57

Session: Poster Presentation
Category: Community Health
Trainee Rank: Rush Student RMC: M2

Samantha Esposito, B.S.

Samantha Esposito, BS, John Toms III, MS, Laura Pabalan, MD, Karen Lui, MD; Rush University Medical Center, Department of Pediatrics

CHILDREN AND YOUTH ENRICHMENT PROGRAM'S NEED ASSESSMENT EVALUATING THE NEEDS OF CHILDREN IN FAMILIES EXPERIENCING HOMELESSNESS

INTRODUCTION: Despite the plethora of data corroborating the greater health risk of children experiencing homelessness, there is a lack of data highlighting the unmet needs of families experiencing homelessness and their barriers to access existing programs. This community project aims to provide such data outlining unmet needs of children experiencing homelessness, with the intention of better equipping community partners to positively impact the health and wellness of children experiencing homelessness. METHODS: Cross section observational study that evaluates qualitative and quantitative data through needs assessment surveys completed by families experiencing homelessness that presented to the Salvation Army Shield of Hope for intake from August 2022 - December 2022. RESULTS: Fifteen families experiencing homelessness completed surveys, with an average of 2.27 children in each family (average age 5.4 y/o; range of 2 months-18 years old). When asked about educational resources, transportation was the most utilized and school supplies were the most widely unavailable and needed - followed by after school activities/childcare, tutoring, and quiet study spaces. Two families stated their children were able to see a physician at least once a year, and 3 families felt they did not have adequate resources to see a physician when needed. Childcare and social work/therapy services were the most widely unavailable and needed resources, while transportation is the most available with limited access to. Despite the lack of resources, 14 of 15 families stated they feel comfortable navigating community resources/social work services if resources were available. CONCLUSION: The most needed and unavailable resources for children experiencing homelessness surrounded school related activities such as transportation, tutors, quiet study areas, and after-school activities, while community resources for families (food pantries, legal support, clothing, etc.) were more widely available/accessible. Despite the lack of resources provided to the children, most families are confident in their abilities to navigate these programs if they were provided. Because of the limited number of participants in this study, further investigation is warranted to corroborate the need of specific resources, evaluate the usefulness of programs in place, and identify specific barriers to accessing community programs.

Poster Number: 58

Session: Poster Presentation
Category: Community Health
Trainee Rank: Rush Student RMC: M2

Annie Fritsch, Bachelor of Science

Natalia Whitney (RMC); Annie Fritsch (RMC), Adrian Markewych (RMC);Sydney Arnold (RUMC); Brielle Weinstein (RUMC); Loren Schechter (RUMC).

ADVOCACY IN AMERICAN MEDICAL ORGANIZATIONS: A CROSS SECTIONAL REVIEW AND IMPLICATIONS FOR HEALTHCARE

INTRODUCTION: Many professional medical associations engage in advocacy to advance health and well-being, expand access to medically necessary care, and educate the public. Many of these organizations publish clinical healthcare guidelines. This study examines the prevalence of advocacy efforts on the part of professional medical associations within the United States through review of professional organization websites. METHODS: A scoping review of literature was conducted regarding medical advocacy, and a review of medical organizations' websites was performed. Based on the review, an original evaluator questionnaire of advocacy content was created on RedCap. 109 medical associations were identified using the American Medical Association (AMA) list of member organizations in their house delegates. Researchers reviewed the professional group websites to identify advocacy efforts. A numerical scoring system (0-5) was used to assign each websites' level of involvement in advocacy. Additional details regarding advocacy efforts were collected including topics, financial information, policy statements, formation of committees, etc. RESULTS: Involvement with political advocacy appeared on 79 of the 109 websites (72.4%). Twelve organizations' websites expressed advocacy as a major focus of their organization with a rating of 5/5, while 18 organizations had no advocacy efforts visible on their site. The mean rating for the level of involvement in advocacy on the medical organization websites, excluding 18 organizations with no advocacy efforts found, was 2.65 out of 5 (SD=1.46). Of the 79 organizations with website evidence of political advocacy, specific advocacy topics evaluated included monetary contribution to candidates (17.7%), statements in support of candidates or legislation (26.6%), statements in response to legislation (79.7%), committees for issues of concern (75.9%), and sending board representatives to advocate to policy makers (53.2%). CONCLUSION: Advocacy in medical societies and associations in the United States is common. Per website review, professional medical organizations utilize multiple tools to advocate on behalf of their members and patients.

Poster Number: 59

Session: Poster Presentation
Category: Community Health
Trainee Rank: Rush Student RMC: M2

Amy Kim, BA MCB - Physiology track, BA Psychology

Brittney S. Lange-Maia (Rush); Amy Y. Kim (Rush); Joselyn L. Willingham (Rush), Sheila A. Dugan (Rush), Melissa M. Crane (Rush), Daniel R. Lindich (Rush), Samantha Marinello (UIC), Elizabeth B. Lynch (Rush)

"YOU JUST HAVE TO KEEP IT MOVIN'": PERCEPTIONS OF PHYSICAL FUNCTION LIMITATIONS IN AN AFRICAN AMERICAN HEALTH MINISTRY

INTRODUCTION: Physical function (PF) limitations are common in aging. However, there is a dearth of interventions focused on addressing PF limitations in community-based settings, particularly in minoritized communities. METHODS: To guide intervention development, we conducted focus groups to understand perceptions of PF limitations, gauge intervention interest, and identify potential intervention strategies as part of a large health partnership of African American churches in Chicago, IL. Participants were age 40+ years with self-reported PF limitations. Focus groups (N=6 focus groups; N=40 total participants) were audio recorded, transcribed, and analyzed using thematic analysis methods. RESULTS: Six themes were identified: 1) causes of PF limitations, 2) impact of PF limitations, 3) terminology and communication, 4) adaptations and treatments, 5) faith and resilience, and 6) prior program experiences. Participants described how PF limitations affected their ability to live a full life and play an active role in their family, church, and community. Faith and prayer aided in coping with limitations and pain. Participants expressed that it is important to keep moving, both from an emotional (not giving up) and physical (to prevent further exacerbating limitations) standpoint. Some participants shared adaptation and modification strategies, but there was overall frustration with communicating with others and obtaining medical care for PF limitations. CONCLUSIONS: Participants expressed that they would like to have programs in their church focused on improving PF (including physical activity), particularly as their communities often lacked resources conducive to being active. Community-based programs focusing on reducing PF limitations are needed, and the church is a potentially acceptable setting.

Poster Number: 60

Session: Oral Presentation

Category: Community Health

Trainee Rank: Rush Student CHS: Clinical Doctorate

Rachel Lifton, Bachelor of Arts

Rachel Lifton (Rush University) Deja Kerns (Rush University) Hayley Greiner (Rush University) Megan Helgesen (Rush University) Laura Vanpuymbrouck (Rush University)

PROCESS BARRIERS AND SUPPORTS IN TRANSITIONING FROM HOMELESSNESS TO HOUSED: LEARNING FROM THE EXPERTS

INTRODUCTION: Transitioning out of homelessness is accompanied by client factors stemming from trauma, challenges in adapting to a change in routine, demands of different living skills, and social context (Herzberg & Petrenchik, 2010; Marshall & Rosenberg, 2014). Although occupational therapy (OT) is not yet integrated into most supportive housing environments, literature is emerging on the role of OT in working with previously homeless individuals in successful transition to becoming housed (Marshall et al., 2018; Roy et al., 2017). This study aimed to better understand the supports and barriers in Chicago's housing transition processes which can inform development of OT interventions to facilitate successful transition. METHODS:We conducted three focus groups with community members who have successfully transitioned to being housed. We used qualitative thematic analysis to analyze all de-identified transcripts. Each team member independently used open, descriptive and in-vivo codes aligned to text and then assigned codes to one of 5 categories based on the research questions. These categories were: support to transition, barrier to transition, support to sustained housing, barrier to sustained housing, and a category for 'other' codes that did not specifically fall into any of the research question-based categories. RESULTS: Our analysis identified the following themes for barriers to transition: dealing with the past, adjustment, failure of the system, lack of access to resources and knowledge. Themes identified as supports to transition included: realizing it's a process, having support, and health management. Themes identified as barriers to sustained housing included: the habit of homelessness, environment impact, the past, and the mental work. Themes identified as supports to sustained housing included: behavior change strategies, and becoming grounded. CONCLUSION: It is clear there are many barriers to both transitioning from homelessness to housed and sustaining housing once achieved, however, there are supports that participants described. Ensuring supports are available and accessible and removing identified barriers can benefit housing programing in the city of Chicago.

Poster Number: 61

Session: Poster Presentation
Category: Community Health
Trainee Rank: Rush Student CON: PhD

Linda O'Kelley, MS, RNC-NIC

Linda O'Kelley (Rush); Barbara Swanson (Rush); Jessica Bishop-Royse (Rush)

ETHYLENE OXIDE EXPOSURE SIGNS AND SYMPTOMS

INTRODUCTION: While the U.S. Environmental Protection Agency has designated ethylene oxide (EtO) as a known human carcinogen, extant literature on the health effects of EtO exposure reports mixed findings. The disparate findings may reflect the effects of industry bias as many studies have been funded by a large chemical industry lobby. A systematic review of bias-free literature is warranted to determine health consequences of EtO exposure. OBJECTIVE: To conduct an integrative review of studies free from industry bias to facilitate compilation of a comprehensive list of reported signs and symptoms of EtO exposure in humans. METHODS: A review was conducted in accordance with PRISMA guidelines. The presence of bias was assessed using JBI checklists. RESULTS: Non-industry biased literature confirmed serious adverse health effects associated with EtO exposure at the occupational, hospital, and community levels of exposure. EtO represents a carcinogen, neurotoxin, and respiratory irritant, with a wide variety of systemic effects reported. CONCLUSION: After removal of industry-biased studies, EtO was unequivocally found to pose a threat to human health. While emerging evidence suggests this threat extends to residential exposure, there remains a gap in the number of studies examining EtO exposure at the community level. As EtO emitting facilities are concentrated in diverse and disadvantaged communities, environmental justice concerns arise and warrant further investigation. Further study of health effects related to EtO exposure can facilitate the development of exposure screening assessments and inform public policy on toxic air emissions.

Poster Number: 62

Session: Poster Presentation
Category: Community Health
Trainee Rank: Rush Student GC: Masters

Trevor Poulson, BS, MS

Trevor Poulson (Rush); Evan Patel (Rush); Manushi Shah (UIUC); and Ashok Jagasia (Rush)

GEOGRAPHIC DISTRIBUTION OF OTOLARYNGOLOGISTS IN ILLINOIS

INTRODUCTION: There has long been debate noted within academic literature regarding whether the supply of otolaryngologists is able to adequately meet the demand for otolaryngological services across the United States. Although this issue of supply and demand is complex, it has significant consequences for the future of the field as well as accessibility of care to patients. Too few otolaryngologists can decrease the accessibility of specialized head and neck care for patients and potentially impact the quality of care provided. However, an excess number of otolaryngologists could potentially result in underemployment and increased medical costs. METHODS: In November 2022, a list of 291 board-certified otolaryngologists from Illinois was obtained from the American Academy of Otolaryngology (AAO) website which includes data on 93% of otolaryngologists practicing in the United States. We determined the number of otolaryngologists per capita in rural versus urban counties in Illinois as well as the practice location of each listed otolaryngologist. Classification of an urban or rural practice was determined using the zip code and county in which the practice operated. The definition of urban and rural was determined using the criteria used by the Illinois Department of Public Health. RESULTS: Of the 291 otolaryngologists with a primary practice location in Illinois, approximately 93% practiced in urban counties, with over half having a primary practice location in Cook County alone. In addition, 96.6% of otolaryngologists specializing in certain procedures (ie, Cochlear implantation), patient populations (ie, pediatrics), or areas of focus (ie, cosmetics) are located in urban counties within Illinois. Urban counties yielded an average of 1.88 otolaryngologists per 100,000 people, whereas in rural counties, there are only 0.63 otolaryngologists per 100,000 people. This number is a rough estimate, and the true value may be lower, given that a substantial number of the 291 practicing otolaryngologists listed have retired or moved from the state (14.4%). CONCLUSION: The concentration of otolaryngologists among high-income urban areas further exacerbates health care disparities. Despite the clear need for specialized ear, nose, and throat care in rural environments, the Illinois otolaryngology workforce remains preferentially located in urban and suburban environments.

Poster Number: 63

Session: Poster Presentation
Category: Community Health
Trainee Rank: Rush Student RMC: M2

Sarala Prabhu, BS Biology, BS Psychology, MA Medical Sciences

1,2,3 Sarala Prabhu, 1,2Ashley Murphy, 2 Heather Risser, 1,3Margaret Scotellaro 1Illinois Department of Children and Family Services, Chicago, IL, United States 2Northwestern Feinberg School of Medicine, Chicago IL, United States 3 Rush University, Chicago, IL, United States

LESSONS LEARNED FROM ADAPTING A HOME VISITING ASTHMA PROGRAM INTO A VIRTUAL ASTHMA INTERVENTION FOR YOUTH IN FOSTER CARE

Background Youth in foster care face disproportionally worse asthma outcomes and greater asthma management barriers than their peers. The Illinois Department of Children and Family Services (ILDCFS) piloted a pre-COVID, nurse-led asthma home visiting program with 62 youth-caregiver dyads that resulted in a 78% reduction in ED visits. However, pandemic restrictions halted home visits and limited nurses' availability, requiring virtual programming led by community-health workers (CHW). Objective To discuss feasibility and acceptability of ILDCFS' virtual asthma home visiting program. Methods Limited nursing availability and caregiver engagement prevented direct program adaptation. Thus, ILDCFS tested multiple iterations of a virtual home visiting program during August 2020-September 2022. After consulting with ILDCFS nursing staff, leadership, IT specialists, and its Foster Parent Advisory Board, ILDCFS adopted a CHW-led virtual visit, standardized with an adaptive REDcap form, for youth with recent asthma encounters. ILDCFS staff pulled Medicaid claims of asthma encounters in July-November 2022 and received referrals from its managed care organization. Caregivers of youth living in a foster home and whose medical encounter primarily focused on asthma were contacted via phone to schedule a visit. The CHW met with the youth-caregiver dyad to discuss asthma events, conduct the Asthma Control Test, review medication usage and environmental trigger management, and provide tailored asthma educational materials. After the visit, caregivers completed the Client Satisfaction Questionnaire and CHWs completed a fidelity survey. Results ILDCFS identified 95 youth with asthma medical encounters, and 78 (84%) youth were eligible for the program. Of these eligible youth, 58 (74%) of their caregivers responded to scheduling requests, 43 (55%) of youth-caregiver dyads were scheduled, and 23 (29%) of youth-caregiver dyads completed visits.Caregivers reported high levels of satisfaction, that the program largely met their needs, and that provided education materials were useful. CHWs reported an average session length of 34 minutes while being able to adhere to the protocol (M=34, SD = 8 minutes). Conclusions ILDCFS virtual asthma home visiting program is feasible and acceptable to participants. Further analyses are needed to measure the impact of the program on self-reported asthma severity and number of asthma encounters of participating youth as well as to further embed the program into ILDCFS' managed care provider.

Poster Number: 64

Session: Poster Presentation

Category: Community Health

Trainee Rank: Rush Student CHS: Clinical Doctorate

Lauren Schuler, BA, OTS

Brett Neiderer, Gretta Leigh, Kate Moran

Employment among Mothers of Children with Developmental Conditions

INTRODUCTION: Mothers of children with Autism Spectrum Disorder (ASD) earn 56% less than mothers of children without health conditions (Cidav et al., 2012) and experience an additional 14% total loss of income due to the need for therapy sessions for their child (Little et al., 2018). Mothers of children with ASD have been found to experience a number of additional barriers to employment including depression, feelings of burnout, and the experience of stigma in the workplace. However, studies have not uncovered specific elements that may influence employment, particularly following the COVID-19 pandemic. To understand the experiences of mothers caring for children with ASD who require medical and therapy services as compared to mothers of typically developing children, we aim to study the specific facets of career adaptability in relation to having a child with ASD. METHODS: We used a cross-sectional online survey study that assessed: career advancement, discrimination and stigma, impacts of therapy/child healthcare, and the influence of the pandemic on employment experiences of mothers of children with ASD. Using data from n=105 mothers, we used descriptive statistics to characterize employment opportunities and perceived effects of the COVID-19 pandemic on employment. RESULTS: Findings showed that mothers of children with ASD perceived decreased employment opportunities as a result of their child's diagnosis as well as increased stigma in the workplace due to the child's autism diagnosis. CONCLUSION: Our findings have potential to uncover specific elements that influenced maternal employment and career adaptability, particularly following the COVID-19 pandemic.

Poster Number: 65

Session: Oral Presentation

Category: Community Health

Trainee Rank: Rush Student RMC: M2

Justin Thomas, MS

Justin Thomas (RU); Leping Kristie Fang (RU); Kyra VanDoren (RU); Raj Shah, MD (RU)

CROSS-SECTIONAL ASSOCIATION OF SOCIAL VULNERABILITY INDEX AND PRE-DIABETES IN CHICAGO NEIGHBORHOODS, 2014-2018

INTRODUCTION Pre-diabetes, defined as a glycosylated hemoglobin (HbA1c) between 5.7% and 6.4%, is a common condition that is amenable to intervention to ameliorate progression to diabetes. The distribution of pre-diabetes at the census tract level in diverse urban communities and the neighborhood factors that may influence community pre-diabetes rates are not well understood. The social vulnerability index (SVI) was created by the Centers for Disease Control and Prevention (CDC) to study how communities may be affected following natural disasters. The objective of this proof-of-concept project was to determine the distribution of pre-diabetes in patients from census tracts served by a single academic health center and to understand how census tract SVI scores may be associated with pre-diabetes rates over time. METHODS The cohort of interest for this study were Chicago residents over 18 years of age who sought care at Rush University Medical Center (RUMC) between January 1 and December 31 of 2014, 2016, and 2018. The primary patient information data source for HbA1c was extracted from the Chicago Area Patient-Centered Outcomes Research Network. Using census tract information from the CDC, the SVI for Chicago neighborhoods was compared with the prevalence of pre-diabetes as a diagnosis at RUMC. A linear regression model was used to assess the change in SVI score with the rate of pre-diabetes per year of study. RESULTS Out of the 1,313 census tracts for which data was available, there were 1,203 with at least 25 adult patients seen at RUMC in 2014, 2016, and 2018. Each 0.1 unit increase in SVI score (a higher score is equivalent to more vulnerability) was associated with a 0.35% increase in the rate of pre-diabetes in 2014 (SE = 0.029; p-value <0.0001), 2016 (SE = 0.032; p-value <0.0001), and 2018 (SE = 0.028; p-value <0.0001). CONCLUSION While there was significant heterogeneity of SVI score and pre-diabetes rates, this proof-of-concept work shows a potential relationship between SVI and pre-diabetes rates at the census-tract level that has remained relatively stable over time. If confirmed in future studies, SVI could be a tool for future targeted neighborhood-specific interventions to reduce the health impact of pre-diabetes.

Poster Number: 66

Session: Poster Presentation
Category: Community Health
Trainee Rank: Rush Student RMC: M2

Yvonne Clifvonne Webb, B.S. of Biology

Yvonne Clifvonne G. Webb, BS (RMC); Kiana S. Jones, BS (RMC); Sheila A. Dugan, MD (RUMC)

ASSESSING NEEDS AND BARRIERS TO CLOSE THE GAP

INTRODUCTION The significance of healthcare disparities contributing to the life expectancy gap between socioeconomically poor neighborhoods and affluent neighborhoods in Chicago is well-known. West and East Garfield Park (WGP, EGP) are predominantly Black communities on the westside of Chicago where about half the residents are living in poverty and the life expectancy is 75 years and 66 years, respectively. Compared to residents of the Chicago Loop, a more affluent neighborhood with <10% of its residents identifying as Black, who are expected to live 80 years. Westside Walk for Wellness (WW4W) is a well-established community-based hybrid summer program facilitated by physicians and medical students striving to combat these disparities through health education and community-building. METHODS Participants were recruited via flyer distribution in the WGP, EGP, Rush, and American Medical Association communities. We engaged participants in seven weekly sessions of a group walk and physician-led wellness discussion. A pre-survey was conducted to qualitatively assess participants' regards towards their health, behavior change, goal setting, and barriers. Participants could elect to be matched with an accountability partner. We encouraged the utilization of goal setting with the FAST strategy (Frequently Discussed, Ambitious, Specific, Transparent) developed by MIT. RESULTS Of the 369 participants, 11.38% (42) live in zip codes corresponding to WGP and EGP and 19.51% (72) to high hardship index neighborhoods on the westside of Chicago. A 74% (274/369) response rate for the pre-survey revealed 87.96% (241/274) rated ≥ 7/10 readiness to implement a behavior change and 84.71% (231/274) rated ≥ 7/10 likelihood to utilize goal setting. Time and motivation were identified as barriers most often, occurring at 64.23% (176/274) and 51.09% (140/274), respectively. Finance (23.72%, 65), and access (5.47%, 15) were also identified as potential barriers. 18.25% (50/274) elected to be matched with an accountability partner. CONCLUSION Despite readiness for lifestyle changes, there is a prevalence of possible barriers. These findings can be useful in targeting strategies toward community empowerment related to healthy living. Additional insights for research and program planning will come from qualitative interviews to explore participants' experiences to continue to learn more about their needs and potential barriers in their health journeys.

Poster Number: 67
Session: Oral Presentation
Category: Diet/Health Behavior
Trainee Rank: Rush Student CHS: Masters

Julia Doherty, BS Nutrition and Dietetics
Julia Doherty (Rush University) Kellye Walters-Warren (Rush University)

ACCEPTABILITY AND FEASIBILITY OF WEIGHT LOSS IN PATIENTS RECEIVING CARE AT RUSH UNIVERSITY MEDICAL CENTER (RUMC) VIA TELEHEALTH AND FACE-TO-FACE ENCOUNTERS.

INTRODUCTION: Obesity is a multifactorial disease that increases the risk of many chronic diseases. Registered dietitians (RD) play a crucial role in weight loss care, specifically helping patients adhere to dietary and lifestyle changes. Following the coronavirus (COVID-19) pandemic, many providers began using primarily telehealth visits rather than face-to-face visits. However, little data is available to describe differences in weight loss between these two types of patient encounters. OBJECTIVE: The purpose of this study was to determine if the total number and type of encounter (telehealth versus face-to-face) influences weight loss in patients receiving care at Rush University Medical Center (RUMC). METHODS: This was a retrospective, cross-sectional study. The target population were obese patients 18 years and older who met with a RD at RUMC between October 2020 and December 2021 (n=83). Weight loss outcomes and attendance rates were collected. Participants were divided into three groups: Medical Weight Loss (Group 1, n=14); Metabolic/Bariatric Surgery, pre-op only (Group 2, n=32) and Metabolic/Bariatric Surgery, pre-op and post-op (Group 3, n=37). RESULTS: Participants were 84.3% female, with a mean age of 46.6 ± 13.1 years. Weight loss outcomes were higher in Group 3 with a median weight loss (kg) at 3-months 18.4 (8.3, 20.7, p = 0.001), 6-months 22.5 (17.0, 27.4, p = 0.001), and 12-months 27.8 (14.8, 25.9, p = 0.001). Additionally, participants in Group 3 had a greater percent excess weight loss of 40.8 (36.4, 51.1, p = 0.025) than Group 1 and Group 2. Overall, 96% of participants had at least one telehealth visit with a RD. No difference in weight loss was observed between patients with telehealth and face-to-face encounters. The median number of scheduled visits for the whole sample was 6.0 (9.0, 5.0). Most participants completed their scheduled visits, with Group 3 having more visits completed compared to Group 1 and Group 2 (5.0, 4.0, 4.0, p = 0.014). CONCLUSION: Metabolic/bariatric surgery was most effective for weight loss in patients seen via telehealth. Additionally, telehealth showed promising results in improving attendance. However, more research is needed to compare telehealth and face-to-face patients for weight loss outcomes.

Poster Number: 68

Session: Poster Presentation
Category: Diet/Health Behavior
Trainee Rank: Rush Student CON: PhD

Susan Price, MSN

Susan Price (Rush) and Todd Ruppar (Rush)

KETOGENIC THERAPIES IN PARKINSON'S DISEASE, ALZHEIMER'S DISEASE, AND MILD COGNITIVE IMPAIRMENT: AN INTEGRATIVE REVIEW

INTRODUCTION: Ketogenic therapies have shown benefit for seizure reduction in epilepsy but their impact on other neurologic conditions is less known. In this literature review, the efficacy of ketogenic therapies was assessed in Parkinson's Disease (PD), Alzheimer's Disease (AD), and Mild Cognitive Impairment (MCI). METHODS: A literature search was conducted using PubMed, Scopus, and Google Scholar. Inclusion criteria included: experimental study; use of ketogenic diet interventions or supplements; adults aged 18 years or older; a diagnosis of PD, AD, or MCI; and studies reported symptom or disease progression outcomes. RESULTS: A total of 2565 records were screened with 15 studies (3 for PD and 12 for MCI/AD) meeting criteria for analysis. The ketogenic diet was used in all PD studies and did show significant improvement in motor function either through vocal quality, gait, freezing, tremor, and/or balance. Variations on the ketogenic diet or other ketogenic therapies were utilized in the MCI and AD groups. The Mediterranean, modified Adkins, and low-carbohydrate diets showed statistically significant improvements in some cognitive measures. Use of ketogenic supplements, drinks, or compounds showed variable results in the AD and MCI groups. The Axona and AC-1202 compounds showed no significant improvement in cognition at the end of their respective 90-day trials. Most MCT supplements did show cognitive improvements, although only after 6 months of adherence. CONCLUSIONS: Ketogenic therapies have promise in PD, AD, and MCI for symptom improvement, although larger studies are needed to support implementation in clinical practice.

Poster Number: 69

Session: Poster Presentation

Category: Diet/Health Behavior

Trainee Rank: Rush Student CHS: Clinical Doctorate

Morgan Timmerman, BA, OTS

Morgan Timmerman, OTS; Nicole Karabas, OTS; Carly Kleiman, OTS; Madison Houle, OTS; Orli Maya, OTS; Department of Occupational Therapy, CHS

BODY MASS INDEX AMONG CHILDREN WITH NEURODEVELOPMENTAL CONDITIONS

INTRODUCTION: Approximately 33% of children with autism are overweight or obese, with a body mass index (BMI) at or above the 85th percentile; however, it is unknown which factors impact the population's BMI more than children without neurodevelopmental conditions. Specifically, demographic and location factors may influence a child's BMI. Therefore, this study addressed the following research question: To what extent is BMI associated with neighborhood factors (i.e., % minoritized, median income by zip code) among children with ASD? METHODS: This retrospective chart review study examined EPIC records from n=139 children with autism aged 3-17 years (mean age = 7.91 years). Autism status, BMI, and zipcode were gathered from medical records. RESULTS: Children with autism showed small, yet significant associations between BMI and % minoritized neighborhood population, ASD Group: $r = .196$, $p = .021$. CONCLUSIONS: The findings showed that there is a significant positive correlation between percentage of minoritized residents based on zip code and having a higher BMI for individuals with ASD. This suggests that living location could be a contributing factor to obesity for children with ASD, as percent minoritized is representative of zip code. In other words, a child with ASD living in a neighborhood with higher percentage of minoritized residents may be at a higher risk for being overweight or obese.

Poster Number: 70

Session: Poster Presentation
Category: Education
Trainee Rank: Clinical Fellow

Sasha Amiri, MD, MS

Sasha Amiri (Rush University Medical Center); Michelle Bartlett (University of Washington); Ellen Ribar (University of Colorado); Yingying Zheng (East Carolina University); Nicolle Fernández Dyess (University of Colorado); Ashley M. Lucke (University of Texas at Austin); and Heather French (Children's Hospital of Philadelphia)

THE NEONATAL-PERINATAL MEDICINE FELLOWSHIP APPLICATION WEBINAR SERIES: A NOVEL APPROACH TO HELP CANDIDATES SUCCEED

INTRODUCTION: In 2022, 13,586 candidates applied to subspecialty fellowships. Formal resources for specialty-specific fellowship application education are limited. Candidates are expected to rely on residency application experience, word-of-mouth advice, and online research for navigating the application process. OBJECTIVE: To assess the impact and utility of a national virtual curriculum in assisting trainees with the Neonatal-Perinatal Medicine (NPM) fellowship application process. METHODS: In 2022, the AAP Organization of NPM Training Program Directors (ONTPD) and Trainees and Early Career Neonatologists (TECaN) co-hosted a four-part national webinar series to educate candidates on the NPM fellowship application and interview processes. Webinars were advertised through list-servs and social media, conducted in two time zones, and recorded for asynchronous viewing online. Registration, demographic data, and questions for panelists were collected via REDCap survey. Program evaluation data was collected after each webinar and following the fellowship match. RESULTS: In the 2022 appointment year, 310 candidates participated in the NPM fellowship match and 248 individuals registered for the webinar series (Table 1). 64% and 81% of registrants reported minimal/no knowledge of the fellowship application (158/248) and interview (201/248) processes. 70% of registrants (173/248) were planning on applying to fellowship in 2022. Description of the webinar series is shown in Table 2. 91% of post-webinar respondents (43/47) felt the webinars were moderately or extremely helpful, a finding that was sustained beyond the match (37/42). All candidates rated the quality of the webinars as good or higher, and were likely or very likely to recommend them to peers. There is considerable variability in the number of fellowship programs applied to/interviewed at/ranked, factors influencing rank list, and primary scholarly interest (Table 3). Candidates also identify opportunities for residency programs to better prepare them for fellowship applications. CONCLUSION: We describe a national virtual curriculum to prepare trainees for the fellowship application and interview process. This webinar series provides needed education to fellowship candidates, bridges the gap between candidate knowledge and program director expectations, is generalizable to other specialties, and can be replicated with minimal resources.

Poster Number: 71

Session: Poster Presentation

Category: Education

Trainee Rank: Rush Student RMC: M2

Evelynn Cover, MS, BS

Evelynn Cover (Rush) Jerome Martin, MD (Rush) Thomas Alcorn, MD (Rush) Melissa Rice, MD (Rush) Sara M. Hock, MD (Rush)

Deliberate Practice for Attending Physician Procedural Skill Maintenance: A Multi-year Curriculum and Evaluation

INTRODUCTION Ongoing maintenance of procedural skills required by Emergency medicine (EM) physicians has transformed due to the broad availability of simulation based education. Deliberate practice continues to be imperative given the low frequency occurrence of many critically important skills in the clinical setting. This study set out to evaluate procedural frequency and confidence over a span of seven years of procedural training in attending physicians at one academic medical center. METHODS Attending EM physicians at our academic medical center have been required to attend simulation-based procedural practice events annually since 2015. The curriculum of the training program was designed to address high acuity low frequency procedures, with a deliberate practice and coached-learning approach. This study utilizes surveys pre- and post-procedural simulation to determine the number of clinical procedures performed yearly as well as self-reported pre- and post- simulation confidence in procedural skills. RESULTS Four procedures had multiple year pre- and post-procedural session data available (fiberoptic intubation (n=51 pre and 29 post), cricothyrotomy (n=96 pre and 42 post), vaginal delivery (n=97 pre and 71 post), thoracostomy (n=74 pre and 71 post)). The majority of physicians reported "rare" clinical frequency (0-5 per year) on these procedures (fiberoptic 97%, cricothyrotomy 87%, delivery 88%, thoracostomy 87%). Overall, confidence prior to the training session showed a trend towards increase on a 5-point likert scale following the training session (+1.11 for fiberoptic, +0.92 for cricothyrotomy, +0.42 for vaginal delivery and +0.33 for thoracostomy, ns). CONCLUSION Ongoing procedural skill training of attending physicians is an imperative for patient safety, especially in procedures shown here to be performed "rarely." This multi-year curricular model was well accepted by physician learners and feasible using a deliberate practice model. Learners showed a trend towards increased confidence following the training sessions.

Poster Number: 72

Session: Poster Presentation

Category: Education

Trainee Rank: Clinical Fellow

Anna Culhane, MD

Anna Culhane, (Rush) Jerome Martin, (Rush) Zachary Huston (Rush) Sara Hock (Rush)

Simulating Empathy: An Intern Boot camp approach to Patient Experience

INTRODUCTION: Patient satisfaction and patient experience scores are becoming increasingly important in Emergency Department care. Several studies have shown that patients' satisfaction with physician interactions improves when the provider shows empathy for their condition. Multiple simulation models have been used to teach residents patient communication and empathy skills, including didactic components with lectures and standardized patient experiences. The goal of this study is to evaluate whether senior residents can improve their communication skills when an intern is acting as their patient, while at the same time increasing the interns' empathy for the patients' experiences while in the Emergency Department. METHODS: A total of 25 residents participated in the study. Prior to the cases, participants filled out the Toronto Empathy Questionnaire (TEQ). They then went through three simulated cases, with the 11 interns portraying the patients and the 14 seniors acting as the physicians. Following the cases the residents underwent a structured debrief. At the conclusion of the session participants again filled out the TEQ and answered a Likert questionnaire on their thoughts about the utility of this type of simulation. RESULTS: Twenty-two Residents completed both the pre and post TEQ, the numerical values of which range from 0-64. The mean scores pre and post cases for all residents were 46.2 (SD 4.64) and 47.9 (SD 6.03), P-value =0.29. The intern subgroup scores were 47.45 (SD 4.18) pre and 49.89 (SD 5.62) post, p=0.28. The senior subgroup scores were 45.28 (SD 4.92) pre and 46.53 (SD 6.14) post, p=0.56. On a five-point Likert survey related to the simulated cases, respondents rated the realism of the cases 4.23 (SD 0.63), their comfort providing feedback to their peers 4.41(SD 0.95), and gaining insight into the patient experience 4.27 (SD 0.83). CONCLUSION: The embedded intern exercise was rated well by resident participants, and residents demonstrated a trend towards increased empathy following participation. Residents accepted this style of simulation and found it realistic. They also felt comfortable providing feedback to their peers in different roles and felt they gained insight into the patients' experiences in this style of simulation.

Poster Number: 73
Session: Poster Presentation
Category: Education
Trainee Rank: Rush Student CON: DNP

Grace Grady, DNP

Grace Grady, RN, BSN (Rush University) and Julianne Doucette, DNP, MSN, APRN, CPNP-PC (Rush University)

IMPROVING EARLY BREAST MILK EXPRESSION PRACTICES IN THE NICU

IMPROVING EARLY BREAST MILK EXPRESSION PRACTICES IN THE NICU INTRODUCTION Mother's own milk (MOM) benefits an infant's immune system, disease risk, and psychosocial development; however, Neonatal Intensive Care Unit (NICU) nurses at an urban Level III NICU reported lacking the knowledge to provide breast pumping education to mothers, leaving vulnerable infants without MOM. The objectives were to 1) deliver an evidence-based educational bundle to NICU nurses targeting breast pump use, 2) evaluate knowledge, competence, and confidence in providing breast pumping education, 3) increase documentation of pumping education, and 4) increase rates of infants discharged receiving breast milk. Evidence for improving pumping practices includes providing timely education on MOM supply, common problems, and resources. The Plan-Do-Study-Act model helped translate these strategies into education to address barriers and increase MOM administration, according to World Health Organization (WHO) recommendations. METHODS Participants included NICU nurses (n=168) caring for infants admitted within five days of birth. Nurses completed a knowledge pre-survey on breast pumping, received virtual education, completed a post-survey, and participated in hands-on pump assembly and operation sessions. A survey, adapted from Medela, evaluated pump knowledge in participants (n=88) who completed both the pre-test and post-test. Nurses (n=50) demonstrated competence during hands-on sessions using an evidence-based checklist derived from Spatz's Pumping Initiation Tool. Nurses (n=50) completed Likert-scale confidence surveys. The electronic health record (EHR) tracked six pumping education documentation points and infants receiving MOM at discharge. RESULTS A paired t-test showed significance in knowledge scores between pre-tests (M=78%, SD=12.44%) and post-tests (M=87%, SD=9.8%); t= 5.96, p=<0.001. 100% (n=50) demonstrated competence following hands-on education. Nurses reporting feeling very confident in providing pump education improved 4% (n=2/50) to 82% (n=41/50) and feeling very confident operating the pump improved 8% (n=4/50) to 84% (n=42/50). The average number of education points documented per patient improved 1.3/6 to 1.7/6. The average monthly rate of infants discharged receiving breast milk increased 55% to 71%. CONCLUSION This project provides useful information regarding the impact of a breast pumping educational program on nurse knowledge, competence, and confidence. To improve documentation practices, revision of EMR can facilitate ongoing assessment of breast pumping among NICU mothers.

Poster Number: 74

Session: Poster Presentation

Category: Education

Trainee Rank: Rush Student RMC: M2

MacKenzie Griffith, BA

MacKenzie J Griffith, BA (presenting author, co-author) (Rush); Adam B Wilson, PhD (first author) (Rush); Christopher Ferrigno, PhD (co-author) (Rush)

Pulling back the curtain: Exploring norms and practices of anatomy -related departments in U.S. medical schools.

INTRODUCTION: Within medical education, programs often use national datasets as comparative baselines and to identify areas for improvement. While anatomy-related departments have access to comparative research productivity data (e.g., Blue Ridge Institute for Medical Research), there are no annually maintained datasets for comparing departments' demographics, educational offerings, or general practice models. This study investigated practice trends in anatomy-related departments across the U.S. METHODS: A 27-item national survey was administered through Qualtrics to leaders of anatomy-related departments among U.S. allopathic and osteopathic medical schools. The survey inquired about i) faculty time allocations, ii) faculty labor distribution models, iii) anatomy teaching services offered, and iv) faculty compensation practices pertaining to merit/cost-of-living increases and bonuses. RESULTS: A total of 35 departments (of 195) responded to the survey. This sample was representative of national demographics. On average, anatomy educators are allotted 24% (range=0-80%) of their time for research, irrespective of funding, 62.0% for teaching and course administration (range=5-90%), 11.7% for service, and 2.3% for administration. Forty-four percent (15 of 34) of responding departments taught at least 5 different student populations, often across multiple colleges. Many departments (65%; 11 of 17) applied formulaic methods for determining faculty workloads, often as a function of course credits or contact hours. Reported average base salaries for 'instructors' through 'associate professors' were consistent ($p \geq 0.272$) with national means (i.e., AAMC Annual Faculty Salary Report). Merit salary increases and bonuses were most frequently determined according to faculty productivity and chairperson evaluations. Bonuses averaged 10.1% of the total base salary among the schools offering them (n=10). Cost-of-living increases averaged 3.1%; consistent with the mean U.S. inflation rate of 3.8% per year (1960 to 2021). CONCLUSION: This dataset allows anatomy-related departments to compare their practices and reflect upon their competitiveness in recruiting and retaining faculty. Overall, departments' workload and compensation practices vary widely, likely a consequence of different institutional cultures, locations, and needs.

Poster Number: 75

Session: Poster Presentation

Category: Education

Trainee Rank: Rush Student RMC: M2

Zachary Huston, BS, BSN

Zachary Huston BSN (Rush Medical College); Jerome Martin MD (Rush University Medical Center); Nicole Siparsky MD (Rush University Medical Center); Sara Hock MD (Rush University Medical Center)

SIMULATION BASED TRAINING LEADS TO IMPROVED SAFETY GUIDELINE ADHERENCE IN ATTENDING PHYSICIANS PERFORMING SIMULATED PROCEDURAL SEDATION

INTRODUCTION While procedural sedation and analgesia (PSA) is frequently performed, serious complications related to PSA are relatively rare. This combination of high-acuity low-occurrence (HALO) in serious PSA complications increases the difficulty in maintaining physician skill in the management of these complications. High fidelity clinical simulation has emerged as a novel and effective tool to teach and maintain competency among attending physicians, especially in cases of HALO situations. We compare pre and posttest physician scores on a checklist of PSA preparation and management of complications. METHODS Sixty-nine total physicians from six different specialties were placed in 18 groups by specialty as part of ongoing conscious sedation credentialing training. Following an introduction to the simulated environment, physicians were asked to complete a simulated conscious sedation demonstrating their usual practice while observed by a trained rater. They then received a focused debriefing covering the conscious sedation checklist and highlighting items missed in the pretest. Debriefing sessions were supervised by a faculty member with expertise in conscious sedation and simulation-based education. Immediately following education, the physicians repeated a similar posttest case and were evaluated on their completion of the safety items on the checklist. An 18 item checklist was developed for the conscious sedation educational initiative using the 2018 ASA guidelines for preparation prior to conscious sedation. Each skill or item was listed in order and given equal weight. Scoring for each item of the checklist was 1 for done or correct and 0 to indicate done incorrectly or not done. RESULTS Participating physicians were largely mid-career (32% reported 5-10 years of practice) and performed conscious sedation rarely (49% reported >10 sedations in the past year). Average safety checklist item completion on the 18-item pretest simulation was 78% (range 50-88%). Average post test completion score across all groups was 97% (range 72-100%) Every group demonstrated improvement after the educational intervention of on average 18% (range 8-38%). CONCLUSION This simulated procedural experience resulted in a change in the demonstrated behaviors of attending physicians managing complications of conscious sedation. Future research could investigate the retention of knowledge and/or behavior change of physicians repeating standardized training.

Poster Number: 76

Session: Poster Presentation

Category: Education

Trainee Rank: Clinical Resident

Crystal Lafleur, DO

Dr. Crystal Lafleur, PGY-1; Nicholas Cozzi, MD MBA; Louis Hondros, DO; Dr. Vinootna Sompalli, PGY-1; Dr. Haley Plattner, PGY-1; Dr. Hans Murica, PGY-3; Sophia Redpath, M1, RMC; William Mati, M1, RMC; Candice Lee, M1, RMC; Prakriti Mehta, M2, RMC; Dr. Edward Ward; Dr. Corey Goldstein; Dr. Amy Marks; Dave Leckrone; Dr. Jerome Martin; Kevin Johnson; Pam Manning; Dr. Yanina Purim Shem-Tov; Dr. Jessen Schiebout; Dr. Sophia Bodnar; Dr. Brian Dugal; Dr. Marilyn Hallock

Combat Medical Readiness: The Rush University Medical Center Advanced Trauma Training Program

BACKGROUND: Combat medical training is essential for U.S. Military Medical Service Members from both the Active and Reserve Components as it increases combat casualty survival while decreasing morbidity. Rush University Medical Center (RUMC) provides U.S. National Guard Service Members the Advanced Trauma Training Program (ATTP), a one-week training centered on trauma-care delivery, procedural competency, and military resiliency combating post-traumatic stress disorder (PTSD). OBJECTIVES: The primary outcome of this work was characterizing course graduate feedback and identifying-self-reported belief of medical readiness. METHODS: ATTP graduates from 2010-2022 electronically completed a self-administered, anonymous, on-line survey approved for use by the American College of Emergency Physicians. Specific feedback was obtained on the program's content, instructor impact, and level of combat medical preparedness. Permission was obtained from all participants to use survey data for research purposes. RESULTS: Over the program's ten year history, RUMC has trained 876 U.S. National Guard Members with 61.1% being male. The prominent medical backgrounds are EMT-B (40.1%) followed by RN (27.3%), PA (19.6%), and MD/DO (6.9%). Among course graduates, 49.2% had never been deployed and of those previously deployed, 95.6% rated ATTP as important to their combat medical experience. The average number of deployments per class was 9.75. In terms of deployment preparation, students rated the course as important to both personal (93.2%) and unit (97.0%) preparedness with a 98.5% likelihood to recommend. Students remarked the live-tissue and cadaver lab as extremely important (84.4%) while noting a post-deployment PTSD lecture as important (95.9%). CONCLUSIONS: The Rush University Medical Center Advanced Trauma Training Program began as a targeted intervention to medically prepare U.S. Military Medical Service Members. These results suggest graduates believe this training is positively impacting their combat medical readiness and resilience. Further investigation with course graduates that were subsequently deployed to combat is imperative and ongoing.

Poster Number: 77
Session: Poster Presentation
Category: Education
Trainee Rank: Rush Student CHS: Clinical Doctorate

Rachel Lee, OTD

Bridget Hahn, OTD, OTR/L, Rush University Linda Olson, OTD, OTR/L, Rush University Hillary Napier, OTD, OTR/L, DePual University Rachel Lee, BS, Rush University June Park, BS, Rush University Abigail Woollacott, BS, Rush University

UNDERSTANDING OCCUPATIONAL THERAPY ADMISSIONS DECISIONS RELATED TO DIVERSITY

INTRODUCTION: The vast majority of occupational therapy (OT) practitioners are white, leaving gaps between the representation of our profession and those we serve. Admissions practices determine the future of the profession. This cross-sectional study aimed to understand how admissions requirements, particularly the GRE and interview, influenced OT graduate students' application decisions, specifically those who identified as a first-generation college student (FGCS), under-represented minority, English as a second language, and/or receiving public assistance. METHODS: Methods included an online survey distributed to current OT graduate students. The survey consisted of background information, closed-ended questions on application requirements influence, and open-ended questions on priority factors in application decision-making and barriers and supports to the application process. RESULTS: Of the 263 participants, 37.4% agreed that the GRE requirement influenced their application, most frequently citing test-taking ability and cost as reasons; 16.2% agreed that an in-person interview requirement influenced their application, most frequently citing cost and interviewing ability as reasons. Participants identifying as FGCS ($p<.01$) and English as a second language ($p<.05$) were significantly correlated with the GRE requirement influencing their application. All demographic variables of interest were predictive of the GRE requirement influencing their application. Financial elements and application requirements were the most frequently reported barriers, and mentorship was the most frequent support desired during the application process. CONCLUSION: Admissions committees should carefully weigh the costs of admissions requirements with their efficacy in predicting student outcomes and the need to diversify the profession. The profession is called to develop mentoring and other supports for applicants from various backgrounds.

Poster Number: 78

Session: Poster Presentation

Category: Education

Trainee Rank: Rush Student RMC: M2

Gerard Martusciello, MPA

Gerard R. Martusciello, MPA (Rush); Gwyneth A. Sullivan, MD, MS (Rush); Nathaniel Koo, MD (Rush); Srikumar Pillai, MD (Rush); Mary Beth Madonna, MD (Rush); Ami N. Shah, MD (Rush); Brian C. Gulack, MD, MHS (Rush)

IMPLEMENTATION OF STANDARDIZED CAREGIVER EDUCATION WITH PHOTOS OF EXPECTED HEALING REDUCES HEALTHCARE UTILIZATION FOLLOWING PLASTIBELL CIRCUMCISION

INTRODUCTION: Plastibell circumcisions can cause high levels of caregiver anxiety regarding healing of the circumcision site, which may increase post-procedure communications and visits. Providing educational materials that describe the post-procedural course may help to reduce these encounters. Our aim was to create and implement a post Plastibell circumcision caregiver handout including photos of expected healing and measure post-procedure healthcare utilization. METHODS: All patients who underwent an outpatient Plastibell circumcision at a single academic institution between 04/2021 - 03/2022 were included. A handout was developed that provided information about the Plastibell device, how to care for the surgical site, when to follow up, and pictures demonstrating expected healing by day. Caregivers received the handout beginning 10/2021. Measures of healthcare utilization included electronic medical record (EMR) messages, phone calls, and follow-up visits. Post-procedure healthcare utilization was compared between patient records during the six months prior to (n=314) and following (n=295) implementation. Complications were followed as a balancing measure. Over a one month-period post implementation, all caregivers of children who underwent circumcision (n=46) were invited to be interviewed regarding the educational materials. Chi-squared test was used to compare outcomes (significance: $p<.05$). RESULTS: Following implementation, the percentage of caregivers sending EMR messages significantly decreased (7.8% vs 17.8%, $p<.001$). The percentage of patients who called (7.1% vs 11.5%, $p=0.09$) and required follow-up visits (4.1% vs 3.2%, $p=0.73$) was not significantly different. The overall complication rate was unchanged (3.7% vs 3.2% $p=0.88$). Thirteen semi-structured interviews among the 46 caregivers contacted (28.3%) were completed. Most (n=12, 92.3%) found the materials informative and helpful, particularly the included images. CONCLUSION: Education materials that included photographic images of expected healing following Plastibell circumcision were effective in reducing healthcare utilization. Development of materials focused on the expected post-procedural course should be considered following other surgical procedures.

Poster Number: 79

Session: Poster Presentation

Category: Education

Trainee Rank: Rush Student RMC: M1

William Mati, Doctor of Medicine

William Mati (RU), Nicholas Cozzi (RU), Louis Hondros (RU), Vinootna Sompalli (RU), Haley Plattner (RU), Crystal Lafleur (RU), Hans Murica (RU), Sophia Redpath (RU), Candice Lee (RU), Prakriti Mehta (RU), Corey Goldstein (RU), Amy Marks (RU), Dave Leckrone (RU), Jerome Martin (RU), Kevin Johnson (RU), Pam Manning (RU), Jessen Schiebout (RU), Sophia Bodnar (RU), Brian Dugal (RU), Marilyn Hallock (RU), Edward Ward (RU), Yanina Purim Shem-Tov (RU)

RUSH ADVANCED TRAUMA TRAINING PROGRAM: AGGREGATE COURSE DEPLOYMENTS AND IMPACT ON MILITARY MEDICAL READINESS

INTRODUCTION Combat medical training is essential for U.S. Military Medical Service Members as it increases combat casualty survival while decreasing morbidity. Rush University Medical Center (RUMC) provides U.S. National Guard Service Members the Advanced Trauma Training Program (ATTP), a one-week training centered on trauma-care delivery, procedural competency, and military resilience. The primary objective was to characterize course graduate feedback and identify self-reported belief of medical readiness. METHODS ATTP graduates from 2010-2022 electronically completed an anonymous survey validated and approved for use by the American College of Emergency Physicians. Feedback was obtained on the program's content and level of combat medical preparedness. RESULTS Over the program's history, RUMC has trained 876 U.S. National Guard Members. Courses were aggregated into two separate groups based on the mean number of deployments per course per month: group A (2013, 2019, 2020, 2022; 60-80% of ≥ 1 deployment) and group B (2014-2018, 2021; 40-60% of ≥ 1 deployment). The average number of deployments per class was 9.75 (49.2% of total graduates never deployed). In terms of group A, 90.6% rated the course as very/extremely important, while 98.6% would recommend ATTP prior to deployment. In group B, these numbers were 90.1% and 98.4%, respectively. With regard to preparation for deployment, 84.3% (group A) and 87.4% (group B) valued the course as at least an 8/10 overall. In terms of hands-on skills, 90.6% of both groups viewed the trauma skills as very/extremely important. Discussion on traumatic brain injury was viewed as very/extremely useful by 79.5% of group A and 89.6% of group B. CONCLUSION The Rush University Medical Center Advanced Trauma Training Program began as a targeted intervention to medically prepare U.S. Military Medical Service Members. Our preliminary results suggest prior deployment does not impact likelihood to recommend the course, trauma skills training, preparation to deploy, and overall course rating. However, prior deployment was correlated with a lower satisfaction on TBI discussion. Further investigation with course graduates that were subsequently deployed to combat is imperative and ongoing.

Poster Number: 80

Session: Poster Presentation

Category: Education

Trainee Rank: Rush Student RMC: M2

Prakriti Mehta, B.S. in Cell and Molecular Biology

First Author: Prakriti Mehta, BS, M2, RMC Nicholas Cozzi, MD MBA Louis Hondros, DO Dr. Vinootna Sompalli, PGY-1 Dr. Haley Plattner, PGY-1 Dr. Crystal Lafleur, PGY-1 Dr. Hans Murica, PGY-3 Sophia Redpath, M1, RMC William Mati, M1, RMC Candice Lee, M1, RMC Prakriti Mehta, M2, RMC Dr. Edward Ward Dr. Corey Goldstein Dr. Amy Marks Dave Leckrone Dr. Jerome Martin Kevin Johnson Pam Manning Dr. Yanina Purim Shem-Tov Dr. Jessen Schiebout Dr. Sophia Bodnar Dr. Brian Dugal Dr. Marilyn Hallock

Preparing All Levels of Training for Combat Medical Readiness: RUSH Advanced Trauma Training Program

INTRODUCTION Rush University Medical Center (RUMC) Department of Emergency Medicine provides the Advanced Trauma Training Program (ATTP), a one-week training centered on trauma-care delivery, procedural competency, and military resiliency combating post-traumatic stress disorder (PTSD), to U.S. National Guard Service Members. Members of servicemen and women enter the program with varying medical backgrounds such as EMT-Bs, EMT-Ps, RNs, PAs, and MD/DOs. OBJECTIVE The primary outcome of this work was characterizing course feedback from graduates through the lens of the level of previous medical training. METHODS ATTP graduates from 2010-2022 electronically completed a self-administered, anonymous, on-line survey validated and reproduced with permission from the American College of Emergency Physicians. Course graduates' medical backgrounds were noted, and specific feedback was obtained on the program's content, instructor impact, and level of combat medical preparedness. RESULTS Over the program's ten year history, RUMC has trained 876 U.S. National Guard Members with 61.1% being male. Among participants, previous backgrounds included EMT-B (40.1%) followed by RN (27.3%), PA (19.6%), and MD/DO (6.9%). Among course graduates, 49.2% had never been deployed and of those previously deployed, 95.6% rated ATTP as important to their combat medical experience. Of class participants, 3.6 students per class had taken ATTP previously. In particular, the Live-Tissue and Cadaver lab were ranked by 99.1% of participants as important, with 84.4% ranking it as extremely important. Similarly, the Post-Deployment TBI Lecture was ranked by 95.9% as important. CONCLUSION The Rush University Medical Center Advanced Trauma Training Program began as a targeted intervention to medically prepare U.S. Military Medical Service Members. These results suggest that despite the diverse array of backgrounds in graduates, many found similar courses such as the cadaver lab and post-deployment TBI lecture particularly important in their education. Further investigation with course graduates that were subsequently deployed to combat is imperative and ongoing, and a stratified further analysis of level of medical training and course satisfaction will be imperative.

Poster Number: 81

Session: Poster Presentation

Category: Education

Trainee Rank: Rush Student RMC: M2

Julia Mueller, B.S.

Julia Mueller, B.S (RMC), Grace Sassana-Khadka, B.S (RMC), Jordan Dunlap B.S (RMC), Michael Choi B.S (RMC), Kirsten Gidd-Hoffman, MSN,RN,NE-BC,CPN (Rush University Medical Center), Elaine Chen, M.D. (Rush University Medical Center)

A DATA-DRIVEN IMPROVEMENT PROCESS OF AN INTERDISCIPLINARY STUDENT-LED ORGANIZATION FOR PALLIATIVE CARE PATIENT EXPERIENCE

INTRODUCTION Ohana is an interdisciplinary student-led organization created to provide purposeful companionship to patients needing emotional support and comfort. We aim to decrease delirium, improve engagement, and decrease loneliness for patients while providing students with a meaningful volunteer experience and increased awareness of palliative care. Additionally, it allows pre-clinical and non-clinical students to become more comfortable with the hospital environment. Due to the COVID-19 pandemic, this robust volunteer program was halted for 2 years. The program was restarted in the Medical Intensive Care Unit (MICU) in Spring 2022, and many challenges were noted. Here, we describe the data-driven process improvement plan that was implemented in Fall 2022. METHODS Round-table discussions were held to collect feedback from students and staff. We designed a post-shift survey to allow for data-driven solutions. Meetings with charge nurses and volunteers were conducted to gain insight into strengths and weaknesses in the current program and to allow stakeholders to have input in future adjustments. RESULTS Our quality improvement process led to an increase in volunteer participation by 78% from 6.3 shifts/ month to 11.25 shifts/month over a 4-month period. Students volunteered a total of 1,670min (average visit: 62min). Participating hospital units increased from one to two with a planned expansion to a third hospital unit. After learning from the survey that several students found no patients available during their scheduled shifts, a process was implemented to check with the charge nurse on the alternate unit to see if other patients might be available. CONCLUSION An interdisciplinary student-led volunteer organization providing a palliative care experience is valuable for students, patients, and staff. We designed and are disseminating a post-shift survey to document volunteer hours and student feedback in order to continuously improve the experience.

Poster Number: 82

Session: Poster Presentation

Category: Education

Trainee Rank: Rush Student RMC: M3

Melissa Porterhouse, BS

Melissa Porterhouse1, Olivia Negris1 , Grant Owen1 , Taylor Laskowski1 , Ali Piracha1 , Ami Shah2 , Rosalinda Alvarado3 ; 1Rush Medical College, Chicago, IL, USA; 2Rush University Medical Center, Division Of Pediatric Surgery, Department Of General Surgery, Chicago, IL, USA; 3Rush University Medical Center, Division Of Surgical Oncology, Department Of General Surgery, Chicago, IL, USA

SURGERY MENTORSHIP FOR MEDICAL STUDENTS: A PILOT STUDY

INTRODUCTION: Mentorship plays a valuable role in medical education by helping students navigate significant career decisions and cultivate enhanced professional networks. The importance of quality mentorship is notable in competitive surgical specialties in which preparation for residency applications often begins early in medical school. While the importance of mentorship is clear, it is not always readily available. We sought to implement and evaluate a reproducible surgical mentorship program for medical students at a tertiary care medical center in the United States. METHODS: Student members of the Surgery Interest Group and faculty surgeons were invited to participate in a mentorship pilot program. Following consent, mentors were randomly paired with 1-2 student mentees. Mentees were instructed to schedule 3 meetings with their mentor between January-May 2022. Mentees also attended 4 structured group sessions. All participants were asked to complete pre- and post-program surveys which were standardized using a five-point Likert scale, aside from demographics and open-ended questions for comments. Responses were compared using Fisher's Exact Test and comments were assessed using Reflexive Thematic Analysis (RTA). RESULTS: 43 mentees and 21 mentors were enrolled. 32 mentees (74.4%) and 9 mentors (42.9%) completed both pre- and post-surveys. In pre-surveys, mentees placed greater importance on gender of mentor compared to mentor preference of mentee gender (27.9% vs 0%; $p<0.01$). There was little preference for race by mentee or mentor (7.0% vs 0%; $p=0.54$). In post-surveys, mentees found individual meetings more meaningful than group sessions (68.8% vs 31.3%; $p<0.01$). RTA of comments revealed that 17 (53.1%) mentees gained a connection or mentor within the field of surgery and 7 (77.7%) mentors enjoyed a personal connection with students. Most common criticisms from mentees included concern for group meeting timing or content (n=11, 34.4%) and poor communication/availability by mentor (9, 28.2%). Mentors critiqued student communication and initiative (4, 44.4%). Further communication results are shown in Table 1. CONCLUSION: Our findings suggest a structured mentorship program has the potential to provide meaningful career guidance and network connections to medical students interested in pursuing surgery. When structuring such a program, it is critical to ensure adequate availability of mentors and sufficient commitment from mentees. Furthermore, formal training on communication expectations.

Poster Number: 83

Session: Poster Presentation

Category: Education

Trainee Rank: Rush Student RMC: M3

Savina Sahgal, BS

Savina Sahgal (Rush Medical College), Stephanie Erickson (Rush Medical College), Usama Ahmad (Rush University Medical Center), Caspian Folmsbee (Rush University Medical Center)

PARENTAL LEAVE POLICIES FOR MEDICAL STUDENTS AND INTERNAL MEDICINE RESIDENTS: A COMPARATIVE STUDY

INTRODUCTION: The average medical school matriculant is reported as 24 years old, coinciding with childbearing years (1). Consequently, medical students and residents must make difficult decisions regarding family planning (2,3). Programs may use sick, disability, or other forms of leave as parental leave, propagating the archaic belief of pregnancy and child rearing as a pathologic state. This dehumanizes trainees, and undermines gender equity. Parental leave guidelines should adhere to national guidance (4,5); however, this has not been well-examined. This study sought to review parental leave policies in Illinois, New York, and California for medical trainees in medical school and internal medicine (IM) residency. METHODS: In October 2022, two independent researchers reviewed websites of the Accreditation Council for Graduate Medical Education's 141 accredited IM residencies and 42 MD- or DO-granting medical schools in Illinois, New York, and California, due to their high number of programs and geographic diversity. For all programs, webpages, sample house staff contracts, and handbooks were searched using keywords: "pregnant" OR "pregnancy" OR "maternity" OR "paternity" OR "parent" OR "parental OR "family" OR "child" OR "birth." Time off indicated without these keywords was not considered a parental leave policy. Data were analyzed using descriptive statistics. RESULTS: Forty-two medical school programs and 141 IM residencies were evaluated. Of the medical schools, 57% (n=24) discussed parental leave in their materials. 17% of programs (n=7) have specific parental leave policies not discussed under a pre-existing leave of absence or Title IX policy. Four policies referred to "maternity" only. Of the IM residency programs, 44% (n=62) discussed parental leave in public materials, and 11% (n=16) offer their residents dedicated paid parental leave. Four programs offer dedicated "maternity" paid time off. CONCLUSION: Navigating family building during medical training requires institutional support, however parental leave policies are only available via public web search at approximately half of medical schools and IM residencies. Programs should improve transparency of policies that communicate the institution's support and approach to its trainees building families. This can improve gender inequity and trainee well-being, while also serving as a recruiting tool for the institutions.

Poster Number: 84

Session: Poster Presentation

Category: Education

Trainee Rank: Rush Student RMC: M3

Natalia Whitney, BS

Natalia Whitney,BS(1); Okensama La-Anyane(1); Kelly Harmon(1); Rahim Laiwalla(2); Loren Schechter, MD(1); Amir Dorafshar, MD(1) 1) Rush University Medical Center, Department of Plastic and Reconstructive Surgery 2) Rosalind Franklin Medical College

TRANSMASCULINE GENITAL SURGERY EDUCATION TRENDS ON YOUTUBE

INTRODUCTION Interest in gender-affirming surgeries (GAS) continues to rise. In the age of internet-education, both medical trainees and patients often seek information on YouTube. While this platform increases education accessibility, it is largely unchecked for quality. This project examines the quality of transmasculine genital GAS (metoidioplasty and phalloplasty) videos intended for medical trainee and patient education. METHODS Utilizing key search-terms, the top 40 metoidioplasty and phalloplasty videos on YouTube were collected via YouTube application programming interface. Video quality was rated via two DISCERN score reviewers, with a minimum of 15 and a maximum of 75. To identify the target audience, videos were categorized as using medical or layman's terminology. Descriptive and inferential statistics were performed. RESULTS 35% percent of all 80 videos targeted a medical audience while 60% of videos targeted patients. The mean DISCERN scores for metoidioplasty and phalloplasty videos were 41.84 and 30.13, respectively. Metoidioplasty scores were significantly greater than phalloplasty for both medical ($p=0.019$) and patient targeted videos ($p= 0.0036$). Variables significantly associated with higher scores included surgeon involvement, longer duration, inclusion of photos/diagrams, academic affiliation, National Academy of Medicine (NAM) accreditation, and medical terminology. CONCLUSION Metoidioplasty and phalloplasty YouTube videos are of low to moderate quality based on DISCERN scores. Significantly higher-quality videos were identified for metoidioplasty intended for medical trainees. These findings suggest a lack of high-quality phalloplasty and metoidioplasty videos accessible to patients, in addition to a lack of phalloplasty videos for medical trainees. NAM accredited academic institutions should prioritize the creation of longer, high-quality phalloplasty videos for patients by incorporating surgeons and accurate photos/diagrams.

Poster Number: 85

Session: Poster Presentation
Category: GI/Inflammation
Trainee Rank: Rush Student RMC: M2

Timothy Breider, BS

Timothy Breider, BS (RMC) Bradley Hunt, BS (RMC) Bulent Arslan, MD (RUMC)

OUTCOMES OF TIPS DIAMETER REDUCTION USING SINGLE BALLOON EXPANDABLE COVERED STENTS

INTRODUCTION: Hepatic encephalopathy and liver failure are potential complications of TIPS creation. Depending on severity of these complications TIPS diameter reduction or TIPS occlusion may become necessary. One method of shunt reduction is expansion of a covered balloon expandable stent in an hourglass formation within the original TIPS stent. This easy to perform technique effectively reduces shunt diameter in a controlled fashion and increases the portosystemic gradient. The purpose of this study was to assess technical and clinical outcomes of TIPS reduction using only this technique. METHODS: Electronic medical records were reviewed to identify all TIPS reductions performed using an intra-stent balloon expandable stent (Viabahn VBX, Gore; Newark, Delaware). Clinical notes immediately prior to and 30 days following the reduction were used to identify rates of resolution and improvement of symptoms, changes in shunt diameter and portosystemic gradient, systemic ammonia levels, and MELD score. RESULTS: In total, 19 intra-stent TIPS reductions were identified (8M, 11F). Indications for reduction included overt hepatic encephalopathy (14) and acute liver failure due to ischemia (5). Original shunts ranged in diameter from 5-10mm with an average of 7.5mm. Reduction procedure reduced shunt diameters between 1 to 7mm with an average reduction of 2.9mm. This coincided with an average gradient increase of 5.8 mmHg. Following reduction, 63% of patients had resolution of shunt related symptoms within 30 days. An additional 10% had partially reduced symptoms and 26% had no improvement. Change in MELD score was not statistically significant. Blood ammonia levels were reduced on average by 78 μ/dL. Technical success rate of reduction procedures was 100% with an average fluoroscopy time of 15.3 minutes. Of note, in one patient who was overcorrected, subsequent shunt expansion was easily performed due to prior use of this technique. CONCLUSION: TIPS reduction continues to be a procedure that is poorly standardized across institutions. One institution's use of an hourglass shaped balloon expandable stent was shown to be technically feasible and effective in reducing portosystemic gradients, symptoms, and plasma ammonia levels. Compared to other methods available, this procedure is quick, easily performed, and has the option of controlling shunt diameter.

Poster Number: 86

Session: Poster Presentation
Category: GI/Inflammation
Trainee Rank: Rush Student GC: Masters

Malia Gasteier, Bachelor of Science

Malia Gasteier (Rush), Maliha Shaikh (Rush), Christopher Forsyth (Rush), Ali Keshavarzian (Rush), Garth Swanson (Rush)

CHARACTERISTSICS OF EXTRACELLULAR VESICLES IN INACTIVE ULCERATIVE COLITIS PATIENTS AND HEALTHY CONTROLS UNDER CIRCADIAN MISALIGNMENT

INTRODUCTION: Circadian rhythms orchestrate multiple biological processes with 24-hour oscillations that regulate diverse bodily functions. The central clock is in the suprachiasmatic nucleus and orchestrates peripheral circadian clocks in every organ system including the gastrointestinal tract (GIT). Previous work has shown that the presence of circulating exosomes is greater in patients with IBD, including ulcerative colitis. Given the already existing relationship between IBD and circadian rhythm, this study aimed to address the potential relationship between circulating exosomes in healthy controls and ulcerative colitis subjects under circadian misalignment. METHODS: 6 subjects, 3 UC and 3 Healthy Controls (HC), were recruited into the study. All UC subjects were inactive (partial Mayo Score ≤ 1) and on stable medications with no flares for the last 3 months. For two weeks prior to entry into the circadian lab all subjects were on a prescribed regular sleep schedule. Subjects were then kept in the circadian lab for 6 days with strict control of their light/dark cycle. All subjects underwent baseline blood draw, occurring every 2 hours over 24 hours. This blood draw protocol was repeated following the 3 days of simulated night shift sleep scheduling, totaling 26 blood samples per subject. Exosomes were extracted from each blood sample utilizing precipitation from baseline and post shift and utilized in western blots to determine the protein presence of GPA33 and TSG101 antibodies normalized to tubulin. Western blots were then analyzed using ImageJ software. Wilcoxon Signed Ranks test and AUC data was measured utilizing Prism statistical software. RESULTS: Band density, AUC analysis, and Wilcoxon Signed Ranks test of the western blots showed that there was a statistically significant increase in tsg101 following circadian misalignment protocol with a p value of 0.028. CONCLUSION: Circadian misalignment by alternation of light:dark cycles (simulated night shift) causes misalignment of host central clock and impacts circadian regulated biological processes. This preliminary study highlights the importance of studying environmental factors that impact circadian timing in UC including night shift work which may be a significant risk factor for a disease flare. Given the observed relationship between circulating exosome presence and circadian misalignment, further investigation and characterization is warranted.

Poster Number: 87

Session: Poster Presentation
Category: GI/Inflammation
Trainee Rank: Post-Doctoral Research Fellow

Pranav Mishra, MBBS

Pranav K. Mishra (Rush); Sai Rama Krishna Meka (Rush); Michael Kluppel (Rush); Makena Parker (Rush); Alfonso Torquati (Rush); and Anna Spagnoli (Rush)

DEVELOPMENT OF A SURGICAL BIOREPOSITORY TO EXAMINE THE BONE-FAT-GLUCOSE INTERFACE

INTRODUCTION Translational research is limited by the availability of biological specimens, which establish disease pathophysiology and provision an in vitro for therapeutic evaluation. Establishing biorepositories with corresponding clinical data provides on-demand experimental capabilities to present / future researchers. Our group created a biorepository to examine obesity-related comorbidities, with a specific focus on the interplay between bone, fat, and glucose physiology and its augmentation by the gastrointestinal system. METHODS Adult bariatric patients, with BMI > 40 or > 35 with obesity-related comorbidities, undergoing laparoscopic Roux-en-Y gastric bypass (RYGB), are recruited. Intra-operatively, we collect subcutaneous and omental fat, plus tissue excised from the jejunojejunal anastomosis (JJA) closure. Longitudinal serum, plasma, and clinical data are collected on the day of surgery and post-operatively at 2 weeks, 3 months, 6 months, and 1 year. Non-obese cadaver donors serve as controls and provide 4 segments of duodenum and 3 regions of the first 75 cm of jejunum. POC glucose and HbA1c are measured prior to aliquoting 0.5mL of serum and plasma. The JJA is stored in toto. Other surgical samples are divided in half and stored separately. Samples are weighed, flash frozen with liquid nitrogen, stored at -80 oC and cataloged. RESULTS 61 patients and 7 cadaver donors have contributed to the biorepository since Sept 2021. RYGB subjects are 78% female, aged 24-66 (mean 42), with mean baseline BMI 42, and with racial demographics comparable to the region. Approximately 2/3 are diabetic, while hepatobiliary disease and hyperlipidemia are prevalent in 1/3 of study subjects. Manual review of notes and reports has greater fidelity over auto-populated EMR fields for clinical data. Our stack of custom code, open-source, and Microsoft products proved advantageous financially and ease-of-use. CONCLUSION The combining latest biorepository guidelines from the NIH and ERIC with a custom software stack has facilitated the storage and recovery of hundreds of biospecimens with correlated clinical data. We reduced the impact of pre-analytical errors by noting timings and initial conditions, processing samples immediately, and recording observations at multiple checkpoints. Data integrity with provenance is optimized for a 50-year storage, exceeding the NIH data sharing requirements.

Poster Number: 88

Session: Poster Presentation
Category: GI/Inflammation
Trainee Rank: Rush Student GC: PhD

Christina Nowicki, B.Sc.

Christina Nowicki, B.Sc. (Rush, UIC); Lucille Ray, Ph.D. (UIC); Natasha Shah, M.D. (UIC); Prachi Chakradeo, Ph.D., M.S. (Rush); Philip Engen, M.S. (Rush); Ali Keshavarzian, M.D. (Rush); Ece A. Mutlu, M.D., M.S., M.B.A. (UIC)

A Longitudinal Analysis of the Human Fecal and Mucosal Microbiome

INTRODUCTION: While limited longitudinal studies have assessed the stability of the gut microbiome in fecal samples, there are no published studies to date that have examined the stability of the mucosa-associated microbiota. There are also no studies that have examined longitudinal diet correlations with gut microbiome composition. The goal of this research is to better understand the stability of the gut microbiome within patient samples over time and between different sample types. Our study identifies and concurrently characterizes the variability in the gut microbiota in mucosal biopsies and at-home collected stool samples of 9 healthy subjects over a 9-month period and examines longitudinal diet correlations with gut microbiome composition. METHODS: We examined colonic mucosal biopsies and at-home collected stool samples from healthy subjects (n=9) at 0, 3, 6, and 9 months. Here, we used an OTU-based approach (operational taxonomic unit) for 16S rDNA sequencing analysis, analyzing beta and alpha diversity using QIIME. At each visit, the subjects completed the standardized NIH Dietary History Questionnaire (DHQ) version 1 consisting of 144 items. DHQ data was analyzed using datacal version. Nutrient intake was adjusted for calories using a regression model and combined with 16S sequencing analysis. Spearman correlations were calculated between the reported nutrient intake. RESULTS: There were notable differences between stool and biopsy samples in beta diversity (all $p < 0.001$), observed species ($p < 0.001$), and alpha diversity metric, Chao1 ($p < 0.001$). The weighted unifrac showed that patient samples at different time points were not statistically different from one another ($p = 0.384$), but differences between patients were statistically significant ($p < 0.001$). Further, cholesterol, protein, and other dietary factors were associated with changes in bacterial abundance. CONCLUSION: Results show inter-individual variation in the bacterial microbiome is preserved in longitudinal colonic biopsy samples and that dietary changes may be associated with changes in bacterial abundance, suggesting that macro and micronutrient intake likely plays a role in the temporal variations in gut microbiota composition.

Poster Number: 89

Session: Poster Presentation
Category: GI/Inflammation
Trainee Rank: Rush Student RMC: M2

Makena Parker, BA, M. Phys

Makena Parker, BA M. Phys (Rush), Katrien Corbeels, PhD (Rush), Michael Kluppel, PhD (Rush), Sai Rama Krishna Meka, PhD (Rush), Pranav Mishra, MBBS (Rush), Alfonso Torquati, MD MSCI (Rush), Anna Spagnoli, MD (Rush)

INCREASED RENAL MRNA EXPRESSION OF CYP27B1 AND IMPROVED GLUCOSE CLEARANCE WITH SCLEROSTIN ANTIBODY IN OVARIECTOMIZED MICE FOLLOWING ROUX-EN-Y GASTRIC BYPASS SURGERY

INTRODUCTION/PURPOSE: Bone loss is common after bariatric surgery. Sclerostin antibody is an effective treatment for osteoporosis. This study takes advantage of a well-designed animal model, aiming to uncover mechanisms underlying bone loss in this high-risk population. METHODS: Six ovariectomized mice, fed a high-fat diet (HFD) to induce obesity, received Roux-en-Y gastric bypass (RYGB) surgery. Seven ovariectomized HFD mice received sham surgery and served as control. Animals were sacrificed 8 weeks postoperatively. mRNA was extracted from the kidneys using TRIzol and qRT-PCR experiments were performed to quantify substrates associated with active vitamin D (1,25 dihydroxyvitamin D) formation and degradation, including CYP27B1, CYP24, and TRPV5. Cortical and trabecular bone mass were assessed by micro computed tomography (mCT). A second study treated ovariectomized HFD mice that had RYGB or sham surgery with sclerostin antibody or carrier. Intraperitoneal glucose tolerance testing (IPGTT) was performed to assess glucose clearance. Statistical analyses were performed using unpaired two-tailed Student t-test; significance set at $p<0.05$. RESULTS: qRT-PCR analyses showed RYGB mice had a six-fold increase of renal CYP27B1 mRNA expression ($p=0.0021$) compared to sham mice (given arbitrary value, 1). CYP24 and TRPV5 did not show statistically significant changes compared to sham mice. IPGTT showed that RYGB mice injected with sclerostin antibody have improved clearance of glucose implying improved insulin sensitivity. DISCUSSION: These findings may be helpful in guiding treatment for bariatric patients postoperatively. We aim to assess the impact of sclerostin antibody on insulin sensitivity using ELISA. CONCLUSION: We found increased renal expression of CYP27B1 and improved glucose clearance in ovariectomized RYGB mice treated with sclerostin antibody.

Poster Number: 90

Session: Poster Presentation
Category: GI/Inflammation
Trainee Rank: Rush Student GC: Masters

Lucille Ray, PhD (Biochemistry), MS (Clinical Research), BS (Biochemistry)

Lucille Ray (UIC); Christina Nowicki (RUSH); Tazeena Khan (UIC); Lisa Tussing-Humphries (UIC); Ece Mutlu (UIC)

Associations of Dietary Factors and Methanogenic Archaeal Abundance with the Presence and Extent of Diverticulosis in the Human Gut

INTRODUCTION Factors which influence the development and progression of diverticulosis are still poorly understood, but sex, age, dietary factors, high BMI, and abundance of methanogenic archaea in the human gut microbiome have all been implicated. Methanogenic archaea in particular have been shown to slow colonic transit within the gut which itself might contribute to the development of diverticulosis. Our aim was to investigate these factors in subjects with and without diverticulosis. METHODS Using a large subject pool of individuals (n=144) undergoing screening colonoscopies, we investigated associations between intake of key dietary nutrients, abundance of archaeal targets, and the presence and extent of diverticulosis within the colon. Abundance of general archaea, M. smithii and methanogenic archaea were compared across stool samples from subjects both with and without diverticulosis using qPCR. RESULTS M. smtihii abundance was found to differ significantly in subjects with low extent compared to high extent of diverticulosis (p=0.015). Male sex was found to be associated with increased extent of diverticulosis compared to females (p=0.002). In addition, differences in M. smithii and general methanogen abundance were seen across males versus females in the whole subject population (p=0.0012 and p=0.048, respectively). Subjects with a low extent of diverticulosis were found to have higher average BMI, compared to the BMI of both high extent diverticulosis cases and those without diverticulosis (p=0.024 and p=0.039 respectively). For dietary factors, normalized carbohydrate intake was lower in those with diverticulosis compared to those without (p=.030). CONCLUSION Overall, this study suggests a wide web of factors that play into the development of diverticulosis.

Poster Number: 91

Session: Poster Presentation
Category: Health Behavior
Trainee Rank: Rush Student CHS: Clinical Doctorate

Abigail Carmona, BS

Abigail Carmona (OTD/S), Olivia Lachowicz (OTD/S), Jasmine Leonard (OTD/S), Chloe Maciolek (OTD/S), Bridget Hahn (OTD, OTR/L), Evguenia Popova (PhD, OTR/L)

WHAT'S THE 'OTEA'? PRACTITIONER AND STUDENT PERSPECTIVES ON PROFESSIONAL RESILIENCE AND WELL-BEING IN OCCUPATIONAL THERAPY

INTRODUCTION As a result of the COVID-19 pandemic, over 80% of adults in the U.S. reported feelings of stress, anxiety, depression, and anger (American Psychological Association, 2021), and over 85% of allied health professionals reported increased stress and decreased access to mental health resources (Coto et al., 2020; Ingham et al., 2022). In occupational therapy (OT), practitioners and students have been experiencing a decreased sense of well-being, which has been associated with increased stress and decreased resilience and participation in self-care (Popova et al., 2022). We explore preliminary research findings on practitioner and student perspectives on professional resilience and well-being in OT. METHODS Our descriptive study used a phenomenological approach. Practitioners and students were recruited using convenience sampling in the U.S. Focus group interviews captured participants' perspectives on resilience, health (physical, mental, and interpersonal), and supports and resources for promoting professional resilience and well-being in OT practice. Interviews were analyzed using thematic analysis. RESULTS Practitioners (n=12) and students (n=12) reported using multiple strategies to promote well-being, including engaging in exercise, social activities, leisure, rest and sleep, cooking and eating, grooming, and nature-based activities. Peers within professional settings were important influencers to professional resilience. Time management and boundary setting were highlighted as critical self-care tools. Participants appreciated access to institutional health and counseling services and desired additional fitness, mental health, and community-building resources. CONCLUSION To support professional well-being and resilience, OT practitioners and students need increased access to physical, mental, and interpersonal self-care resources. In addition, in designing wellness initiatives, the impact of time and boundary setting must be recognized and supported on both individual and system levels.

Poster Number: 92

Session: Poster Presentation
Category: Health Behavior
Trainee Rank: Rush Student CON: PhD

Molly Kokenge, MSN, RN, CNL, CEN

Molly Kokenge, MSN, RN, CNL, CEN (Rush University) Todd Ruppar, PhD, RN, FAAN (Rush University)

FACTORS INFLUENCING ANTIHYPERTENSIVE MEDICATION ADHERENCE AMONG HISTORICALLY UNDERREPRESENTED ADULTS: A META-ANALYSIS

PROBLEM Addressing disparities in blood pressure (BP) control must include supporting antihypertensive medication adherence (MA). Developing effective MA interventions requires identifying the most important factors influencing MA. Healthcare system-level factors have been understudied, and may particularly impact historically underrepresented adults' MA. PURPOSE The primary objective of this review was to meta-analyze the results of research testing the association between factors potentially influencing antihypertensive MA and measured antihypertensive MA in historically underrepresented populations. Additionally, we sought to evaluate the impact of system-level factors potentially influencing MA in historically underrepresented populations. SEARCH STRATEGY A health sciences librarian assisted with searching across ten databases. Search concepts included adherence to medication, underrepresented populations, and hypertension. Inclusion criteria included: studies published in English of patients with hypertension aged ≥ 18 years, with ≥ 50% of participants self-identifying as a race or ethnicity that was socially minoritized in the country where the study was conducted, and reporting sufficient data to calculate an effect size. RESULTS Fifty-nine studies were eligible for inclusion. Nine factors met the criteria for planned analyses. We ran exploratory analyses on system-level factors that were tested in an insufficient number of studies to be included in the planned analyses. SYNTHESIS OF EVIDENCE Older age was significantly correlated with better adherence (r=0.08; p=0.00; 95% CI [0.06, 0.10], k=26 studies). There was no difference in MA based on the participants' sex, education level, marital status, number of medications, comorbidities, or perceived social support. Higher income (r=0.11, p=0.01; 95% CI [0.03, 0.19], k=15) was significantly correlated with better MA, while having depressive symptoms was significantly correlated with worse MA (r=-0.18, p=0.00; 95% CI [-0.25, -0.10], k=11). System-level factors examined in few studies included having insurance coverage, access to healthcare, perceived barriers, financial barriers, having a primary care provider, patients' satisfaction with and perceptions of their healthcare provider, and experiences of discrimination in healthcare. IMPLICATIONS FOR PRACTICE Understanding the impact of factors associated with antihypertensive MA in historically underrepresented adults can support development of targeted, culturally-relevant MA interventions. Future research should examine the impact of system-level factors on antihypertensive MA among historically underrepresented populations.

Poster Number: 93
Session: Oral Presentation
Category: Health Behavior
Trainee Rank: Rush Student CON: PhD

Sudaba Mansuri, Master of Science

Sudaba Mansuri, MSc, Manju Daniel PhD, MSN, APRN, FNP-BC; Susan W. Buchholz PhD, RN, FAANP, FAAN

FEASIBILITY OF LIFESTYLE PHYSICAL ACTIVITY BEHAVIOR MEASURES AMONG YOUNG ARAB AMERICAN WOMEN

INTRODUCTION: Arab American women are disproportionately impacted by adverse health outcomes including cardiovascular disease and diabetes. Lifestyle physical activity (PA) is critical for reducing the risk of cardiovascular disease and type 2 diabetes, and obesity. The purpose of this study was to describe (a) feasibility of obtaining PA measures (subjective and objective) and (b) PA behavior of young Arab American women at risk of obesity, type 2 diabetes, and cardiovascular disease. METHODS: Descriptive exploratory study was conducted at a large faith-based organization (N=24). Inclusion criteria: women 18-35 years of age, and Arab American. Assessments included self-report questionnaires (demographics and International Physical Activity Questionnaire [IPAQ]) and PA measured with ActiGraph GT3X-BT (average daily steps and moderate to vigorous PA; 7-day wear time). Pender's Health Promotion Model guided the study. RESULTS: Mean age was 26 years (SD=6; Range=19-35). Two-thirds of women were single, never married. All participants completed PA questionnaires and 88% (n=21) wore an ActiGraph for 7 days. Fifty-four percent (n=13) of women self-reported engaging in >150 min of moderate PA per week, while 25% (n=6) of participants self-reported > 75 min of vigorous PA per week. Walking at work and during household activities at home were the most frequently self-reported moderate activities. Average daily steps over seven days were 6,489 steps (SD=2,493; Range=3,615-14,420). Thirty-three percent of participants were classified as sedentary (<5,000 steps), 66% were classified in the low active PA category (5,000-7,499 steps). Average ActiGraph wear-time was 6.8 days (SD=0.5; Range=5-7). Per the Actigraph, 42% of women spent > 150 minutes/week engaging in moderate-intensity PA. CONCLUSION: More than half of women self-reported meeting the recommended >150 min of moderate PA per week and a quarter of women self-reported meeting the recommended > 75 min of vigorous PA per week. One-third of women were sedentary and over two-thirds were classified in the low active category for PA. The Actigraph showed that 42% of women spent > 150 minutes/week engaging in moderate-intensity PA. This feasibility study shows that the determination of PA behavior and its correlates within the cultural context is critical in at-risk young Arab American women residing in the U.S.

Poster Number: 94

Session: Poster Presentation

Category: Health Equity

Trainee Rank: Rush Student RMC: M3

Emma Brennan, BA

Emma Brennan, BA (RMC); Artemis Markopoulos, MA (RMC); Jaclyn Rodriguez, RN, SANE-A, SANE-P; Neeral K. Sheth, DO (RUMC); Nupur Shah, DO (RUMC)

ADDRESSING A GAP IN MEDICAL SCHOOL TRAINING: IDENTIFYING AND CARING FOR HUMAN TRAFFICKING SURVIVORS USING TRAUMA-INFORMED CARE

INTRODUCTION: Human trafficking (HT) is a substantial public health problem, and healthcare workers are uniquely positioned to help identify and care for survivors. Despite this fact, few medical schools incorporate HT training using trauma-informed care (TIC) principles into their curriculum. This training aimed to address this gap and educate medical students on recognizing HT red flags and providing TIC to HT survivors. METHODS: One hundred twenty-seven fourth-year medical students at Rush Medical College attended a two-hour session consisting of didactic lectures by expert speakers and participated in a group discussion guided by a clinical vignette. Students completed anonymous pre- and post-session surveys that assessed comfort levels in detecting HT red flags and providing TIC. A paired t-test was used to compare pre- and post-session survey responses. RESULTS: Of the 127 attendees, 95 pre- and post-session surveys were matched with unique identifiers and used for analysis. The results demonstrated significant improvement in all the metrics assessed. CONCLUSION: This training significantly improved medical students' comfort in identifying and caring for HT survivors and addressed an especially important gap in medical school education. Given the reproducibility of this training, it can be implemented at other institutions to further improve awareness and efforts in identifying and caring for HT survivors while avoiding re-traumatization.

Poster Number: 95

Session: Poster Presentation

Category: Health Equity

Trainee Rank: Rush Student RMC: M2

Sarah Dynia, MA

Sarah Dynia (Rush) Haley Bylina (Rush) Deepa Shankar (Rush) Stephany Valladares (Rush)

THE RELATIONSHIP OF PRIMARY CARE ENGAGEMENT AND HOSPITALIZATIONS IN PATIENTS WITH DIABETES ON THE WEST SIDE OF CHICAGO: A STUDENT EXPLORATION OF RESEARCH METHODS INTEGRATED IN A LONGITUDINAL FAMILY MEDICINE RESEARCH CURRICULUM

INTRODUCTION As of June 2022, 37.3 million people were diagnosed with diabetes in the United States. Approximately 90% of individuals receive diabetes management from primary care providers (PCPs). Primary care delivers healthcare through Starfield's 4 C's: first contact access, continuity of care, comprehensiveness, and coordination. Considering the scope of Rush Medical Center's service area in the West Side of Chicago, the relationship between Rush PCP establishment and diabetes management was explored. It was hypothesized that patients with established primary care within Rush were less likely to be hospitalized for diabetes complications as compared to West Side residents without established care at Rush over a three-year period. METHODS Patient outcomes were investigated with the Chicago Area Patient-Centered Outcomes Research Network (CAPriCORN) Common Data Model, a Chicago-wide partnership of 11 local research institutes. The study cohort included adult patients with at least one outpatient appointment with diabetes ICD code at RUMC or Rush Oak Park that lived on the West Side of Chicago from December 31, 2016 to December 31, 2019. The likelihood of hospitalization for in-system primary care vs. not in-system primary care was analyzed using Chi-Square and Fischer's Exact, and a Kaplain-Meier curve was created to graph hospitalization rates. RESULTS Approximately 42% (n=1736) of the total 4129 patients aggregated from the CAPriCORN database had established primary care within the RUMC network. Analysis revealed that insured individuals (p=.02) and Hispanic-identifying individuals (p=.003) were associated with less hospitalizations. No strong statistical significance analyzing diabetes-related hospitalizations was found between the following stratifications: individuals with Rush primary care versus out-of-network primary care establishment (p=0.88), gender (p=0.55), age (≥65 years old) (0.21) or white versus non-white individuals (p=.104). CONCLUSION No statistical significance was found between Rush primary care patients and out-of-system patients in regards to diabetes-related hospitalizations (p=0.88). However, the decreased hospitalizations seen in Hispanics and insured patients raises a discussion regarding the influence of socioeconomic factors and health inequities in diabetes outcomes. Future directions include further exploration of the 4 C's of primary care as a digital phenotype for the CAPriCORN model to better capture patient health.

Poster Number: 96

Session: Poster Presentation

Category: Health Equity

Trainee Rank: Rush Student CON: PhD

Mary Clare Houlihan, MS, RN

Mary Clare Houlihan, MS, RN Masako Mayahara, PhD, RN

A DESCRIPTIVE STUDY OF HOSPICE CAREGIVER HEALTH LITERACY

INTRODUCTION: Caregiver health literacy is a modifiable risk factor of health outcomes and has been associated with patient outcomes, including patient pain intensity. Although health literacy has been previously described in caregiver populations, the health literacy of caregivers has not been assessed in the hospice setting. Therefore, the primary purpose of this study is to describe the health literacy of a population of hospice caregivers and compare their health literacy levels to normative data. METHODS: This is a secondary data analysis of the ePainSupport clinical trial (Trial Number NCT04869085). Health literacy scores of hospice caregivers in this study were measured using the Rapid Assessment of Adult Literacy in Medicine (REALM) tool. The REALM is an easily administered tool that measures one's health literacy based on accuracy of reading 66 medically relevant words. Total score is categorized into four reading levels (0-18 third grade or below, 19-44 fourth to sixth grade, 45-60 seventh to eighth grade, and 61-66 ninth grade or above). Demographic variables (age, gender, ethnicity, and education level) were summarized using descriptive statistics. Hospice caregiver REALM scores were compared to three studies that obtained REALM scores from community-dwelling older adults. RESULTS: The mean age of participants was 57.2 years. The study sample was predominantly female (80%), Non-Hispanic White (67%), and 86.7% reported having more than a high school education. The mean REALM score was higher in hospice caregivers (62) than a population of community-dwelling older adults (57). However, the proportion of participants with estimated reading levels below 9th grade in hospice caregivers (26.7%) was similar to community-dwelling older adults (28.0%). CONCLUSIONS: This is the first study to investigate the health literacy of hospice caregivers. Findings should be interpreted with caution due to the small sample size and lack of diversity of study participants. Understanding the health literacy of hospice caregivers is important because it will guide the design of future interventions for hospice caregivers with limited health literacy.

Poster Number: 97

Session: Poster Presentation
Category: Health Equity
Trainee Rank: Clinical Resident

Nicole Larsen, MD

Nicole Larsen, MD (Rush); Tricia J. Johnson, PhD (Rush); Paula P. Meier, PhD (Rush); Kayla Dobies, MS (Rush); Mary Dyrland, MS (Rush); Charlie Fisher, MS (Rush); Aloka Patel, MD (Rush); Suhagi Kadakia, MD (Rush)

DISPARITIES IN BREASTMILK FEEDING RATES IN PRETERM INFANTS AFTER DISCHARGE FROM THE NEONATAL INTENSIVE CARE UNIT (NICU)

INTRODUCTION: There are limited data about post-NICU discharge breastmilk feeding (BMF) rates in preterm (PT) infants, despite multiple initiatives to improve in-hospital rates of BMF for this population. OBJECTIVE: 1) To determine BMF rates in PT infants in the first year. 2) To evaluate whether differences in BMF rates exist by race/ethnicity in PT infants in the first year. METHODS: Retrospective study of PT infants (gestational age (GA) <37 weeks) discharged from the NICU that sought care at Rush pediatric clinics. Infant demographics and feeding type at discharge were extracted from the medical record. Feeding history was extracted from healthcare maintenance visits at newborn, and 2, 4, 6, 9 and 12 months for PT infants born between January 1- May 15, 2018, as part of a larger ongoing study. Infants with a contraindication to BMF were excluded. RESULTS: Of 150 infants discharged during the study period, 42 infants met eligibility criteria, with mean birth GA 33±3 weeks. At NICU discharge, 62% were receiving any BM (exclusive or combined with formula). At the newborn visit, 37% were receiving exclusive BM and 16% mixed feedings (BM+formula), yielding 53% receiving any BM. Receipt of any BM decreased over the first year. Racial/ethnic differences were observed, most notably at the newborn visit with 100% of Non-Hispanic White/Asian/Other (NHW) infants receiving any BM compared to 56% of Hispanic (H) infants and 37% of Non-Hispanic Black (NHB) infants. Exclusive formula feeding rates for NHB infants increased 1.7-fold from 46% to 78% over the first 2 months. Although H and NHB infants had similar rates of exclusive BMF, receipt of any BM was higher in H infants due to greater rates of combined feedings. CONCLUSION: BMF rates in the first year progressively decreased for all PT infants, with a sharp decline by 2 months. Disparities previously described during NICU hospitalization persist after discharge, with higher rates of exclusive formula feeding in NHB infants at all time points. These disparities highlight opportunities for research to understand factors contributing to the rapid decline in BMF in order to develop interventions to support continued BMF for former PT infants.

Poster Number: 98

Session: Poster Presentation

Category: Health Equity

Trainee Rank: Rush Student RMC: M2

Autumn Moore, BA in Biological Sciences

Miranda Viars, BFA; Kristin Hill, MA; Michelle DeMeo, BA; Justin Sapp, MS; Chinyere Onyeukwu, BS; Audrey Salas, BA; Raj Singh, BS; Alexander Negron Price, MS-HSM; Autumn Moore, BA; Yvonne Clifvonne Webb, BS; Vinodinee Dissanayake, MD, MPH, FACEP

STAKEHOLDER INTERVIEWS: SICKLE CELL DISEASE ADVOCACY IN THE CLINICAL SETTING

INTRODUCTION Sickle cell disease (SCD) is an example of how health inequities remain prevalent and significantly impact the access to and quality of healthcare for patients from historically marginalized communities. Patients with SCD often experience inequitable and inadequate clinical care due to stigma, lack of provider knowledge, and inconsistent protocols. This project aims to address these inequities by increasing the awareness and comprehension of SCD and barriers to care among clinical staff, as well as decreasing stigma surrounding opioid use for pain management in SCD. Patient perspectives can inform providers on how to be more competent when caring for those experiencing pain crises. METHODS We recruited patients with SCD and their advocates for stakeholder interviews to explore perceptions and experiences within the healthcare system. The interview responses of four participants across two sessions were recorded and analyzed. RESULTS Prevailing themes reveal dissatisfaction with the healthcare system leading to reluctance to seek care and poor quality of life. Interviewees report that SCD patients are not accurately triaged in the emergency department (ED) and that clinical staff often lack empathy. Patients feel they do not receive adequate nor timely pain management, and requests for care are often labeled as drug-seeking behavior. Additionally, clinicians' knowledge gaps burden patients with the responsibility of educating their providers and advocating for themselves in the midst of their pain crises, often resulting in them having to repeat themselves before medical interventions are made. CONCLUSION To improve clinical care, stakeholders request a member of the hospital SCD committee to act as a patient advocate in the ED. Additional recommendations include improving provider education, enforcing protocols for accurate triage and appropriate pain control regimens, and implementing patient-controlled analgesia pumps. These interventions empower patients, improve inclusivity in decision-making, and alleviate the burden on patients during ED visits. Next steps include assessing the needs of patients who require more than six ED visits per year to improve patient-centered approaches to care. The interviewees will continue to guide our clinical and research processes as we strive to improve patient-provider relationships and ensure timely, equitable, and empathetic care for patients living with SCD.

Poster Number: 99

Session: Poster Presentation

Category: Health Equity

Trainee Rank: Rush Student RMC: M1

Evan Patel, MS

Evan Patel (Rush) Trevor Poulson (Rush) Manushi Shah (UIUC) Ashok Jagasia (Rush

WAIT TIME FOR A SUDDEN HEARING LOSS APPOINTMENT IN ILLINOIS

INTRODUCTION: Sudden sensorineural hearing loss (SSNHL) is a commonly encountered, urgent diagnosis in otolaryngologic practice. Intratympanic steroid therapy is the current mainstay of treatment of idiopathic SSNHL in the United States. The prognosis for hearing recovery is dependent on a number of factors including the severity of hearing loss, age, and time to treatment. In fact, the rate of hearing recovery following audiogram within the first few days of onset is 87%, with a week, 87%, 2 weeks 52%, and 10% or less after 3 months. Based on the importance of rapid treatment, we sought to establish the average wait time for a new patient in the state of Illinois presenting with sudden hearing loss. METHODS: In November 2022, a list of board-certified otolaryngologists from Illinois was obtained from the American Academy of Otolaryngology (AAO) website which includes data on 93% of otolaryngologists practicing in the United States. Using a uniform script, each of the otolaryngologists were contacted. The caller informed the office administrative assistant that they were a new patient with SSNHL. No name was provided. There was no reference to any insurance plan, and an appointment with a physician extender was refused if offered. All telephone calls were made between November 1 to November 30, 2022. Wait times were calculated as the number of calendar days from the date of the call until the date of appointment offered. RESULTS: The average wait time in Illinois was 18.0 days for a new patient with SSNHL. This is in contrast to the reported national average wait time for an appointment with an otolaryngologist of 13.2 days. CONCLUSION: These findings are concerning, given the urgency of an SSNHL diagnosis. Many of the office administrative assistants who were contacted appeared unaware of the urgency behind this diagnosis. Many who did urged us to visit the emergency department due to lack of availability. With this in mind, the average state-wide wait time of 18.0 days to see an otolaryngologist would indicate that nearly half of patients developing sudden hearing loss within the state of Illinois will not recover their hearing.

Poster Number: 100

Session: Poster Presentation

Category: Health Equity

Trainee Rank: Rush Student RMC: M3

Yolana Pollak, BA

Grace Sassana-Khadka, BA (Rush); Yolana Pollak, BA (Rush); Dr. Loren Schechter, MD (Rush); Dr. Amir Dorafshar, MD (Rush); Adan Becerra, PhD (Rush)

NATIONAL UTILIZATION PATTERNS OF GENDER-AFFIRMING HORMONE THERAPY AND GENDER-AFFIRMING SURGERY AMONG TRANSGENDER AND NONBINARY INDIVIDUALS BY STATE AND BY INSURANCE

INTRODUCTION: Transgender and nonbinary individuals experience numerous barriers to accessing health care, often caused by structural and policy factors. Limited data exist regarding utilization patterns of gender-affirming hormone therapy (GAHT) and/or gender-affirming surgery (GAS) at the national level. The objective of this study is to evaluate how insurance and state of residence affect utilization patterns of gender-affirming care among transgender and nonbinary individuals. METHODS: We conducted a retrospective cohort study by leveraging PearlDiver-Mariner, a national all-payer claims database. We identified individuals diagnosed with gender incongruence (previously gender dysphoria) between 2010-2020 using billing codes and subsequently calculated the percentage of these individuals who received gender-affirming hormone therapy (GAHT) and/or underwent gender-affirming surgery (GAS). Rates of GAHT and GAS utilization were stratified by insurance and state. Adjusted analyses were conducted using multivariable logistic regression, adjusted for confounders. RESULTS: A total of 78,169 individuals with gender incongruence were identified. The distribution of insurance among this cohort is as follows: 60,275 (77%) had commercial insurance, 12,383 (16%) had Medicaid, and 5,511 (7%) had Medicare. Across all states, rates of GAHT and GAS utilization were highest among those covered by commercial insurance and lowest among those covered by Medicare. In multivariable analyses, individuals covered by Medicaid and those covered by Medicare had 9% (OR=0.91, 95% CI 0.87,0.95) and 25% (OR=0.75, 95% CI 0.71,0.80) lower relative odds of GAHT use, respectively, compared to those covered by commercial insurance. Similarly, individuals covered by Medicaid and those covered by Medicare had 22% (OR=0.78, 95% CI 0.73,0.83) and 31% (OR=0.69, 95% CI 0.63,0.75) lower relative odds of undergoing GAS, respectively, compared to those covered by commercial insurance. However, these differences varied by individual states. For example, in Illinois, differences in GAHT use by insurance (38% commercial, 37% Medicaid, 33% Medicare) were less drastic than other states such as Idaho (35% commercial, 15% Medicaid, 23% Medicare). CONCLUSION: Utilization patterns of GAHT and GAS among transgender and nonbinary individuals were affected by insurance plans. While those covered by commercial insurance were more likely to receive gender-affirming care, individual states were able to mitigate these differences. Future research will analyze whether individual state policies contributed to these patterns.

Poster Number: 101

Session: Poster Presentation

Category: Health Equity

Trainee Rank: Clinical Fellow

Ellen Stephen, MD

Ellen Daily Stephen, MD (Rush Allergy/Immunology); Anandu Dileep, MD (Rush Internal Medicine); Niki Mirhosseini (Indiana University Bloomington undergraduate); Shannon Manz, MD (Rush Internal Medicine); Manali Shah, MD (Rush Internal Medicine); Mahboobeh Mahdavinia, MD, PhD (Rush Allergy/Immunology)

Lower Likelihood of Allergist Evaluation for Black Children with Atopic Dermatitis Despite Increased Risk of Asthma

INTRODUCTION: Recent literature examining racial differences in the atopic march shows high risk of asthma in Black children. We aim to deepen this understanding by exploring real-world diagnosis patterns and factors associated with asthma risk in a large urban atopic population. METHODS: This is a single-center study of children aged 0-18 years diagnosed with atopic dermatitis. We performed retrospective chart review to determine whether each subject was diagnosed with and evaluated for asthma. We used logistic regression to analyze the risk of asthma diagnosis in association with race, sex, age, BMI, insurance, and the Area Deprivation Index (ADI), tabulated by block group, with a higher value indicating more socioeconomic disadvantage. RESULTS: Our study population includes 728 Black children and 246 non-Hispanic White children with atopic dermatitis. Compared with non-Hispanic White children, Black children were significantly more likely to have an asthma diagnosis [31.2% vs. 10%, $p = 0.00$]. Logistic regression demonstrated that 3 main variables impacted this observed difference: higher ADI, higher BMI, and greater age at time of evaluation. Black children with asthma were also less likely to see an allergist (46.7% vs. 69%, $p = 0.002$) and more likely to lack prior inhalant allergy testing [OR=7.5, $p = 0.03$]. CONCLUSION: The atopic march has not been as widely studied in Black children as in White children. In order to effectively minimize existing healthcare disparities, we must further understand the factors underlying racial differences in diagnosis of atopic diseases, as well as barriers to accurate diagnosis and management of these common morbid conditions.

Poster Number: 102
Session: Poster Presentation
Category: Health Science
Trainee Rank: Rush Student RMC: M2

Russell Whitehead, BS

Russell Whitehead BS (RMC), Elias Michaelides MD (RUMC)

"REPOSITORY OF COCHLEAR IMPLANT INFORMATION" (ROCII): THE DESIGN AND IMPLEMENTATION OF A REDCAP DATABASE

INTRODUCTION: Cochlear implants are auditory prostheses that safely provide a high-quality sensation of hearing to patients with a severe or profound level of sensorineural hearing loss. Cochlear implantation is a generally well tolerated surgical procedure that provides patients with marked improvement in auditory performance and psychosocial functioning. There are many variables that may affect patient performance. These include cause of hearing loss, patient related variables, device parameters, and surgical technique. Outcomes can be measured in multiple ways also, which complicates the understanding of patient performance. Comprehensive analysis of these multiple variables is critical in decision-making regarding candidacy, devices selection, and prediction of performance. METHODS: A retrospective, relational repository in REDCap, named the Repository of Cochlear Implant Information (ROCII), has been designed to collect and analyze data on patients who have undergone cochlear implantation at Rush University Medical Center (RUMC) in order to better understand the evaluation process, outcomes, and patient experience of cochlear implantation. Retrospective data is exported manually from Epic and imported into ROCII. All data is de-identified but associated with respective patients via a unique record ID. Static data, including demographics and hearing history, is collected a single instance per patient. Repeatable data, including longitudinal improvement in hearing performance following cochlear implantation, is collected several instances per patient. All data is organized chronologically by date. RESULTS: ROCII is designed for simplistic data entry and permits us to run multifactorial analyses on any combination of data. An example analysis includes, with all data fields denoted by apostrophes: "How does 'brand of cochlear implant' affect audiogram score' in patients '1 year post-op' with history of 'noise exposure' related hearing loss?" CONCLUSION: The implementation of ROCII will allow us to analyze trends in the evaluation process, outcomes, and patient experience of cochlear implantation. Looking forward, we aim to expand the repository to allow providers at other institutions access to input data on their patients as well as run analyses on all patients in the repository.

Poster Number: 103
Session: Poster Presentation
Category: Health Science
Trainee Rank: Post-Doctoral Research Fellow

Yan Xu, Ph.D.

Yan Xu, Ryan Spear, Yanxia Cao, Kwi Hye Koh, Felix Klieve, Steve Mangos, Nicole Endlich, Jochen Reiser and Eunsil Hahm

Therapeutic potential of ICOSL for treating αvβ3-mediated glomerular damage

BACKGROUND: Activation of αvβ3 integrin is an early pathological process in several podocytopathies leading to glomerular disease with no treatment options available. We recently identified inducible co-stimulator ligand (ICOSL) as a renoprotective agent that acts as an antagonist of αvβ3 integrin. We tested the precise mechanistic action of ICOSL in protecting the kidney from injury and evaluated in vivo efficacy of ICOSL and its small peptide in proteinuric animal models. METHODS: Expression dynamics of ICOSL during glomerular injury was established by performing quantitative PCR on 3 main glomerular cell types (human podocytes, glomerular endothelial cells, and mesangial cells) after different injury stimuli. We generated double knockout (DKO) mice (ICOS-/ICOSL-) to explore the importance of ICOSL's canonical receptor to renoprotection. ACR and BUN measurements were used to evaluate renal function in DKO and control mice that were subjected to STZ-induced diabetic nephropathy. ICOSL's binding specificity and affinity toward RGD-binding Integrins was tested using surface plasmon resonance (SPR). A 19 amino acid portion of ICOSL was tested for its ability to target podocyte αvβ3 integrin using an in vitro podocyte adhesion assay, and for its ability to mitigate LPS-induced proteinuria in ICOSL KO mice. RESULTS: Glomerular ICOSL expression is regulated by immunological insults, not by conditions that cause oxidative stress. Among the cell types tested, podocytes are the predominant producers of ICOSL and could be stimulated to express ICOSL under immunological stress. Conversely, mechanical stress resulted in reduced ICOSL expression. KO mouse models treated with STZ demonstrate that the renoprotective function of ICOSL is independent of ICOS. Among the 7 different RGD-binding integrins tested, only αvβ3 integrin shows strong and preferential binding to ICOSL. Both full-length and a 19-mer portion of ICOSL protein could bind podocytes through αvβ3 integrin and reverse LPS-induced proteinuria in ICOSL KO mice. CONCLUSION: Our data suggest that the glomerular expression of ICOSL mainly occurs in podocytes and can be triggered by immunological insults. Oxidative stress has no effect and mechanical stress reduces ICOSL expression. Given the highly selective binding characteristics to αvβ3 integrin, ICOSL and ICOSL-based small peptides may offer novel and safe therapeutic options for treating -mediated glomerular diseases.

Poster Number: 104

Session: Poster Presentation
Category: Infectious Disease/Immunology
Trainee Rank: Rush Student GC: PhD

Michelle Ash, BS

Michelle Ash (Rush University, presenting/first author), Anjelica Reyes (Rush University), Ron Veazey (Tulane National Primate Research Center), François Villinger (University of Louisiana at Lafayette/New Iberia Research Center), Thomas Hope (Northwestern University), Lena Al-Harthi (Rush University), Jeffrey Schneider (Rush University)

ELEVATED VIRAL LEVELS AND INFLAMMATION IN THE CENTRAL NERVOUS SYSTEM FOLLOWING CART CESSATION IN A RHESUS MACAQUE SIV INFECTION MODEL

INTRODUCTION Since the advent of combined antiretroviral therapy (cART), people living with HIV have increased life expectancy and improved clinical outcomes. However, the latent HIV reservoir persists despite cART, preventing total viral clearance. The central nervous system (CNS) is a reservoir for HIV and harbors virus in tissue and cellular compartments. Upon cessation of cART, the CNS HIV reservoir contributes to viral rebound in peripheral tissues. We hypothesize that CNS tissues following cART cessation will exhibit significant viral rebound and an increase in neuroinflammation as a consequence of rebound. METHODS We utilize a simian immunodeficiency virus (SIV) infected rhesus macaque cART cessation model of HIV, including cART suppressed and four days or two weeks post-cART cessation animals. Primary brain regions investigated include frontal, occipital, and temporal lobes as well as midbrain, hindbrain, cerebellum, and brain stem. Viral rebound is quantified using fluorescent RNAscope and correlated to neuroinflammation determined by traditional immunofluorescent microscopy of inflammatory cytokines. RESULTS RNAscope experiments reveal four days and two weeks post-cART cessation tissues exhibiting viral rebound through increased fluorescent RNAscope signal, indicating increased viral RNA expression. cART suppressed tissues did not exhibit significant rebound, while AIDS tissues had consistent viral RNA expression. Neuroinflammation correlating with viral rebound during cART cessation can be seen for inflammatory cytokines TNF-α and neurofilament light chain (NFL), while there was reduced neuroinflammation in cART suppressed tissues. Neuroinflammation for TNF-α and NFL was also increased in AIDS tissues and correlated with expression of viral RNA, compared to lower levels of infection and reduced inflammation in cART suppressed tissues. CONCLUSIONS We observed rebounding SIV reservoirs in cART cessation tissues with increased viral RNA expression, which aligns with current studies indicating the CNS HIV reservoir likely contributes to viral rebound burden upon cessation of cART. Additionally, we show increased levels of neuroinflammation for multiple cytokines following cART cessation pointing to a powerful and detrimental neuroinflammatory cascade as a consequence of viral rebound. These findings are essential in defining the neuroinflammatory component of HIV, including identifying tissues in the CNS that are prone to significant viral rebound and a potent subsequent neuroinflammatory response.

Poster Number: 105
Session: Poster Presentation
Category: Infectious Disease/Immunology
Trainee Rank: Clinical Resident

Anne Ewing, MD

Anne Ewing, MD (1); Ellen D. Stephen, MD (2); Malina Patel, MD (3); Erin Keizur, BS (4); Betty Vu, PharmD (5); Sindhura Bandi, MD (2); Colleen Nash, MD, MPH (6) Rush University Medical Center: 1) Department of Pediatrics, 2) Department of Internal Medicine - Division of Allergy/Immunology; 3) Department of Internal Medicine; 4) Rush Medical College; 5) Department of Pharmacy; 6) Department of Pediatrics - Division of Infectious Diseases

MULTIPRONGED APPROACH TO RECRUITMENT OF PEDIATRIC PATIENTS WITH BETA-LACTAM ALLERGIES FOR EVALUATION AND DE-LABELING

INTRODUCTION Although penicillin allergy is the most commonly reported pediatric drug allergy, most reports do not represent IgE-mediated or late-onset severe hypersensitivity reactions. False allergy labels can lead to the development of antibiotic resistance and adverse drug side effects. We hypothesize that our multipronged approach to evaluate pediatric beta-lactam allergies will "de-label" inaccurate or outdated allergies. METHODS This quasi-experimental study included pediatric patients (0-18 years) with a documented beta-lactam allergy at a single tertiary medical center seen in clinic between 2014-2019 or admitted in 2022. Patients were prospectively recruited, screened, and stratified into risk categories determined by their reported reaction symptoms. Low-to-intermediate-risk patients were referred to Allergy and Immunology (A/I) for evaluation with skin testing and/or oral challenge as deemed appropriate. We report descriptive statistics from our cohort and a two-group comparison of enrolled patients delineated by appointment attendance via one-tail t tests and chi-square tests. RESULTS Among 107 screened participants, 54 were referred to A/I for de-labeling assessment, and a total of 19 were de-labeled (12 via A/I assessment and 7 via screening) in an average of 0.8 (±0.7) A/I visits. The majority of referred patients reported amoxicillin allergy (83%) consisting of either an urticarial (52%) or maculopapular (41%) rash with an average time of 6.0 (±3.3) years since the reaction. Only 1 patient out of the 26 low-to-intermediate-risk patients who completed a de-labeling assessment was re-classified as high-risk by A/I. No allergic or adverse reactions to testing were reported. Anticipated barriers to study completion of insurance type (p=0.57), travel distance to clinic (p=0.21), age of participant (p=0.38), and time since reaction (p=0.16) did not differ significantly between patients who attended at least 1 A/I appointment and patients lost to follow-up. CONCLUSION Use of an inpatient and outpatient algorithm can help identify pediatric patients less likely to have a true or persistent beta-lactam allergy and who could benefit from formal allergy testing to potentially remove their allergy label. In the future, algorithm implementation within the electronic medical record may assist clinicians in thorough documentation of beta-lactam allergies and expeditious referral for allergy testing when appropriate.

Poster Number: 106

Session: Poster Presentation
Category: Infectious Disease/Immunology
Trainee Rank: Rush Student GC: Masters

Aman Hyrams, MS

Aman Hyrams (Rush) Evan Patel (Rush) Margaret Byrne (Rush) David Williams (Rush)

IMPACT OF TARGETED POINT MUTATIONS ON TGR PROTEIN ACTIVITY FOR POTENTIAL SCHISTOSOMIASIS TREATMENT

INTRODUCTION: Schistosomiasis, a parasitic disease that impacts about 230 million people annually, stems from the infection of the flatworm Schistosoma. There is no vaccination and the only available drug, praziquantel, is administered to over 100 million people annually. It is possible that praziquantel resistance may develop in Schistosoma, making the generation of a novel treatment essential. One potential treatment may be linked to a selenium-containing parasite enzyme thioredoxin glutathione reductase (TGR). In its native state, the TGR protein possesses a cysteine residue at the 154 and 159 positions, which form a disulfide bond. Our aim was to generate a single point mutation within the C154 into either a serine or alanine residue, rendering the disulfide bond nonexistent and altering the TGR tertiary structure. METHODS: Mutagenic primers for the creation of C154S and C154A mutants were generated using NEBase Changer. Site directed mutagenesis was done with Q5® Site-Directed Mutagenesis Kit from New England Biolabs. Original samples were amplified in thin-walled PCR tubes and placed in a thermocycler for the denaturation, annealing, and extension. These samples were treated with Kinase, Ligase and Dpnl before the final transformation step in competent E. coli cells. Colonies grown on selection media underwent plasmid isolation and samples were delivered to an off-site laboratory for Sanger Sequencing. Samples were further analyzed against the S. mansoni protein library to confirm the presence of the mutationa. A DTNB and a GSSG assay were performed in 96 well plates for further quantification of the C154S mutant. These assays measured thioredoxin reductase activity and glutathione reductase activity in the protein. Experimental groups included wild type TGR and human GR at 4nM and the mutant TGR proteins at 50nM. RESULTS: Based on the findings of the protein activity assays, a C154S point mutation reduced the activity of TGR by over 50-fold. CONCLUSION: It is unlikely that Schistosoma could survive within its host with an inactive TGR protein. A drug which targets TGR may be both effective and safe for humans. The results of this study including the characterization of TGR activity of the C154S mutation allows for a better understanding of the TGR proteins' structure and function.

Poster Number: 107

Session: Poster Presentation
Category: Infectious Disease/Immunology
Trainee Rank: Rush Student RMC: M2

Harsimar Kang, B.S.

Harsimar Kang (RUMC), Alan Landay (RUMC), JC Rojas (RUMC), Pankaja Desai (RUMC), Francisco Averhoff (Abbott Diagnostics), Gavin Cloherty (Abbott Diagnostics), Robert Balk (RUMC)

VALIDATION OF SCREENING TOOL TO IDENTIFY COVID-19 AT AN URBAN TERTIARY CARE CENTER

INTRODUCTION: The rapid global spread of COVID-19 in 2020 highlights the need for early detection of infectious diseases with pandemic potential. Rush University Medical Center (RUMC) collaborated with Abbott Diagnostics to develop a surveillance tool to identify patients likely to have a novel respiratory pathogen. To assess the effectiveness of the tool, we retrospectively assessed the effectiveness of the tool in identifying COVID-19 patients who presented to our institution and had at least one positive COVID-19 test during their admission. METHODS: A database that included electronic health record data of hospitalized COVID-19 positive patients at RUMC with select symptoms, signs and laboratory and radiologic findings was developed (OMOP database). Patients were included if they had at least one documented positive COVID-19 test (antigen or PCR) during 3/10/2020 - 10/22/2022. A screening tool was developed that included variables to identify potential cases of COVID-19 including clinical symptoms (fever, cough, shortness of breath), physical signs (respiratory rate > 20 bpm, temperature greater than 100.4°F) and lab/radiologic findings (WBC < 4000/mL3, abnormal chest x-ray or ground glass opacities on chest computerized tomography (CT) scan). To identify a potential COVID-19 infection, a potential patient must meet at least 1 criterion in all 3 categories (clinical symptoms, signs, lab/radiologic findings). Statistical analysis of data was conducted using STATA statistical software. RESULTS: The OMOP COVID-19 data base included 1197 patients. The screening tool had 100% sensitivity to detect these individuals and suggested future application for this screening tool to identify a new respiratory pathogen that presents with a flu like illness. Per category - percent with cough = 79.4%, fever = 70.8%, SOB = 60.4%, respiratory rate > 20bpm = 97.7%, Temp > 100.4°F = 7.7%, WBC < 4000/mL3 = 87.4%, ground glass opacities = 18.9%. CONCLUSION: The simple respiratory surveillance tool was able to identify all COVID-19 patients included in our analysis. Future prospective trials and/or application of this surveillance tool to a larger group of patients presenting with respiratory symptoms will be needed to establish the sensitivity, specificity, positive and negative predictive values for the identification of patients infected with a respiratory pathogen.

Poster Number: 108

Session: Oral Presentation

Category: Infectious Disease/Immunology

Trainee Rank: Rush Student GC: PhD

Gabrielle Kooi, BS, MS

Michelle Ash (Rush), Anjelica Reyes (Rush), Leannie Olivares (Rush), Amber Virdi (Rush), Lena Al-Harthi (Rush), Jeffrey Schneider (Rush)

DELIVERY OF IGG TO THE CNS FOLLOWING IP INJECTION IS TRAFFICKED THROUGH MYELOID CELLS

INTRODUCTION: The blood brain barrier makes it difficult for drugs to penetrate the CNS Only approximately 0.1-1% of antibodies make it to the CNS following intravenous injection. Therefore, there is a need for enhancing drug and antibody delivery for neurodegenerative diseases and viral infections that affect the CNS. For instance, HIV is a systemic infection with sanctuaries throughout the body that harbor latently infected cells that have the possibility to egress out following the removal of cART. The brain is a major reservoir that poses a problem with fully clearing the virus due to low penetration of therapeutics such as cART and neutralizing antibodies. We hypothesize that the usage of a humanized NSG mouse model will allow for optimization of antibody delivery to the CNS and characterization of which cell types are important for its trafficking there. METHODS: We have utilized a humanized NSG mouse model that has been intraperitoneally injected with human PBMCs. After two weeks of reconstitution these mice were IP injected with Cy5-labelled GAMUNEX (bulk human IgG) or PGT121 (anti-HIV IgG). Prior to necropsy mice were imaged on the IVIS. Next the mice were PBS perfused and the brain and spinal cord were isolated for further antibody characterization. Lightsheet microscopy and the Licor Odyssey were utilized for characterizing antibody delivery, while traditional immunofluorescence imaging aided in determining the cellular phenotypes, astrocytes (anti-GFAP), microglial cells (anti-AIF1/Iba1) and myeloid-derived cells (anti-F4/80), that take up the injected antibody. RESULTS: After 48 hours-post injection, we were able to visualize both GAMUNEX and PGT121 antibodies via IVIS, Odyssey and lightsheet microscopy. Fluorescent microscopy allowed us to differentiate cell types of the CNS that were associated with the injected Cy5-labelled IgG. The imaging showed that myeloid-derived and microglial cells can uptake the antibody, but not astrocytes. CONCLUSION: We have observed GAMUNEX and PGT121 entering the CNS following IP injection in the humanized mouse model. We found a route for cellular uptake or delivery of the antibody via myeloid-derived and microglial cells, which are cells that are highly susceptible to HIV infection. Future investigations involve manipulating these antibodies biochemically to increase CNS penetration with goal to block viral egress.

Poster Number: 109

Session: Poster Presentation

Category: Infectious Disease/Immunology

Trainee Rank: Rush Student RMC: M2

Rachel Maurer, BA, Biology and MD candidate 2025

Rachel Maurer (Rush), Christopher Codispoti MD (Rush)

SYSTEMATIC REVIEW OF THE EFFECTIVENESS OF BREATHING EXERCISES IN THE TREATMENT OF ASTHMA

INTRODCUTION Asthma is a chronic lung condition characterized by airway inflammation, bronchial hyperresponsiveness and transient airway obstruction. Asthma is a serious public health concern worldwide. Breathing exercises have been commonly used as a non-pharmacological therapy to treat people with asthma. Breathing exercises aim to control the symptoms of asthma and include the Papworth Method, the Buteyko breathing technique, yogic breathing, deep diaphragmatic breathing. The training of breathing usually focuses on allowing for deeper inspiration and expiration, or changes in rate, rhythm, or pattern of breathing. OBJECTIVE To evaluate the current evidence for the efficacy of breathing exercises in the management of adults with asthma. METHODS Search Methods To identify relevant studies we searched PubMed (MEDLINE), Scopus, Google Scholar, and The Cochrane Library and performed hand searching of respiratory journals and meeting abstracts. The most recent literature search was on 25 April 2022. The following string was used in our search: ("Breathing Exercises"[Mesh] OR "Diaphragm/therapy"[Mesh] OR "Respiration/therapy"[Mesh] OR "Voice Training"[Mesh] OR "Voice/therapy"[Mesh] OR "Singing"[Mesh] OR "Yoga"[Mesh] OR "voice training"[tiab] OR "voice exercise"[tiab] OR "voice exercises"[tiab] OR singing[tiab] OR yoga[tiab] OR pilates[tiab] OR "inspiratory muscle training"[tiab] OR "breathing exercise"[tiab] OR "breathing exercises"[tiab] OR "respiratory muscle training"[tiab] OR "diaphragmatic breathing"[tiab] OR "deep breathing"[tiab]) AND ("Asthma"[Mesh] OR asthma*[tiab]) Selection criteria We included randomized controlled trials of breathing exercises in adults with asthma compared with a control group receiving asthma education, a placebo or, with no active control group. All studies published in English within the last 50 years. DATA COLLECTION Two review authors independently assessed study abstracts for inclusion criteria. The reviewers then conducted a full text review to assess study quality. Full text review is ongoing and the next step will be data extraction and analysis. Information collected from each study will include: Methods (study design, recruitment, inclusion/exclusion criteria, randomization, blinding, withdrawal) Participants (country/location of study, study group characteristics including age, gender,) Intervention (type of intervention) Outcomes (asthma control, asthma quality of life, asthma symptoms, asthma-related healthcare utilization (such as ED visits, hospitalizations). Main results The original string included 2108 studies. The researchers performed abstract screening and included 1455 studies. Full text review of studies is ongoing.

Poster Number: 110
Session: Poster Presentation
Category: Infectious Disease/Immunology
Trainee Rank: Rush Student GC: PhD

Charia McKee, B.S. in Biology
Charia McKee; Dr. Joao Mamede

Detailing the Intracellular Innate Immune Response to HIV Infection

INTRODUCTION An estimated 37.7 million people globally, and 1.2 million people in the United States live with HIV/AIDS. Despite the use of combination anti-retroviral therapies in treatment of HIV/AIDS, there is the establishment of persistent inflammation that may contribute to the maintenance and seeding of viral reservoirs, greatly impacting the quality of life of individuals living with HIV/AIDS. Therefore, it is imperative that the cellular mechanisms contributing to these inflammatory processes are explored and studied. The Cyclic GMP-AMP Synthase (cGAS)-Stimulator of Interferon Genes (STING) pathway has been shown to be key in the cellular response to viral infection in cells of myeloid origin. cGAS, a sensor of cytosolic double stranded DNA, synthesizes cyclic GMP-AMP (cGAMP), a second messenger that binds STING, following binding to aberrant viral and cellular DNA species and subsequently initiates a widespread inflammatory innate immune response. However, the mechanisms by which cGAS is activated are not fully defined. Particularly, it is unknown the viral molecular species and the stage of the viral life cycle that are targeted by the cGAS-STING innate complexes. METHODS By optically tracking viral particles and innate sensing proteins via intracellular complementation assay and fluorescence microscopy, I aim to define the kinetics and cellular localization of the interactions of cGAS with the HIV-1 reverse transcribing complexes (RTC) and measure the kinetics of cGAMP signaling in the context of the early steps of HIV-1 infection. I also aim to define the interaction of HIV-1 particles with varying proteins involved in the antiviral response using multiplex Immunofluorescence imaging of tissues of the gut. RESULTS With these techniques I expect to demonstrate early reverse transcription-dependent association of PQBP1 and cGAS in the cytoplasm. Furthermore, early RNA-DNA hybrids will activate cGAS after the initial steps of reverse transcription (first strand transfer) and before the completion of reverse transcription. CONCLUSIONS This will give insight into how the progression of HIV infection influences the triggering of antiviral responses in the cell, including capsid disintegration, reverse transcription, and nuclear translocation.

Poster Number: 111
Session: Poster Presentation
Category: Infectious Disease/Immunology
Trainee Rank: Rush Student RMC: M3

Jinal Patel, B.S.

Jinal Patel, Stefan Green, Laura Furtado, Ankur Naqib, Cheryl Jennings, Alan Landay, Ali Keshavarzian, Robin Voigt (Rush University)

NASOPHARYNGEAL MICROBIOME IN COVID-19-NEGATIVE, MILD, MODERATE, AND SEVERE PATIENTS

INTRODUCTION There is minimal information on the nasopharyngeal microbiomes of COVID-19 patients. A preliminary study revealed increased pro-inflammatory microbiota in COVID-19-positive patients characterized by a greater Proteobacteria-to-Actinobacteria ratio and reduced Streptococcus abundance. Our study served to identify nasopharyngeal microbiome changes in COVID-19-positive patients that developed mild, moderate, and severe disease compared to negative controls. METHODS Samples were collected via nasopharyngeal swabs in March-May 2020 from symptomatic African American patients (as this population was disproportionately affected by COVID-19) with mild, moderate, or severe disease and from SARS-CoV-2 negative patients (n=30 each). Mild, moderate, and severe disease was defined by a positive test with outpatient management, requiring hospitalization, and requiring intensive care unit admission, respectively. All samples were processed at the Genomics and Microbiome Core Facility. The microbiome was characterized using 16S rRNA amplicon sequencing. For some analyses, data were rarefied to 100 and 500 sequences per sample. Analysis of Variance was performed on taxon richness, evenness, and the Shannon index. Analysis of similarity (ANOSIM) was performed on Bray-Curtis dissimilarity (non-phylogenetic) metric. Data were visualized using nonmetric-multi-dimensional scaling. RESULTS Bootstrap analyses showed non-overlapping centroid of microbiomes of those with severe illness compared to those with milder forms of the disease, suggesting a different microbial community in severe disease. Overall, ANOSIM values did not support strong separation of community structure by disease severity ($R = -0.018$ to $+0.068$, $p = 0.013$ to 0.75). We did not note a difference in Staphylococcus abundance when comparing COVID-19-positive and negative samples but noted increased relative abundance of Staphylococcus in severe disease as compared to all other disease severities ($p = 0.001$). There was no significant difference in alpha diversity indices among groups. CONCLUSION There is some evidence microbial communities in individuals that developed severe COVID-19 are distinct from those with milder disease manifestations and COVID-19-negative individuals, including higher relative abundance of putative pathogens in those with severe disease. These data demonstrate the value in monitoring nasal microbiome in viral disease, as altered microbiome may indicate susceptibility to disease or an effect of the disease.

Poster Number: 112
Session: Poster Presentation
Category: Infectious Disease/Immunology
Trainee Rank: Rush Student RMC: M3

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LOWER EXTREMITY NODULES AFTER SPELUNKING IN MEXICO

INTRODUCTION: Mycobacterium marinum is a non-tuberculous mycobacterium affecting 0.27 cases per 100,000 inhabitants that presents as a nodular granulomatous disease [1]. The bacillus typically causes a tuberculosis-like illness in aquatic organisms but can infect humans when damaged skin is exposed to a contaminated aquatic environment. M. marinum infections are usually isolated to skin and soft tissues and can spread in a sporotrichoid distribution [1]. CASE PRESENTATION: A 26-year-old male, while spelunking in Tulum, Mexico, sustained a small laceration on his right ankle. Three months after the initial injury, he presented at his primary care physician with a nonhealing wound on the right ankle. Examination of the lesion demonstrated erythematous to violaceous indurated papules coalescing into plaques (Figure 1). The lesion raised suspicion for infection and a biopsy and tissue culture was performed. Biopsy demonstrated skin with ulceration, neutrophlic serum crust and adjacent reactive epidermal hyperplasia with an underlying neutrophil-rich superficial dermal infiltrate. In the deep dermis, the infiltrate was lymphohistiocytic without evidence of granuloma formation. PAS, GMS and Fite stains were negative for microorganisms. Fluorochrome staining was also negative for acid fast bacilli, however, acid fast bacilli culture with smear confirmed the presence of Mycobacterium marinum. DISCUSSION: M. marinum infections are indolent with an intermediate incubation period of 16 days [2]. Diagnosis of M. marinum can be challenging due to difficulty in culturing the bacteria and its nonspecific clinical polymorphism [3]. Evaluation should include patient history, risk factors, duration of disease, site and morphology of lesions, as well as medical history [2]. Diagnosis is confirmed with tissue cultures biopsies. On histopathologic sections, M. marinum displays epidermal changes, such as acanthosis, pseudoepitheliomatous hyperplasia, and exocytosis [2]. Common histopathologic patterns include granulomatous inflammatory infiltrate [2]. Treatment of M. marinum infection is typically prolonged, requiring months of antibiotics to attain clearance. M. marinum can be particularly difficult to treat as an organism due to increasing multi-drug resistance [4]. CONCLUSION: In cases limited to superficial cutaneous infection, clarithromycin, doxycycline, minocycline or trimethoprim-sulfamethoxazole monotherapy for three months has shown efficacy [2]. For severe infections, a combination of rifampin and ethambutol can be used [2].

Poster Number: 113
Session: Poster Presentation
Category: Infectious Disease/Immunology
Trainee Rank: Rush Student GC: PhD

Veronica Villanueva, PhD (in progress)

Veronica Villanueva (Rush University Medical School), Xiaobo Li (Rush University Medical School), Viviana Jimenez (Rush University Medical School), Hafeez Faridi (Chicago State University), and Vineet Gupta (Rush University Medical School)

CD11b ACTIVATION SUPPRESSES suPAR AND INFLAMMATORY SIGNALING TO AMELIORATE LUPUS NEPHRITIS IN MURINE MODELS

INTRODUCTION Lupus nephritis (LN) is a debilitating comorbidity of systemic lupus erythematosus (SLE). CD11b, the alpha-chain of Mac-1, plays a critical role in cell adhesion, migration, and signaling. Mutations in the ITGAM gene, encoding CD11b, are associated with LN and reduce integrin function. Here we investigated the mediation of suPAR through activation of CD11b. Additionally, we show that activation of CD11b reduces proinflammatory signaling in myeloid cells. METHODS To investigate how signaling is affected by CD11b activation, we utilized in vitro assays using macrophage cell lines and primary macrophages. Cells were treated with TLR agonists, pathway inhibitors, and leukadherin-1 (LA1). Changes in protein expression were assessed by western blot and proinflammatory cytokine levels were assessed by ELISA. For complementary in vivo studies, we utilized a CD11b knock-out model and our newly generated mouse model, where we incorporated a constitutively active CD11b point mutation (I332G) globally in mice to generate a model for CD11b activation - CD11b knock-in model. Additionally, we used two murine models of SLE, one by Yokogawa et. al. 2014 and a humanized mouse model to assess kidney protection induced by CD11b activation in SLE. RESULTS TLR-stimulation increased inflammation and suPAR levels in vitro and in vivo. Importantly, CD11b activation resulted in significantly reduced proinflammatory cytokines and suPAR in both systems, suggesting a novel mechanism for controlling inflammation in glomerular diseases. CD11b activation can mediate suPAR and proinflammatory cytokines through the NFkB pathway. Additionally, IL-1b may be mediated through control of the NLRP3/Caspase-1 pathway. Murine models of SLE and LN display significant decreases in suPAR and ACR when CD11b is activated showing potential protection against glomerular damage. CONCLUSION We have identified a possible link between CD11b activation and suPAR in macrophages using these models. These studies will provide stronger understanding of the influence CD11b has on signaling pathways and inflammation associated with inflammatory diseases such as LN.

Poster Number: 114
Session: Poster Presentation
Category: Muscoloskeletal/Orthopaedics
Trainee Rank: Rush Student GC: PhD

Natalie Adamczyk, BS
Anne-Marie Malfait (RU), Rachel Miller (RU)

ROLE OF MECHANOSTIMULI IN INFLAMMATORY JOINT PAIN

INTRODUCTION: Patients with osteoarthritis (OA) often report pain during activities of daily living. Furthermore, there is often an increase in macrophages and proinflammatory cytokines in OA synovium, providing evidence that OA is inflammation driven, in addition to mechanically driven. However, how mechanical input interacts with inflammation to cause joint pain is not at all understood. The goal of this study is to investigate the role of mechanosensitive ion channels in mouse models of inflammatory knee pain using either genetic or pharmacologic approaches. METHODS: Studies were approved by Rush University Medical Center's IACUC. To conditionally knock-out Piezo2 from nociceptors, we crossed NaV1.8-Cre mice with Piezo2-loxp mice (Piezo2CKO). Experiment 1: Female Piezo2CKO (n=7) and WT (n=5) mice were baseline tested for knee hyperalgesia followed by intra-articular (IA) injection of Complete Freund's Adjuvant (CFA) (5µg in 5µL). Knee hyperalgesia and swelling were tested on days 2-21. Experiment 2: Male WT mice were injected intra-articularly 2x/week with nerve growth factor (NGF, 500ng in 5µL, n=4) or vehicle (0.1% BSA in PBS, n=2). Mice were tested weekly for knee hyperalgesia and swelling. NGF mice were injected IA with GsMTx-4, 10µM in 10µL, 75µM in 10µL after week 6 and knee hyperalgesia was measured. RESULTS: After CFA injection into the knee, WT and Piezo2CKO mice developed knee hyperalgesia and swelling (Fig. 1). However, by day 4 and continuing through day 14, Piezo2CKOmice had significantly less knee hyperalgesia compared to WT mice (Fig. 1A). Despite the reduction in pain, there was no significant difference in knee swelling between the two strains throughout the course of the study. Swelling, like pain, completely resolved by day 21. Next a persistent model of inflammatory joint pain was used. Mice injected with NGF compared to vehicle injected mice developed knee hyperalgesia by 6 weeks (Fig. 2A). Administration of 75µM GsMTx-4, but not 10µM GsMTx-4, attenuated knee hyperalgesia, suggesting there is a mechanical component to the development of hyperalgesia in this model (Fig. 2B). CONCLUSION: These data suggest that the perception of mechanical stimuli is a strong player in the development of sensitization and a possible druggable target in treating joint pain.

Poster Number: 115
Session: Poster Presentation
Category: Muscoloskeletal/Orthopaedics
Trainee Rank: Clinical Resident

Farhan Ahmad, M.D.

Farhan Ahmad, M.D. Rush University Medical Center Samuel L. Shuman, B.A. Rush University Medical Center Brian Xu, B.S. Rush University Medical Center Alejandro A. Espinoza Orías, Ph.D. Rush University Medical Center Rade Jibawi Rivera, B.S. Rush University Medical Center Andre Sabet, B.S. Midwestern Orthopaedics at Rush Xavier Simcock, M.D. Midwestern Orthopaedics at Rush

THREE-DIMENSIONAL ANALYSIS OF ULNAR BOWING MORPHOLOGY COMPARING MODELS CONSTRUCTED FROM 1MM AND 3MM COMPUTED TOMOGRAPHY SCAN SLICE THICKNESSES

INTRODUCTION The bowing of the ulna, particularly at its distal end, has been largely uncharacterized. Three-dimensional (3D) models built from computed-tomography (CT) scans are effective tools to analyze the morphology of the ulna, however varying CT slice thicknesses may affect accuracy. Routine CT scans of the ulna typically range anywhere from 1 mm to 3 mm in slice thickness. However, it is unclear if 3mm reconstructions can accurately measure the bow of the ulna as well as 1mm "fine cut" CT scans. METHODS Using segmentation software, 3D models were reconstructed from CT axial images using both 1 and 3 mm slice thickness from the same ulna in 36 arms. The resulting ulnar models were measured and analyzed in the sagittal and coronal planes. The ulnar bows were then directly compared to assess the accuracy of 1 mm reformatted models to the 3 mm reformatted models. RESULTS 36 ulnae segmented with both 1 mm and 3 mm cuts were analyzed and compared. Comparison of 1 mm versus 3 mm reconstructed ulnae using external radiographic bowing and centroid measurements in the sagittal plane showed no statistically significant differences ($p > 0.05$) in morphology. Comparison in the coronal plane only showed statistically significant differences in distal bow angle and centroid proximal bow location measurements ($p < 0.05$). CONCLUSION 3 mm CT scans of the ulna are just as effective as 1 mm scans in identifying radiographic and centroid ulnar bowing morphology in the sagittal and coronal planes despite their poorer resolution. Clinically, 3 mm CT scans of the ulna may serve as a useful, quicker alternative to 1 mm CT scans.

Poster Number: 116
Session: Poster Presentation
Category: Muscoloskeletal/Orthopaedics
Trainee Rank: Rush Student GC: Masters

Delia Alkhatib, M.Sc. IBS
Delia O. Alkhatib, Kelsey A. Carpenter, Ryan D. Ross

ACTIVATING MUTATIONS IN LRP5 IMPROVE THE PERIODONTAL PATHOLOGY IN THE HYP MOUSE MODEL OF XLH

INTRODUCTION X-linked hypophosphatemia (XLH) is caused by loss of function mutations in the PHEX gene, which leads to decreased bone and teeth mineralization. XLH patients suffer from periodontitis due to the defective formation and mineralization of the alveolar bone and surrounding tissues. Our laboratory has reported that sclerostin antibody (Scl-Ab) improves the mass and mineralization of alveolar bone using the Hyp mice model of XLH. Scl-Ab treatment activates canonical Wnt signaling by inhibiting the binding of sclerostin with low-density lipoprotein receptor-related protein 5 (LRP5). To confirm the positive effects of Scl-Ab are dependent on LRP5-mediated canonical Wnt signaling, the current study tested the hypothesis that crossing Hyp mice with high bone mass (HBM) mice that have mutation in LRP5, would increase the alveolar bone mass and mineralization. METHOD Heterozygous male HBM mice were bred with female heterozygous Hyp mice to obtain male and female WT, Hyp, HBM, and HypxHBM littermates of both male and female mice. Mice were sacrificed at 6 weeks of age and the right mandibles were collected for micro-computed tomography analyses (Scanco µCT50, 70 kVp, 114 µA, 500 ms, 6.0µm voxels). Alveolar bone was analyzed between the first molar roots. The outcome variables were the alveolar bone volume fraction (BV/TV) and tissue mineral density (TMD, mgHA/cm3). RESULTS Genotype effects were compared using a one-way analysis of variance followed by post-hoc T-tests. Alveolar BV/TV and TMD were significantly affected by genotype. Hyp and HypXHBM mice had significantly decreased BV/TV when compared to both WT and HBM littermates of both sexes. However, the BV/TV of HypxHBM mice did not differ when compared to Hyp mice in either males or females. Similarly, both male and female Hyp and HypXHBM mice had decreased alveolar TMD when compared to WT and HBM littermates. However, TMD levels did not differ between Hyp and HypXHBM mice in either males or females. CONCLUSION Despite our previous findings with Scl-Ab, the current study failed to detect similar positive effects by genetically suppressing sclerostin activity using the HBM model. Future work is necessary to determine whether LRP4 and LRP6, non-redundant sclerostin binding partners, are involved.

Poster Number: 117
Session: Poster Presentation
Category: Muscoloskeletal/Orthopaedics
Trainee Rank: Rush Student RMC: M4

Eric Azua, B.A.

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DIRECT BLOOD FLOW TO THE MEDIAL MENISCUS. A CADAVERIC AND SONOGRAPHIC STUDY

INTRODUCTION the first in depth description of the meniscus microvasculature was described by Arnoczky et al. They found that the genicular arteries have branches that give rise to a perimeniscal capillary plexus within the capsular tissues of the knee joint. Recent dissections on cadaveric knees in our biomechanics laboratory have demonstrated the presence of a small arterial vessel that branches off the popliteal artery and inserts into the medial meniscal capsule termed the Medial Meniscal Artery (MMA). This vessel does not follow any previously published anatomical variation. The purpose of this study is to use anatomical dissection of cadaveric knees to provide a detailed characterization of its precise anatomy. METHODS 15 fresh frozen cadavers were obtained and demographics including sex, age, weight, race, and laterality were recorded. The cadaveric knees were dissected to expose the popliteal fossa and isolate the popliteal artery, associated genicular arteries, any other vascular variants extending to the medial knee. Measurements including distance the vascular branched from the posterior tibial plateau, insertion of the semimembranosus tendon and the most prominent point of the medial femoral epicondyle, angle of vascular branching, diameter of vasculature, and length of vascular until insertion was collected. RESULTS The initial branch point of the MMA was on average 14.9mm proximal from the posterior Tibial Plateau (Range: -11-36 , SD ± 10.8). The initial MMA branch point was located a mean distance of 9 mm (Range: 6.68-39, SD ± 9.1) distal to the most prominent aspect of the medial femoral epicondyle, and 22.8 mm (Range: 6.6-39, SD ± 9.1) proximal to the direct insertion of the semitendinosus tendon. The average orientation angle that the MMA branched from the popliteal artery was 30º (Range: 5º-50º, SD ± 14.4). The average length of the MMA from the popliteal artery until its insertion into the perimeniscal capsule was 33.2mm (Range:14.5-58, SD ± 16.8). The average diameter of the MMA vessel itself was 1mm (Range 0.3 -1.48, SD ± 0.47). CONCLUSION This study demonstrated the presence of a persistent artery that branches from the popliteal artery and extends to the medial knee joint capsule, identifying a newly anatomical structure.

Poster Number: 118

Session: Poster Presentation

Category: Muscoloskeletal/Orthopaedics

Trainee Rank: Rush Student GC: PhD

Luisa Cedin, PT, MS

Luisa Cedin (RUSH); Christopher Knowlton (RUSH); and Markus A. Wimmer (RUSH)

REAL-TIME MUSICAL FEEDBACK FROM PRESSURE-SENSING INSOLES FOR ASYMMETRIC GAIT RETRAINING

INTRODUCTION Ankle fracture can lead to asymmetric gait and biofeedback is suggested to provide continuous performance assessment for rehabilitation. However, some effects are not retained and aversion to negative feedback was reported. We aim to approach gait retraining by using reward-based auditory feedback based on pressure-sensing insoles. METHODS Here, we present novel technology (being developed in the Motion Analysis Laboratory at Rush), which is based on a pressure sensitive shoe insole. Real-time plantar pressure and total force that will be obtained at 100Hz with Insole3 (Moticon ReGo AG), a 16-sensor pressure insole with an embedded six axis inertial measurement unit (IMU) controlled by a smart phone app via Bluetooth connection. Total force and pressure from sensors under the hallux and second toe will be real-time transmitted across Wi-Fi and received via User Datagram Protocol (UDP) in Max 8 (Cycling '74), a desktop visual programming environment for music and multimedia. A 50N threshold of total force triggers a Musical Instrument Digital Interface (MIDI) chord to play, followed by a second chord when sum pressure of the toe sensors exceeds their own threshold, adjusted by the researcher and can be progressively increased for training purposes. By listening to whether the second chord plays, the patient will know if sufficient pressure is applied on their toes, and by listening to the rhythm of the chords, they will hear the timing between heel-strike and toe-off. Each progressive step will play a different chord pair, cycling through the four-bar progression of Pachelbel's Canon in D. The music changes keys upward every three minutes to help maintain engagement. Each side can be muted or set to its own instrument with acoustic grand piano as the default. RESULTS Spatiotemporal parameters, as step count, cadence, stride length, speed, and length of stance phase can be obtained from the insoles. Next to total force differences between left and right limb, we will look also into mean pressure differences under the toes during terminal stance. CONCLUSION We expect that this reward-based technology will result in more symmetric distribution of forces and less avoidance of the affected limb.

Poster Number: 119
Session: Poster Presentation
Category: Muscoloskeletal/Orthopaedics
Trainee Rank: Post-Doctoral Research Fellow

Terese Geraghty, PhD

Terese Geraghty, Shingo Ishihara, Alia M. Obeidat, Jun Li, Lai Wang, Natalie Adamczyk, Anne-Marie Malfait, Rachel E. Miller Rush University Medical Center, Department of Internal Medicine, Division of Rheumatology

Macrophage depletion alleviates pain-like behaviors in osteoarthritic mice of both sexes

INTRODUCTION: Osteoarthritis (OA) is one of the leading causes of chronic pain and disability. Yet, management of OA pain remains poor, and often relies on analgesics with limited efficacy. Recent literature points to the emerging role of innate immunity in mediating OA pain. The knee joint is innervated by sensory neurons whose cell bodies reside in the lumbar level dorsal root ganglia (DRG). We previously found increased levels of F4/80+ macrophages in the knee-innervating DRG, 8 weeks after OA was surgically induced in the mouse knee, coinciding with onset of behaviors indicative of persistent pain. In addition, we identified gene clusters via single cell RNA-sequencing (scRNAseq) that suggested the presence of a variety of immune cell types, including macrophages, in the DRGs of naïve mice. Therefore, the objectives of this study were to characterize changes in the immune cell populations in the DRG over time in OA and to determine the effect of macrophage depletion on pain-like behaviors in both male and female mice with OA. METHODS: All animal experiments were approved by our Institutional Animal Care and Use Committee. We performed destabilization of the medial meniscus (DMM) or sham surgery on 10-week-old male WT mice (n=10 per group). We conducted a time course study evaluating immune phenotypes of the L3-L5 DRG in WT mice at 2-, 4-, 6-, and 8-weeks post DMM or sham surgery, including naïve controls, and examined immune phenotypes of the WT L3-L5 DRG via flow cytometry. We performed DMM or partial meniscectomy (PMX) surgery in 12-week-old male and female Macrophage Fas-Induced Apoptosis (MaFIA) mice, respectively. We evaluated hind paw mechanical allodynia (using von Frey fibers) and knee hyperalgesia using pressure application measurement (PAM) in both males and females, and weight bearing in female mice. We depleted macrophages at 8-weeks post DMM surgery and 12-weeks post PMX surgery using AP20187 (Tocris). For flow cytometry, the ipsilateral L3-L5 DRGs were collected at the time points above (pooled two mice per sample, n=5 per group). DRGs were digested using collagenase IV and DNase I to make a single cell suspension, subsequently cells were counted and stained before running through the LSR Fortessa flow cytometer

Poster Number: 120
Session: Poster Presentation
Category: Muscoloskeletal/Orthopaedics
Trainee Rank: Rush Student GC: PhD

Michael Godoy, B.S.

Michael Godoy (RUSH), Kirsten Sipek (RUSH), Jonathan A. Gustafson (RUSH), Brett Levine (RUSH), Robin Pourzal (RUSH), Hannah J. Lundberg (RUSH)

EFFECT OF FEMORAL HEAD MATERIAL, SURGEON EXPERIENCE, AND ASSEMBLY TECHNIQUE ON SIMULATED HEAD-NECK THA IMPACTION FORCES

INTRODUCTION There is no standard method for assembling the femoral head onto the femoral stem during total hip arthroplasty (THA). This study aimed to measure and record dynamic 3D THA head-stem assembly loads from residents, fellows and attending surgeons for metal and ceramic femoral heads. METHODS An instrumented apparatus measured dynamic 3D forces applied through the femoral stem taper in vitro for 31 surgeons (11 attendings, 14 residents, six fellows) using their preferred technique (i.e., number of hits or mallet strikes). Outcome variables included peak axial force, peak resultant force, impulse of the resultant force, loading rate of the resultant force, and off-axis angle. They were compared between femoral head material, surgeon experience level, and the number of hits per trial. RESULTS Peak axial force was 6.92±2.11kN for all surgeons. No significant differences were found between femoral head material and surgeon experience. Nine surgeons assembled the head with one hit, three with two hits, 14 with three hits, two with four hits, and three with five hits. The first hit of multi-hit trials was significantly lower than single-hit trials for all outcome measures except the off-axis angle. The last hit of multi-hit trials had a significantly lower impulse of resultant force than single-hit trials. CONCLUSION Differences in applied 3D force-time curve dynamic characteristics were found between single and multi-hit trials. No significant differences were found between femoral head material and surgeon experience. Results can help better understand the influence of surgical assembly and technique on THA failure.

Poster Number: 121
Session: Poster Presentation
Category: Muscoloskeletal/Orthopaedics
Trainee Rank: Clinical Fellow

Felipe Gonzalez, MD, MSc

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IDENTIFYING GAIT PROFILES IN INDIVIDUALS WITH MEDIAL MENISCUS ROOT TEAR WITH ARTIFICIAL INTELLIGENCE NEURAL NETWORKS

INTRODUCTION: A meniscal root tear is defined as a complete injury of the meniscus at its attachment to the tibia. Meniscal root tears severely impair knee function as these injuries can rapidly progress to knee osteoarthritis (KOA). Gait characteristics (e.g. motions and loads) have been used to develop rehabilitation programs for monitoring KOA progression and general joint health. However, outcomes in individuals with root tears are highly variable and we have no way to identify ideal candidates for meniscal repair. We aim to employ an artificial intelligence neural network approach to identify gait profiles of knee joint overload or load avoidance in individuals with meniscal root tears or root repairs. METHODS: Three groups of 35 individuals will be recruited. Group 1: individuals with medial meniscus tear. Group 2: individuals submitted to medial meniscus root repair. Group 3: healthy individuals. Subjects will be excluded if they have a prior history of other lower extremity injuries or surgeries. Motion analysis data will be collected through an optoelectronic system with 16 cameras and 2 force plates. Lower limb joint kinematics and moments will be used to categorize gait profiles. A 4-step artificial intelligence approach will be implemented to identify gait profiles. Step 1: Principal component analysis to reduce the dimensionality of the data. Step 2: Self-organizing maps used to form segments. Step 3: K-means technique used to classify the data. Step 4: Characterizing identified profiles. Significance level will be set at 0.05. RESULTS: We expect to uncover unique gait profiles for groups 1 and 2, showing that individuals with medial meniscal root tears are not homogeneous, regarding their gait and functionality. At least one profile in each group showing maladaptive kinetic and kinematic characteristics (increased knee joint flexion and adduction moments) and one with a protective strategy (decreased knee overload - decreased knee flexion moment), when clinically compared to the control group (healthy individuals). CONCLUSION: Uncovering different subgroups of gait and knee load profile in individuals with meniscal root tears and repair is highly relevant for future studies to analyze their natural history, response to surgical intervention, and rates of recovery.

Poster Number: 122
Session: Poster Presentation
Category: Muscoloskeletal/Orthopaedics
Trainee Rank: Rush Student GC: PhD

Stephanie McCarthy, BS
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A Novel Use of the Particle Induced Osteolysis Murine Model to Study CoCrMo Trafficking to Brain Tissue

INTRODUCTION: Reports of neuropathological symptoms linked to total joint arthroplasty (TJA) implant debris are causing clinical concern. TJA wear debris is known to traffic through the lymphatic and circulatory systems into distant organs. The blood brain barrier (BBB) allows a higher influx of circulating debris into neural tissues as we age, and preliminary evidence has shown CoCrMo implant debris embedded within the brains of TJA patients. An in vivo animal model is needed to study implant debris trafficking to neural tissues, resulting inflammatory effects, trafficking pathways, and pathological burden. This study used the particle induced osteolysis (PIO) murine model to study debris trafficking, hypothesizing that aged mice would exhibit higher particle neuro-burden when compared to young mice with an intact BBB. METHODS: Three groups (n=5/group) were defined:(1)C57BL/10J female young, (2)C57BL/6 female young, (3)C57BL/6 female aged. Mice received 2mg of CoCrMo-alloy particles on Days 1 and 4 on the calvaria midline. Calvaria and brain tissue were isolated on Day 7. Osteolysis percentage was determined by scanning isolated calvaria within a 5mm diameter control area. Brains were sectioned sagittally, formalin fixed, and embedded. 6µm paraffin embedded sections were analyzed microscopically and with an SEM to image and measure particles and quantify chemical composition. RESULTS: CoCrMo particles were present in all three experimental groups. PIO was lowest in the C57BL/6 young group. Analysis of brain sections in the (1)C57BL/10J young, (2)C57BL/6 young, (3)C57BL/6 aged groups showed CoCrMo embedded within the tissue in 2, 2, and 1 brains, respectively. Co-localized presence of Co, Cr, and Mo, corresponding mass percentage, and particle size range were consistent with simulated CoCrMo wear debris. CONCLUSION: Implant debris disseminated to brain tissue in aged and young murine groups using the PIO model. Our findings suggest translocation of implant debris to brain tissue is likely mediated by active transport, as opposed to passively through a leaky BBB. The successful dissemination of particles indicates the potential of this model, providing justification for continued work. Further studies will examine additional histological sections to identify cellular and morphological trends to provide a clearer understanding of particle induced inflammation.

Poster Number: 123
Session: Poster Presentation
Category: Muscoloskeletal/Orthopaedics
Trainee Rank: Rush Student GC: Masters

Niyati Patel, MS
Niyati Patel (presenting/first author), Bryan Dulion (co-author), Ryan Ross (mentor)

SCLEROSTIN ANTIBODY TREATMENT INCREASED RENAL WNT SIGNALING IN HYP AND WILD-TYPE MICE

INTRODUCTION: X-linked hypophosphatemia (XLH) is an inheritable form of Rickets. XLH is caused by loss of function mutations in the PHEX gene. Loss of PHEX function results in elevated levels of fibroblast growth factor 23 (FGF23), decreased phosphate reabsorption, and impaired skeletal mineralization. Sclerostin is an osteocyte-derived protein that suppresses bone formation by antagonizing the canonical Wnt-signaling pathway. In a previous study, we found suppression of sclerostin via systemic infection of sclerostin antibody (Scl-Ab) increased bone mass and suppressed FGF23 in growing Hyp mice (XLH murine model). Our initial studies focused specifically on the skeletal response to Scl-Ab, however, previous studies have shown that the kidney responds to sclerostin, but there is limited data on the renal response to Scl-Ab treatment. Therefore, in the current study, we evaluated the renal response to Scl-Ab in both male and female Hyp mice and age and sex-matched wildtype (WT) littermates. METHODS: Tissues were obtained from our previous study where mice were randomly assigned to either twice weekly subcutaneous injections of 25 mg/kg Scl-Ab or equal volume injections of vehicle (saline), which continued for 8 weeks at which point kidneys were dissected and stored in RNAlater at −20 °C. qPCR was performed to detect gene expression of GAPDH (glyceraldehyde-3-phosphate), SOST (sclerostin), and AXIN2 (gene silencing apoptosis that modulates Wnt/beta-catenin signaling pathway). RESULTS: Preliminary data indicates increased expression of AXIN2, a marker of activated Wnt-signaling, in Scl-Ab treated mice compared to vehicle treated controls. The results were consistent in both Hyp and WT mice and for male and female mice. CONCLUSION: Our data suggests systemic treatment with Scl-Ab influences both bone and kidney cell activity. Future studies will investigate the contribution of renal activation of Wnt signaling pathway on phosphate metabolism.

Poster Number: 124
Session: Poster Presentation
Category: Muscoloskeletal/Orthopaedics
Trainee Rank: Rush Student GC: PhD

Abhayavarshini Sridhar, MS, MS
Abhayavarshini Sridhar (Rush University); Niyati Patel (Rush University); Pankaj Shitole (Rush University); Ryan Ross (Rush University) Presenting: Abhayavarshini Sridhar

EFFECTS OF PERINATAL EXPOSURE TO DOLUTEGRAVIR-BASED CART ON SPRAGUE DAWLEY RATS

Combination antiretroviral therapy (cART) is an effective triple therapy that has transformed HIV from a deadly disease to a manageable disease, where people can have a normal lifestyle while on treatment (Domingo & Vidal, 2011). Despite the positive effects of cART therapy, such as increased life expectancy and better quality of life for people living with HIV (PLWH), they also face increased risk of co-morbidities. For example, PLWH are at an increased risk for low bone mineral density (BMD), consistent with a diagnosis for osteoporosis, which has been observed in around 40-90% of PLWH (Olali et al., 2022)(Biver, 2022). cART treatments such as tenofovir disoproxil fumarate (TDF) have been shown to have a direct negative effect on the bone (Grant & Cotter, 2016)(Domingo & Vidal, 2011). Due, in part, to the negative effects of TDF on bone, newer cART regimens are now recommended as first line treatments in PLWH. One cART that is commonly prescribed is a cocktail of three ART drugs: Abacavir (ABC), Dolutegravir (DTG) and Lamivudine (3TC). Switching from TDF-based cART onto DTG/ABC/3TC is associated with improved bone mineral density (Güerri-Fernández et al., 2017; Tebas et al., 2015). However, the effects of DTG/ABC/3TC on bone in treatment naïve PLWH is not clear (Ahmad et al., 2017). As cART has become safer, pregnant women living with HIV are now also taking cART to prevent perinatal HIV transfer. However, the effects of fetal exposure to cART on bone mass, architecture and quality is unclear (Lipshultz et al., 2011). One study showed that fetal exposure to ART may impair myocardial growth (Lipshultz et al., 2011), suggesting that understanding the perinatal exposure of the cART is necessary. Therefore, the objective of this study is to analyze the bone mass, quality, and architecture in rats perinatally exposed to DTG/ABC/3TC. We hypothesize that combination antiretroviral therapy negatively affects bone mass in perinatally exposed rat model. By the end of the study, we aim to bridge the current gap in knowledge on the fetal exposure of cART on bone mass, especially the DTG/ABC/3TC drugs.

Poster Number: 125
Session: Poster Presentation
Category: Muscoloskeletal/Orthopaedics
Trainee Rank: Rush Student RMC: M1

Zachary Wang, BS

Zachary Wang BS (Rush), Sachin Allahabadi MD (Rush), Kevin Credille BSE MS (Rush), Tristan Elias BA (Rush), Elizabeth Shewman MS (Rush), Joao Artur Bonadiman MD (Rush), Mario Hevesi MD PhD (Rush), Grant Garrigues MD (Rush), Nikhil Verma MD (Rush), Adam B. Yanke MD PhD (Rush)

BIOMECHANICAL ANALYSIS OF ANTEROINFERIOR BANKART REPAIR ANCHOR TYPES: HAS TECHNOLOGY SURPASSED THE SURGEON'S HAND?

INTRODUCTION: To limit risk of recurrent dislocation, subsequent injury, and more complex surgeries, it is critical to understand the best techniques to repair a soft-tissue Bankart lesion in the setting of minimal bone loss. To the authors' knowledge, there is no current biomechanical data comparing tensionable knotless all-suture anchors to knotted all-suture anchors and hardbody knotless anchors in labral repair constructs. Therefore, the purpose of this study was to perform a quantitative biomechanical comparison of three labral fixation devices for soft-tissue Bankart lesions: soft body tensionable knotless anchor (SB knotless), knotted soft body anchor (SB knotted), knotless interference polyetheretherketone (PEEK) hardbody anchor (HB knotless). The authors hypothesized that the three anchor types would exhibit similar biomechanical properties including elongation, failure load, and stiffness but that the SB knotless would display different failure mechanisms from the SB knotted and HB knotless anchors. METHODS: Twenty-one glenoid cadavers were randomized to 3 groups: SB knotless, SB knotted, and HB knotless. The humeral head was disarticulated and artificial Bankart lesions were created at the anteroinferior (AI) labrum. Anchors were placed at the 3:30, 4:30, and 5:30 positions, and sutures were passed through 1cm of tissue. Anchors were tested simultaneously as one construct by pulling the capsular tissue connected to the AI quadrant. Cyclic loading (5-25 N, 100 cycles) was followed by load-to-failure testing (15mm/min). RESULTS: There was no significant difference in cadaveric age (P = 0.84) or bone mineral density at the AI aspect of the glenoid fossa (P = 0.51) between groups. There was no significant difference between groups in cyclic elongation measured from the first to last cycle during cyclic loading (P = 0.40; F = 0.95). Ultimate load to failure between SB knotless (309.74 ± 125.63 N), SB knotted (226.40 ± 34.77 N), and HB knotless (256.48 ± 90.45 N) did not significantly differ (P = 0.25; F = 1.49). Failure mechanisms included anchor pulling out the of bone (SB knotless 33.3%; SB knotted 24.0%; HB knotless 29.0%), suture cutting through the capsular tissue (SB knotless 66.6%; SB knotted 38.0%; HB knotless 33.3%), and implant failure, defined by knot failure or locking mechanism failure (SB

Poster Number: 126
Session: Poster Presentation
Category: Muscoloskeletal/Orthopaedics
Trainee Rank: Rush Student RMC: M2

Alec Warrier, BS

Alec A. Warrier, B.S. (RMC), Eric N. Azua, B.S. (RMC), Luke B. Kasson, B.S. (RMC), Sachin Allahabadi, M.D. (RUSH), Zeeshan A. Khan, B.A. (RUSH), Enzo S. Mameri, M.D. (RUSH), Hasani W. Swindell, M.D. (Columbia University), John M Tokish, M.D. (Mayo Clinic Arizona), and Jorge Chahla, M.D., Ph.D. (RUSH)

Performance-Enhancing Drugs in Healthy Athletes: An Umbrella Review of Systematic Reviews and Meta-Analyses

INTRODUCTION: Despite regulatory bodies prohibiting the use of many substances in competition, the pressure and desire for athletes to succeed leads some to try and gain a competitive edge through pharmacological interventions. Unfortunately, due to the lack of high-quality evidence, many providers, trainers, and athletes do not have a true understanding of the effects of commonly used performance-enhancing drugs (PEDs) on performance and health. Thus, the purpose of this review is to provide an evidence-based overview of seven commonly used pharmacological interventions for performance enhancement in athletes. METHODS: The PubMed and Scopus databases were searched in April 2022 for systematic reviews (SRs) and meta-analyses (MAs) assessing the performance-enhancing effects of the following interventions were included: androgenic anabolic steroids (AAS), growth hormone (GH), selective androgen receptor modulators (SARMs), creatine, ACE-inhibitors, recombinant human erythropoietin (rHuEPO), and cannabis. Primary outcomes collected were: (1) body mass, (2) muscle strength, (3) performance, and (4) recovery. Adverse effects were also noted when reported. RESULTS: Twenty-seven papers evaluating five pharmacological interventions met inclusion criteria. AAS lead to a 5-52% increase in strength and a 0.62 standard mean difference in lean body mass with subsequent lipid derangements. GH alters body composition, without providing a strength or performance benefit, but potential risks include soft tissue edema, fatigue, arthralgias, and carpel tunnel syndrome. Creatine use during resistance training can safely increase total and lean body mass, strength, and performance in high-intensity, short-duration, repetitive tasks. Limited evidence supports rHuEPO benefit on performance despite increases in both VO2max and maximal power output, and severe cardiovascular risks are documented. Cannabis provides no performance benefit and may even impair athletic performance. CONCLUSION: In studies evaluating young healthy individuals and athletes, creatine can safely provide a performance-enhancing benefit when taken in controlled doses. AAS, GH, and rHuEPO do not support an ergogenic effect, despite changes in bodily composition, strength, and/or physiologic measures, and severe adverse events can occur. Cannabis may have an ergolytic, instead of ergogenic, effect. Further high-quality studies should be performed to evaluate the performance-enhancing and long term side effects of these substances.

Poster Number: 127
Session: Poster Presentation
Category: Muscoloskeletal/Orthopaedics
Trainee Rank: Post-Doctoral Research Fellow

Brittany Wilson, PhD

Brittany M. Wilson (RUMC); Martin B. Rasmussen (U Copenhagen); Thomas Thymann (U Copenhagen); Per T. Sangild (U Copenhagen); and D. Rick Sumner (RUMC)

MINERAL METABOLISM MARKERS IN A PIG MODEL OF PRETERM BIRTH MIMIC CLINICAL FINDINGS

INTRODUCTION: Preterm births (<37 weeks gestation) make up about 10% of all live human births. Because 80% of mineral accrual occurs during the final trimester of gestation, the skeletal system may be particularly affected. However, a major barrier to studying skeletal phenotypes after preterm birth is the lack of a translational animal model. The purpose of this study was to evaluate metabolic markers of mineral and bone metabolism in a pig model of preterm birth. METHODS: Naturally-delivered, sow-reared full-term pigs were sacrificed for sample collections on postnatal days 5 and 19 (n=7/day) and compared with corresponding caesarean-delivered, artificially-reared pigs delivered preterm (106 of 117 days gestation) sacrificed on the same postnatal days (n=14-18/day). Following caesarean delivery, preterm pigs were fitted with orogastric tubes for enteral feeding and umbilical catheters for parenteral nutrition and housed in incubators with supplemental oxygen for the first 12 hours. At sacrifice, body and organ weights were recorded and whole blood and urine were collected (n=46 total, 27 males/19 females). All procedures were approved by the Danish National Committee of Animal Experimentation. Plasma and urine were assayed for biomarkers of mineral metabolism and tubular mineral reabsorption rates were calculated. Blood and urine biomarker data were analyzed by two-way analysis of variance with birth status and postnatal sacrifice day as fixed independent factors, and sex as a covariate. A threshold of $p<0.05$ was used to determine statistical significance. RESULTS: Plasma phosphate and calcium were each reduced in preterm pigs on postnatal days 5 and 19 compared to full term pigs. By day 19, alkaline phosphatase was elevated in preterm pigs compared to full term pigs. Calcium reabsorption was reduced in preterm pigs on days 5 and 19. By day 19, phosphate reabsorption was higher in preterm pigs compared to full term pigs. CONCLUSIONS: Elevated alkaline phosphatase and depressed phosphate and calcium reabsorption were replicated in the pig model, similar to what is observed clinically in preterm neonates. Analysis of additional markers of mineral metabolism and bone turnover are ongoing. The pig appears to be a potentially useful animal model to study preterm birth-associated skeletal phenotypes and interventions.

Poster Number: 128
Session: Oral Presentation
Category: Muscoloskeletal/Orthopaedics
Trainee Rank: Post-Doctoral Research Fellow

Matthew Wood, BSc, PhD

Matthew J. Wood (Rush University Medical Center), Terese Geraghty (Rush University Medical Center), David Thomas (University of Minnesota), Alia M. Obeidat (Rush University Medical Center), Jun Li (Rush University Medical Center), Richard J. Miller (Northwestern University), Rachel E. Miller (Rush University Medical Center), Anne-Marie Malfait (Rush University Medical Center).

PAIN IN OSTEOARTHRITIS - IDENTIFICATION OF GPR34 AND GPR150 AS NOVEL TARGETS IN THE DORSAL ROOT GANGLIA

INTRODUCTION: Currently available pain-alleviating therapies for Osteoarthritis (OA) are often inadequate and associated with serious adverse effects. Through single cell RNA-sequencing of mouse dorsal root ganglia (DRG) in experimental OA, we identified several putative molecular targets, including G-protein coupled receptor (GPCR) genes. We focused on druggable targets in both neuronal and non-neuronal (macrophages) DRG cells. METHODS: Partial meniscectomy (PMX) or sham surgery was performed in 10-week old male and female mice, and ipsilateral L4 DRG were collected 12 weeks later. Gpr34 was assessed by RNA in situ hybridization (ISH) using RNAscope. For mouse DRG, Adgre1and Gpr34 probes were used. Human DRG were removed postmortem from a male (age 82) and female (age 86) donor and flash frozen. RNA ISH was performed using GPR34 and CD14 probes. Spatial gene expression was performed using the 10X Genomics Visium platform. Protein expression of GPR34 and GPR150 was confirmed in purified protein extracted from 4 human DRGs (2 male, 2 female). RESULTS: Mice of both sexes developed joint damage by 12 weeks post PMX. We observed an increase in the number of F4/80+ cells in DRGs after PMX, compared to sham controls. When assessing the expression level of Gpr34 by Adgre1+ cells, we noted a significant increase in expression in DRG macrophages after PMX compared to sham controls. In human DRGs, both male and female, we confirmed that macrophages (CD14+ cells) express GPR34 and both GPR34 and GPR150 gene expression was confirmed and visualized in human DRGs using spatial gene expression technology. Finally, GPR34 and GPR150 protein were highly expressed in human DRGs. CONCLUSION: We identified two GPCRs as targets in the DRG: Gpr34 as a macrophage target and Gpr150 as a neuronal target. We have shown that the number of DRG macrophages is increased in an experimental model of OA (PMX), and that Gpr34 is specifically expressed by DRG macrophages. Since these are druggable targets, our findings open new avenues for exploring the effect of targeting non-neuronal cells or neuronal cells. Furthermore, we found both receptors to be highly expressed in human DRGs, providing further support that these receptors should be explored as putative targets.

Poster Number: 129
Session: Poster Presentation
Category: Nephrology
Trainee Rank: Rush Student GC: PhD

Ryan Spear, BS

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Altered bone marrow myelopoiesis contributes to renal injury

INTRODUCTION: Altered hematopoiesis in bone marrow (BM) is commonly found in diverse disease conditions associated with CKD, including infection, chronic inflammation, diabetes, CVD, cancer and aging. However, the BM-kidney axis is poorly understood. Here, we tested if inflammatory signals alter BM myelopoiesis leading to renal injury. METHODS: We explored the phenotypic changes of BM components in renal disease by collecting BM aspirates and plasma samples from CKD patients and healthy individuals. We used an in vitro differentiation system to examine how inflammatory signals affect myelopoiesis and cellular functions. Briefly, human CD34+ hematopoietic stem cells were isolated from healthy donors and cultured in myeloid expansion media. TNF was added to the media to mimic inflammatory conditions. Cells and culture supernatants were subjected to Seahorse, multicolor flow cytometric, and secretome analyses. The link between BM alteration and renal injury was tested in vivo using two different animal models. RESULTS: CKD patients have high levels of TNF and suPAR in both plasma and BM, indicative of chronic inflammation. Moreover, these patients show myeloid-biased hematopoiesis and showed a robust increase in inflammatory CD14+CD16+ BM monocytes expressing uPAR. Consistently, myeloid-lineage differentiation assays showed that TNF skews hematopoietic stem cell (HSC) differentiation towards the monocytic lineage cells at the expense of granulocytes. Along with the altered myelopoiesis, TNF markedly increases uPAR expression, suPAR secretion, and promotes the production of proinflammatory cytokines including TNF, IL-8, and IL-6. Additionally, TNF stimulates monocyte subsets to become metabolically active during myelopoiesis. Soluble factors from TNF-driven myeloid cells cause filtration dysfunction in a transgenic zebrafish functional assay. Injecting mice with TNF and IFN (essential for myelopoiesis) leads to significantly elevated ACR, BUN, and suPAR levels, along with a robust increase in uPAR expressing CD11b+ BM myeloid cells, suggesting that TNF contributes to renal injury by altering BM. CONCLUSION: Our findings suggest that TNF reprograms BM myelopoiesis. Renal injury results from the generation of metabolically active myeloid cells that secrete proinflammatory cytokines and soluble permeability factors such as suPAR. These observations provide important ground work for the exploitation of the BM-kidney axis as a novel therapeutic target for immune-mediated nephrotic syndrome currently categorized as 'idiopathic'.

Poster Number: 130
Session: Poster Presentation
Category: Nephrology
Trainee Rank: Rush Student GC: PhD

Ishwarya Venkatesh, MS

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SEQSTAIN BASED SPATIALOMIC PROFILING OF HUMAN KIDNEY TISSUES IDENTIFIES CELLULAR NEIGHBORHOODS

INTRODUCTION: An improved understanding of the underlying cellular heterogeneity of human kidney tissue is essential in providing an accurate disease diagnosis, rate of progression and potential therapeutic avenues for a variety of chronic kidney disease pathologies. Newer multiplex imaging based methods are providing such tools for implementation in the clinical setting in the future. We recently developed a novel tissue imaging method, termed SeqStain, for immunofluorescence based multiplexed tissue imaging and analyses. Here, we describe utility of this approach for improving our understanding of kidney tissue samples from healthy subjects and patients with various glomerular diseases. METHODS: SeqStain utilizes fluorescent DNA-tagged antibodies and antibody-fragments for analyzing tens of kidney-specific analytes in a single tissue section. We designed and optimized SeqStain multiplex panels with sets of antibodies to probe different histological regions relevant to the kidney and used conventional fluorescence microscopy set-up for imaging and analyses. RESULTS: We show that SeqStain is an efficient method for multiplex imaging of both paraffin-fixed and frozen tissue sections. Image acquisition using off-the-shelf components, and using confocal microscopes that are widely available in laboratories, we were able to accurately image tens of antigens on single tissue specimens for healthy subjects, and from patients with lupus nephritis (LN) or diabetic nephropathy (DN). Automated analysis of the aligned tissue images showed enrichment of specific cellular clusters into distinct neighborhoods. CONCLUSIONS: This newly developed imaging method, SeqStain, provides an easy to use and robust platform for deep profiling of kidney tissue specimen. Th generated spatial maps will provide important new insights about the disease pathobiology and improve future diagnostics and therapeutics for LN and DN.

Poster Number: 131
Session: Poster Presentation
Category: Neuroscience
Trainee Rank: Rush Student GC: Masters

Michael Basovich, B.S., M.S.

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EVALUATION OF CHEMOKINE RECEPTOR CXCR4 ANTAGONISM ON PAIN BEHAVIORS IN A MURINE LOW BACK PAIN MODEL AND PAIN PATHWAY MODULATION IN THE MOUSE HIPPOCAMPUS

INTRODUCTION: Evaluating novel targets that can attenuate chronic pain is necessary to develop more effective therapeutics than current opioid-based regimens. Expression of CXCR4 induces neuronal sensitivity centrally and peripherally, playing a significant role in the establishment of chronic pain (1,2). We hypothesized that CXCR4 antagonist AMD3465 would reduce mechanical hyperalgesia in low back pain (LBP) and CXCR4 knockout in hippocampal neurons would modulate proteins associated with pain chronification. METHODS: Following IACUC approval, 12 adult female CD-1 mice (30g; 9 weeks) were evaluated for mechanical hyperalgesia in a mouse model of disc puncture (DP) for LBP as previously described by Das et al., 2019. Mice were randomly allocated to two treatment groups: Saline (n=6) and AMD3465 (10mg/kg) (n=6). Treatments were administered intraperitoneally on day 45 post-surgery. Mechanical hyperalgesia was evaluated pre-treatment, 0.5h (hour), 1h, 2h, and 4h post-treatment using calibrated von Frey filaments. AUC values were calculated using the trapezoidal method and treatment groups were compared using a 2-sample t-test. Primary mouse hippocampal neurons were cultured in a 6-well plate for 8 days using complete Neurobasal Medium supplemented with GlutaMAX-I and B-27 and incubated at 37°C, 5% CO2. 2 wells each were allocated to the following groups: Untreated, Scramble (negative control), and siRNA (CXCR4 siRNA + Lipofectamine). Neurons were transfected using CXCR4 siRNA (siRNA group) following Invitrogen guidelines and stimulated with 12.5 ng/mL BDNF for 30 minutes. Protein was isolated and expression was analyzed via Western Blot. Bands were quantified using ImageJ and median difference between siRNA and Scramble was calculated. RESULTS: Median PWT was 3.69g pre-surgery. 3-4 weeks post-surgery, median PWT was 0.26g. Saline-treated mice median AUCs were lower (0.97g*h) compared to AMD3465-treated mice (2.46g*h) (-1.48 difference: 99% CI -2.71 to -0.44) (p = 0.138). CXCR4 knockout reduced BDNF (-0.192), p-EIF4E (-0.222), p-EIF2S1 (-0.485), and p-CAMKII (-0.226) expression compared to scramble. CONCLUSION: Hippocampal CXCR4 knockout decreased expression of BDNF, p-EIF4E, p-EIF2S1, and p-CAMKII; proteins shown to be over-expressed in central pain sensitization (4,5,6). However, AMD3465 was unable to significantly increase antiallodynic phenotype. Statistical power is a limiting factor in these studies and target-based investigation is ongoing to examine CXCR4 as an analgesic target.

Poster Number: 132
Session: Poster Presentation
Category: Neuroscience
Trainee Rank: Rush Student RMC: M1

Ankita Batra, Bachelor of Science

Ankita Batra, Juliet K. Knowles , Haojun Xu, Caroline Soane, Tristan Saucedo, Eleanor Frost, Lydia T. Tam , Danielle Fraga, Lijun Ni, Katlin Villar, Sydney Talmi , John R. Huguenard, and Michelle Monje (Stanford University)

MALADAPTIVE MYELINATION IN SEIZURE PROGRESSION

INTRODUCTION Neuronal activity influences myelin structure and function. In turn, activity-dependent myelination affects neural network synchrony and brain function. Little is known about the effects of activity-dependent myelination in disease states such as epilepsy. Absence seizures occur in generalized forms of epilepsy and are characterized by behavioral arrests associated with generalized spike-wave discharges on EEG. We studied the relationship between progressive absence seizures and activity-dependent myelination in rodent models. We hypothesized that abnormal myelination, driven by absence seizures, contributes to seizure progression. METHODS We used two rodent models of generalized epilepsy with absence seizures (Wag/Rij rats and Scn8a+/mut mice). We quantified oligodendroglial lineage cells with immunohistochemistry and unbiased stereology, and myelin structure with electron microscopy. In some experiments, seizures were prevented with the drug ethosuximide. To genetically block activity-regulated myelin plasticity, we generated Scn8a+/mut mice with seizures and tamoxifen-inducible deletion of TrkB from OPCs. To pharmacologically block activity-dependent myelination, Scn8a+/mut mice were treated with vehicle or the HDAC inhibitor trichostatin A (TSA). EEG recordings were taken to assess seizure progression. RESULTS In both Wag/Rij rats and Scn8a+/mut mice, we found an increase in seizure network myelination and oligodendrogenesis. This was only apparent after seizure onset. In addition, seizures are necessary for aberrant myelination. Seizure blockade with ethosuximide prevented aberrant myelination in Wag/Rij rats. Conversely, either genetic or pharmacological blockade of activity-dependent myelination decrease seizure burden over time. CONCLUSION These findings indicate that absence seizures induce abnormal activity-dependent myelination, and this myelin plasticity maladaptively contributes to epilepsy progression. This novel disease mechanism can potentially illuminate new therapeutic targets for epilepsy and other neurological diseases.

Poster Number: 133
Session: Poster Presentation
Category: Neuroscience
Trainee Rank: Rush Student GC: Masters

Hannah Carson, Biotechnology
Hannah Carson (Rush University), Liudmila Romanova (Rush University)

ROLE OF CNS-BORDER MACROPHAGES IN ALZHEIMER'S DISEASE

INTRODUCTION Insufficient clearance of Aβ and tau peptides from the brain is a major feature of Alzheimer's disease (AD) pathophysiology. Understanding clearance pathways and their bottlenecks, therefore, has high translational value. The role of microglia in amyloid clearance within brain parenchyma is well established. However, meninges that envelope the brain are populated by a dense network of specialized macrophages, called meningeal macrophages that continuously survey the surface of CNS border. In order to investigate the role of this population in the development of AD, we need to establish a protocol for isolation of their primary cultures. METHODS Primary macrophages were isolated from freshly dissected rat meninges. Following digestion, flow sorting was used to collect the target cells based on the expression of the markers CD206+/CD45+/Lyve-1. Phenotype was confirmed by immunoreactivity to these markers. Functional activity was confirmed by in vitro phagocytosis and autophagy assays. Uptake was monitored with microscopy and quantitatively assessed by reading of fluorescence intensity. RESULTS We successfully performed isolation of primary culture of the meningeal macrophages. Target cell population expresses all expected macrophage markers and have functional phagocytic activity. CONCLUSIONS Our optimized macrophage isolation protocol from rat meninges will be used in studies of the meningeal macrophage function and activity in AD.

Poster Number: 134
Session: Poster Presentation
Category: Neuroscience
Trainee Rank: Rush Student GC: PhD

Stefanie Cassoday, B.S.

Stefanie L. Cassoday (Rush), Lihua Chen (Rush), Anita Donner (Rush), Lena Al-Harthi (Rush), Xiu-Ti Hu (Rush)

SARS-COV-2 ENHANCES HYPERACTIVITY OF MEDIAL PREFRONTAL CORTEX PYRAMIDAL NEURONS IN COCAINE SELF-ADMINISTERED HIV-1 TG RATS

INTRODUCTION: Neurological manifestations, including cognitive impairments, are common complications found with COVID-19 and HIV-associated Neurocognitive Disorders (HAND, a.k.a. neuroAIDS or neuroHIV), which can be exacerbated with substance use disorders, including cocaine use disorders (CUD). While the mechanism behind these neurological symptoms is not fully understood, many can be attributed to hyperexcitability and consequential neurotoxicity in cognitive-regulating brain regions including the medial prefrontal cortex (mPFC). It is also unknown how and to what extent SARS-CoV-2 disturbs the activity of living brain neurons in the context of neuroHIV and CUD, independently or jointly, which may lead to these neurocognitive deficits. Therefore, the goal of this study is to identify if SARS-CoV-2 induces hyperactivity of mPFC pyramidal neurons; and if that exacerbates Cocaine and/or HIV-induced neuronal overactivation and excitotoxicity. METHODS: Wild-type non-transgenic (non-Tg) and HIV-1 Tg rats self-administered cocaine (Coc-SA) (1mg/kg/0.1ml via jugular vein) for 2 weeks, followed by a forced withdrawal period for 3 weeks during which, they underwent drug-seeking behavior assessments at days 3 and 21. Saline-yoked non-Tg and HIV-1 Tg rats were used as controls. Immediately following the withdrawal, rats were transcardially perfused, brains were removed and sliced for electrophysiology evaluation. Slices were perfused with SARS-CoV-2 spike protein (in nM: 0, 1, 2.5.5) and firing activity of mPFC pyramidal neuron was assessed. RESULTS: We found that there was no significant difference in drug-taking behaviors between non-Tg and HIV-1 Tg Coc-SA rats. Additionally, drug-seeking behaviors were reduced, but not abolished; and that were associated with significantly increased firing in mPFC pyramidal neurons from Coc-SA rats. SARS-CoV-2 spike protein (5nM) did not affect neuronal firing in non-Tg, HIV-1 Tg, or Coc-SA rats, but significantly enhanced hyperactivity of cortical pyramidal neurons in HIV-1 Tg/Coc-SA rats. CONCLUSION: Our novel finding demonstrates that SARS-CoV-2 enhances the deleterious effects of neuroHIV and Coc-SA on mPFC pyramidal neurons, which could worsen neuronal hyperexcitability/neurotoxicity in the context of neuroHIV and CUD; and that may jointly contribute to the mechanism underlying the syndemic of HAND/CUD/COVID-19.

Poster Number: 135
Session: Poster Presentation
Category: Neuroscience
Trainee Rank: Post-Doctoral Research Fellow

Lihua Chen, Ph.D.

Lihua Chen (RUMC); Stefanie L Cassoday (RUMC); Anita Donner (RUMC); Lena Al-Harthi (RUMC); and Xiu-Ti Hu (RUMC)

METHAMPHETAMINE EXACERBATES NEUROHIV-INDUCED K+ CHANNEL DYSFUNCTION IN ASTROCYTES THROUGH TAAR-1 SIGNALING PATHWAY

INTRODUCTION: Methamphetamine (Meth) is a highly addictive and widely abused psychostimulant. There is no FDA-approved medicine for treating people with Meth use disorders (MUD). Chronic exposure to Meth decreases neuronal activity in certain brain regions, including the medial prefrontal cortex (mPFC, one of the critical regulators of cognition and addiction), which may contribute to the mechanism underlying Meth addiction. The mPFC is profoundly altered by Meth and HIV. However, little is known whether such neuronal dysfunction results from alterations in the synaptic/intrinsic excitability of neurons, dysregulation of extracellular environment (e.g., glutamate and K+ levels) mediated by astrocytes, or both. OBJECTIVE: Male HIV-1 transgenic (HIV-1 Tg) or F344 non-Tg rats at the age of 5~7-week were used in this study. METHODS: Whole-cell patch-clamping approaches were used to assess mPFC astrocyte dysfunction in rat brain slices. For acute Meth treatment, slices were treated with vehicle or Meth (20, 100 µM) for 10 min in a continuing perfusion system. For chronic Meth treatment, rats received daily repetitive s.c. injection of Meth (5 mg/kg/day) for 5 days followed by a 3-day withdrawal. RESULTS: Acute Meth exposure suppresses functional activity of voltage-sensitive K+ channels in conducting outflowing IK in mPFC astrocytes from both non-Tg and Tg rats in a dose-depend manner. Chronic Meth, as well as neuroHIV, significantly decreases efflux and influx of K+ currents in mPFC astrocytes, regardless of genotype; while the greatest reduction occurs with combined Meth abuse/neuroHIV. Blockade of trace amine-associated receptor 1 (TAAR-1)-mediated signaling pathway reverses the effects of chronic Meth and neuroHIV on suppressing K+ efflux/influx in astrocytes of both genotypes. Meanwhile, chronic Meth, but not neuroHIV, depolarizes resting membrane potential mediated by other K+ channel subtype(s) in astrocytes, which is also abolished by blocking TAAR-1 signaling. CONCLUSION: Both Meth abuse and neuroHIV disturbt functional activity of mPFC astrocytes in the brain by suppressing activity of various K+ channel subtypes mediated by TARR1 signaling. The comorbidity of Meth abuse and neuroHIV exacerbates astrocyte dysfunction caused by either one alone. Such dysfunction of astrocytic K+ channels causes extracellular K+ dyshomeostasis, thereby interrupting the membrane excitability of surrounding cortical neurons.

Poster Number: 136
Session: Poster Presentation
Category: Neuroscience
Trainee Rank: Rush Student GC: PhD

Solji Choi, Master of Science
Solji G. Choi (Rush); Tyler Tittle (Rush); Gabriela Mercado (Van Andel); Yaping Chu (ASU); Patrik Brundin (Van Andel); Jeffrey H. Kordower (ASU); and Bryan A. Killinger (Rush)

POTENTIAL ROLE OF OLFACTORY BULB MITRAL CELLS IN SYNUCLEINOPATHY PATHOGESNSIS

INTRODUCTION: Lewy Pathology (LP) is the central pathological feature of synucleinopathies, and it consists of aggregated α-synuclein that is phosphorylated at serine 129 (PSER129). LP has been identified in postmortem synucleinopathy olfactory bulb (OB), and dysfunction of the OB is a common prodromal symptom of Parkinson's disease (PD), suggesting the OB might be where the synucleinopathy process begins. Despite the importance for understanding the pathogenesis of synucleinopathies, the normal functions of endogenous α-synuclein or PSER129 in the OB remain unknown. We hypothesize that disruptions of α-synuclein's normal function in the OB initiate the synucleinopathy disease process. Here, we conducted several studies to investigate the function of PSER129 in the OB. METHODS: Using the sensitive tyramide signal amplification (TSA) technique, we determined the distribution of PSER129 throughout the neuroaxis of non-diseased mice, rats, non-human primates, and healthy humans. Next, we determined the interactome of PSER129 in healthy mouse OB using biotinylation by antibody recognition (BAR) with subsequent liquid chromatography-tandem mass spectrometry for protein identification. Functional significance was inferred PSER129 by conducting pathway analysis on the BAR-PSER129 determined interactome. RESULTS: Results show that in non-diseased mice, rats, non-human primates, and humans, endogenous PSER129 was observed in OB mitral cells in non-diseased mice, PSER129 was also observed in several other brain nuclei significant for PD, including the amygdala. Mass spectrometry analysis of BAR-PSER129 identified 125 proteins unique to mouse OB involving SNARE machinery, RNA metabolism, presynaptic vesicle cycle, and oxidative phosphorylation. Subsequently, BAR-PSER129 identified protein Ywhag was confirmed by TSA multiplex labeling as Ywhag was examined to be physically associated with PSER129 in the OB mitral cells and throughout the neuroaxis. Despite neuronal activity being previously implicated in the generation of PSER129, we found that PSER129-positive mitral cells were inactive (i.e., c-Fos negative). CONCLUSION: PSER129 normally accumulates in non-active OB mitral cells as part of the cell's presynaptic vesicle machinery. Therefore, early pathogenic processes for synucleinopathy likely involve disruptions in the presynaptic vesicle machinery of the OB mitral cells. These findings help advance our understanding about the pathogenesis of synucleinopathy.

Poster Number: 137
Session: Poster Presentation
Category: Neuroscience
Trainee Rank: Rush Student CHS: Clinical Doctorate

Cassandra Cisneros, Occupational Therapy Doctorate
Cisneros, Cassandra & Sims, Emma & Gryzik, Olyvia

NEURAL UNDERPINNINGS OF COGNITIVE, BALANCE, AND GAIT DEFICITS IN HUNTINGTON'S DISEASE

INTRODUCTION Huntington's disease (HD) is a neurodegenerative disease characterized by complex cognitive, gait, and balance deficits causing reductions in activities of daily living, increased fall risk, poor quality of life, morbidity, and mortality. Previous HD studies have investigated relationships between cognitive deficits and mobility impairment, including difficulty dual tasking. In addition, the loss of automaticity in HD causes previously automatic motor tasks to require more attentional resources. However, our understanding of the neural mechanisms underlying these relationships is minimal. METHODS This research project examines the extent of cortical brain region activation in individuals with HD during cognitive, balance and walking, and multi-tasking conditions by using functional near infrared spectroscopy (fNIRS) technology. fNIRS is a reliable neuroimaging technique that measures blood flow alterations in the brain and can be worn with minimal mobility restrictions. fNIRS is combined with portable inertial sensors to measure gait and balance deficits during challenging and ecologically valid tasks. Brain imaging through MRI was completed to obtain volumetric measurements of different cortical regions to explore the structure-function relationships mediating cognitive, balance and gait dysfunction in HD. RESULTS Our research determined a relationship between cortical activity in the prefrontal cortex (PFC), posterior parietal cortex (PPC), and executive and visuospatial function in individuals with HD compared to healthy controls. Preliminary data identifies the expected abnormal cortical activation patterns and structural changes in several cortical brain regions during complex cognitive, balance, and gait tasks in HD. CONCLUSION Completion of our aims using a multimodal approach will elucidate the structural-functional brain abnormalities underlying cognitive, balance and gait deficits in HD. This research will lay the foundation for dynamic functional imaging and neural structure-function relationships in HD. It will also inform future rehabilitation and therapeutic studies and provide outcome measures to monitor their efficacy in future clinical trials, which is needed to improve health care and quality of life for HD patients and their families.

Poster Number: 138

Session: Poster Presentation

Category: Neuroscience

Trainee Rank: Rush Student GC: PhD

Anita Donner, BS

Authors: Anita Donner, Lihua Chen, Michelle Ash, Jeffrey Schneider, Lena Al-Harthi, and Xiu-Ti Hu

Dept. of Microbial Pathogens and Immunity, Rush University Medical Center, Chicago, IL 60612, USA

HIV-INDUCED CORTICAL ASTROCYTE DYSFUNCTION IS PARTIALLY REVERSED BY CART IN BRAIN OF HAND PATIENTS

INTRODUCTION: People living with HIV/AIDS (PLWH) have an improved life expectancy due to combined antiretroviral therapy (cART); but the prevalence of HIV-associated neurocognitive disorders (HAND) persists. The mechanism underlying HAND is unknown; but it is likely related to HIV/cART-induced neurotoxicity in the brain regions regulating neurocognition, including the prefrontal cortex (PFC). Such neurotoxicity causes dysregulation, injury, and in severe cases, death of neurons in the brain; and that is worsened by astrocyte dysfunction. Among infected/affected astrocytes, HIV not only dysregulates cytokines/chemokines, but also disturbs K+ buffering (mediated by inwardly rectifying Kir4.1 channels), glutamate uptake (mediated by excitatory amino acid transporters, GluT-1), and cell-to-cell communication (mediated by connexin 43, Cx43, a gap-junction, and hemichannel protein); all promote neurotoxicity. However, there is a knowledge gap regarding how and to what extent HIV, with or without cART, alters astrocyte function in the human brain. Our previous study revealed that the protein levels of Kir4.1 channels and GluT-1s were significantly decreased ($p<0.01$ and $p<0.05$); while Kir4.1 channel mRNA levels were significantly increased ($p<0.05$) in the expression of these proteins/mRNAs in the cerebellum of HIV+ human brains, suggesting a region-specific astrocyte dysfunction. This study assessed the effects of cART on HIV-induced astrocyte dysfunction. METHODS: Post-mortem HIV- (n=16), HIV+ (n=16), and HIV+/cART (n=15) human brain (PFC) tissues were obtained from National NeuroAIDS Tissue Consortium (NNTC). All HIV+ patients were diagnosed with HIV-Associated Neurocognitive Disorders (HAND) before death, with or without cART. Protein was processed and target proteins Kir4.1, GluT-1, and Cx43 were assessed using Western Blot methods. Proteins were normalized to the housekeeping gene gapdh RESULTS: We found that cART significantly reduced HIV-induced changes in Kir4.1 and Cx43s ($p<0.05$), but not GluT-1s, in the PFC of untreated HIV+ human brains compared to healthy controls. CONCLUSION: Our novel findings indicate that HIV-induced astrocyte dysfunction disturbs extra-cellular glutamate, K+ homeostasis, and cellular communication in the brain of HAND patients; but cART partially reversed such effects of HIV, which may contribute to the underlying mechanism of HAND in HIV patients.

This study was supported by NIH grants R01 NS084817, R01 DA044552/DA044552-03S1, and R01 DA057197 to X-TH; and DA033966, NS060632 and MG122241 to LA

Poster Number: 139
Session: Oral Presentation
Category: Neuroscience
Trainee Rank: Rush Student RMC: M2

Jordan Dunlap, BS

Jordan Dunlap (Rush Medical College, Rush University); Bryan James, PhD (Rush Alzheimer's Disease Center, Rush University)

THE ROLE OF THYROID STIMULATING HORMONE (TSH) IN ALZHEIMER'S DISEASE (AD)

IMPORTANCE: While several studies have shown that thyroid dysfunction is related to cognitive function, the relationship with AD pathology and dementia remains inconclusive. OBJECTIVE: To determine the cross-sectional association of baseline thyroid dysfunction, as measured by TSH, with dementia, cognition, and AD pathology. DESIGN: The Rush Memory and Aging Project and Minority Aging Research Study were used to assess 2,366 participants with baseline TSH measurements, clinical diagnosis of cognitive status, and global cognition scores. Autopsies were performed on 638 deceased participants. TSH levels were classified as normal (reference), below normal, or above normal in accordance with the reference range of Quest Diagnostics (0.40-4.50 mIU/L). MAIN OUTCOMES: Primary outcomes were dementia diagnosis based on standard criteria and global cognitive function measured by 19 cognitive tests. Autopsy measures were AD pathology assessed by averaged amyloid and tangle measures from 8 brain regions, and NIA-Reagan Diagnosis of AD. Linear and logistic regression analyses were used to examine association of TSH with dementia, global cognition, and AD pathology, adjusting for age, sex, education, and race. RESULTS: Of 2,366 participants with baseline TSH measurements, 2,126 (90%) had normal TSH levels; 166 (7%) had TSH above and 74 (3%) had TSH below normal. No significant associations were observed between abnormal TSH levels and dementia (above: OR=1.00, p=0.99; below: OR=1.08, p=0.90). Abnormal TSH levels were not associated with global cognition (above: estimate=0.018 [SE=0.04], p = 0.69; below: estimate=0.01 [SE=0.06], p=0.99). Similarly, there was no association between TSH and AD pathology (above: estimate=-0.02 [SE=0.09], p=0.81; below: estimate=-0.07 [SE=0.15], p = 0.66) or pathologic diagnosis of AD (above: OR=1.24, 95%CI=0.69,2.32); below: OR=0.86, 95%CI=0.33,2.39). There were no significant interactions of TSH with AD pathology. CONCLUSION: Abnormal TSH is not associated with dementia, cognitive function or AD pathology. These findings do not support the hypothesis that thyroid dysfunction is a risk factor for AD.

Poster Number: 140
Session: Poster Presentation
Category: Neuroscience
Trainee Rank: Rush Student RMC: M2

Lillian Hallmark, MD Candidate (Medical Student)
Lillian Hallmark (RU); Neelum Aggarwal, MD (RU); Annabelle Volgman, MD (RU

INVESTIGATING THE PREVALENCE OF DEMENTIA IN PATIENTS WITH IMPLANTABLE CARDIAC DEVICES AT RUSH UNIVERSITY MEDICAL CENTER

INTRODUCTION While it is widely acknowledged that cerebral health closely influences cardiac health and vice versa, there currently exists a minimal amount of research on the correlation between cognitive decline and cardiac implantable device placement, particularly in high-risk patient populations. Cognitive impairment may lead to worse outcomes in patients with complicated cardiovascular disease. To assess the effect of cognitive decline among patients with an implantable device, we conducted a pilot study that defines the prevalence of these co-morbid conditions. This retrospective chart review study aims to quantify and describe the patient population within the Rush University device clinic that have both received an implantable cardiac device and are taking prescription medications for dementia. METHODS A retrospective chart review design was employed to identify patients who have received an implantable cardiac device and have at least one of the following dementia medications: donepezil, galantamine, rivastigmine, or memantine in their prescribed medication lists. An electronic chart review was performed on patients who were seen in cardiology clinics from 07/01/2020-07/01/2022. Once patients were identified to meet these criteria, the retrospective review included demographic characteristics such as age, sex, marital status, occupation, education level, past medical history, drug use, problem lists, and prescription medications. PARTICIPANTS/RESULTS: 600 participants at Rush cardiac device clinics were screened for inclusion criteria. 9 patients were excluded from the review if they were not evaluated at a Rush clinic or did not have a minimum amount of information in their medical records. 16 patients met the criteria of having at least one dementia medication prescription (2.67%). 24 patients (4%) had documented cognitive decline and/or dementia without any associated dementia prescription medications. In total, 40 patients (6.67%) had documented cognitive decline regardless of prescription medication status. DISCUSSION/CONCLUSION: We identified a small percentage of patients with an implantable cardiac device and cognitive decline. We plan to investigate the association between device placement and neuro-worsening in addition to overall clinical course compared to patients without cognitive decline. The prevalence and characterization of these co-morbid conditions have important implications on patient safety and screening protocols for patients with cognitive decline in both arrhythmia and neurology clinics.

Poster Number: 141
Session: Poster Presentation
Category: Neuroscience
Trainee Rank: Rush Student GC: PhD

Yan Li, Masters of Engineering
Yan Li (Rush) Ricardo A. Vialle (Rush) Dan Nicholson (Rush)

Characterizing the Role of Structural Variation in Alzheimer's Disease-Related Neurodegeneration

INTRODUCTION: Alzheimer's disease (AD) is a neurodegenerative disorder affecting an estimated 6.5 million elderly Americans, and is projected to affect twice that number by 2050. Current research into the mechanisms of AD has not yet resulted in substantial improvement in treatment. This lack of progress is partly due to a gap of knowledge in the genetics of the disease, where a considerable proportion of heritability is not yet explained. Genomic structural variation (SV), defined as any genetic variant with fifty or more nucleotide base pairs, is a potential candidate for accounting for this missing heritability. This project's objectives aim to address that gap by first creating a novel computational workflow for discovering new SV data derived from short-read and long-read whole-genome sequencing (WGS) combined with up-to-date reference genomes, and then apply statistical analysis to find novel SVs associated with AD-related phenotypes. METHODS: This workflow will a) align short-read sequences to the GRCh38.p13 and T2T-CHM13 reference genomes; b) apply four SV detection methods (Manta, Lumpy, Dysgu, and BioGraph) to produce a merged SV discovery panel; c) combine SV data derived from long-read sequences from the Human Genome Structural Variation Consortium with existing SV datasets into an SV reference panel; and d) perform pangenome genotyping on the two SV panels. Finally, linear regression analysis will be performed to quantify the role of the discovered SVs with various cognition, cognitive resilience, and neurodegenerative pathology phenotypes. RESULTS: Access to the data of over 1200 short-read genome sequences derived from the Religious Orders Study and Memory and Aging Project (ROSMAP) participant cohort has been obtained, and implementation of the pipeline is currently undergoing quality control. CONCLUSION: We expect these results to demonstrate the effectiveness of the workflow as a method for improving novel SVs discovery and to contribute to the body of knowledge of AD genetics not only by accounting for a proportion of the missing heritability but also by helping the understanding of the molecular mechanisms involved in genetic risk loci of AD and related phenotypes.

Poster Number: 142
Session: Poster Presentation
Category: Neuroscience
Trainee Rank: Rush Student RMC: M2

Seema Pathak, Bachelor of Arts (BA), Master of Science (MS)

Seema Pathak, BA, MS (Medical Student, Rush University Medical College) Dr. Michael Chen (Neurology and Neurosurgery, Rush University Medical Center) Dr. Yazan Radaideh (Neurology and Neurosurgery, Rush University Medical Center)

RELATIONSHIP OF RUPTURED INTRACRANIAL ANEURYSM SIZE AND ANATOMIC LOCATION IN AFRICAN AMERICANS

INTRODUCTION Although unruptured intracranial aneurysms are often incidentally discovered, there is a paucity of research on rupture risks. Intervention is based on ISUIA trial results which suggest aneurysm diameters < 7 mm have a low risk of rupture. Recent studies indicate that rupture risk is multifaceted and observed trends in clinical practice are different from what published literature suggests. This study aims to provide insight into unruptured intracranial aneurysm risk assessment accuracy by focusing on the relationships between ruptured aneurysm size and location with subgroup analysis of self-reported race. METHODS In this IRB-approved retrospective cohort study, consecutive patients presenting with subarachnoid hemorrhage were evaluated for cerebral aneurysm anatomic location and diameter and classified into groups of ≤ 3 mm, > 3 mm and ≤ 7 mm, and > 7 mm. Data was further stratified by self-identified African American race. All calculated group percentages were compared to evaluate the relationship between ruptured aneurysm size and anatomic location. RESULTS From 2012-2015 and early 2019 and 2022, 293 of 475 patients had ruptured aneurysms leading to subarachnoid hemorrhage. For all patients, anatomic distribution varied based on size with smaller ruptured aneurysms (≤ 3 mm; > 3 mm and ≤ 7 mm) located at ACOM (32.4%; 31.5%) and MCA (14.9%; 16.9%) and larger ruptured aneurysms (> 7 mm) at PCOM (33.3%) and ACOM (20.4%) (p-value: 0.002). When separating by race, a strong ruptured aneurysm size and location relationship in ≤ 3 mm (30.3%) and > 3 mm and ≤ 7 mm (30.3%) at ACOM as well as > 3 mm and ≤ 7 mm (28.8%) and > 7 mm (50%) at PCOM was found in self-identifying African-Americans (p-value: 0.005). CONCLUSION The average size of ruptured aneurysms varies based on location. This may be helpful in calibrating dome size thresholds used to determine future rupture risk and treatment decision-making based on anatomic location. Cerebral aneurysms among self-identifying African Americans do not rupture at different dome diameters and locations than non-African Americans. This cohort study is limited in defining a causal relationship. More data must be collected and assessed for stronger size and location relationship significance.

Poster Number: 143
Session: Poster Presentation
Category: Neuroscience
Trainee Rank: 2022 Summer Research Program Participants (Non-Rush matriculated students)

Amogh Shetty, High School
Amogh Shetty (IMSA); Srinivas D. Narasipura, PhD (RUMC); Tanner Shull, MPH (RUMC); Lena Al-Harthi, PhD (RUMC)

ASTROCYTES DIFFERNTIATED FROM HUMAN INDUCED PLURIPOTENT STEM CELLS ROBUSTLY EXPRESS THE WNT/B-CATENIN PATHWAY

INTRODUCTION: Astrocytes are an abundant cell type in the central nervous system (CNS), but most sources of astrocytes for in vitro experimentation can be difficult to access. Recently, hiPSCs (human induced pluripotent stem cells) were successfully differentiated into induced astrocytes (iAs), which may help surpass the previously mentioned limitations. The Wnt/β-catenin pathway is an important pro-survival pathway that is robustly expressed and regulates vital functions in normal human astrocytes. However, this pathway is not yet characterized in iAs. METHODS: Here, we use RT-qPCR, immunoblotting, and the luciferase assay to show that the Wnt/β-catenin pathway is expressed at the transcriptional and functional levels in iAs. We then attempt to knockout β-Catenin from the iAs using CRISPR-Cas9 via lentiviral approach, with and without doxycycline dependent regulation of Cas9. Knockouts were characterized using immunoblotting and next generation sequencing. RESULTS: It is shown that the downstream transcription factors of the pathway are present in abundance at the mRNA level using RT-qPCR; active β-catenin, the central mediator of the pathway, is robustly detected at the protein level using immunoblotting; and the pathway is highly active and can be significantly induced in the presence of CHIR-99021, which was detected using the luciferase assay. Preliminary evidence is then demonstrated for CRISPR-Cas9 knockout of β-Catenin via lentiviral approach without the need for doxycycline dependent regulation of Cas9 via immunoblotting and next generation sequencing. CONCLUSION: The study not only establishes that iAs robustly express the Wnt/beta-catenin pathway, but also demonstrates a method to assess the functional aspects of this pathway in astrocytes.

Poster Number: 144
Session: Poster Presentation
Category: Neuroscience
Trainee Rank: Rush Student GC: PhD

Emily Timm, BS

Ms. Emily Timm (Rush); Ms. Nancy Cao (Rush); Dr. Erin Robertson-Dick (Rush); Ms. Nicollette Purcell (Rush); Ms. Yuanqing Liu (Rush); Dr. Deborah Hall (Rush); Dr. Joanne O'Keefe (Rush)

IMPACT OF DUAL TASKING ON BALANCE IN FRAGILE-X ASSOCIATED TREMOR/ATAXIA SYNDROME (FXTAS) AND POTENTIAL PRODROMAL POSTURAL SWAY DEFICITS IN ASYMPTOMATIC FMR1 PREMUTATION CARRIERS

INTRODUCTION: FXTAS is a neurodegenerative disorder occurring in some Fragile X Messenger Ribonucleoprotein 1 (FMR1) gene premutation carriers (PMC) and is characterized by cerebellar ataxia, tremor and cognitive deficits which negatively impact balance and increase fall risk. Dual-task (DT) cognitive-motor paradigms may have the capacity to reveal impairments not present under single-task (ST) conditions. Markers of FXTAS onset are needed to provide preventative treatment interventions. Our aims were to determine: 1) the impact of DT interference on balance in FXTAS and 2) whether environmentally and cognitively challenging tasks uncover postural deficits in asymptomatic PMC. METHODS: Participants with FXTAS (n = 33; 68.6 + 9.5 years), PMC without FXTAS (n=34; 54.9 + 9.5 years) and controls (n = 48; 64.0 + 10.5 years) underwent balance testing using an inertial sensor system (APDMTM). Stance (feet apart (FA)/together (FT)), vision (eyes open (EO)/closed (EC)), surface stability (firm/foam), and cognitive demand (ST/DT) were manipulated in 30 second trials. A concurrent verbal fluency task, the Controlled Oral Word Association Test (COWAT), was used in DT conditions. RESULTS: FXTAS subjects had significantly greater total sway area, jerk, and RMS sway under all test conditions, but less dual-task costs (DTC) for jerk than controls during the FTEC condition. PMC without FXTAS had significantly greater RMS sway (a measure of sway variability) compared to controls in the ST/FAEC, DT/FAEO, and DT/FTEC conditions. In several conditions, PMC without FXTAS were approaching the FXTAS level of balance dysfunction. CONCLUSION: Postural sway deficits under EC and DT conditions in PMC without FXTAS might represent prodromal signs of the disease. Participants with FXTAS had reduced DTC for jerk which suggests they prioritize balance over cognition while dual tasking. This information may be useful to provide sensitive biomarkers of FXTAS onset, and in the design of preventative treatment strategies to improve balance and prevent falls in individuals at risk for FXTAS.

Poster Number: 145
Session: Poster Presentation
Category: Neuroscience
Trainee Rank: Rush Student GC: PhD

Tyler Tittle, M.S.
Tyler Tittle (Rush); Liudmila Romanova (Rush); Bryan Killinger (Rush)

DEFINING THE ALZHEIMER'S DISEASE INTERACTOME WITH IN SITU PROXIMITY LABELING IN A PRESENILIN/APP TRANSGENIC RAT MODEL

INTRODUCTION: Alzheimer's disease (AD) is a complex neurodegenerative disorder defined by the clinical manifestation of cognitive impairment including memory loss and disruption of executive functions. Importantly, the hallmarks of AD pathology consist of aggregates of β-amyloid and tau which are visualized as plaques and neurofibrillary tangles, respectively. Despite the necessity for understanding disease development, the interactions of AD pathology and how it is cleared from the brain remains unclear. METHODS: In the current study, 40µm sections of transgenic rat (TgF344-AD) brains engineered to express both mutant human presenilin 1 (PS1ΔE9) and mutant human amyloid precursor protein (APPsw) were characterized by immunohistochemistry (IHC) using a battery of antibodies targeting tau (EPR2731), various epitopes of β-amyloid (4G8, 6E10, D5N5H) and α-synuclein co-pathology (Syn1). Additionally, whole meninges of TgF344-AD rats were characterized by multiplex immunofluorescence targeting total β-amyloid(4G8) and CD31. The β-amyloid interactome of TgF344-AD rats was assessed through tissue-matched controls of both brain and meninges from initial characterization using in situ proximity labeling via biotinylation by antibody recognition (BAR). Capture of proximity-labeled proteins was validated by dot blot targeting biotin with subsequent mass spectrometry. RESULTS: Characterization of TgF344-AD rat brain tissues confirmed the presence of significant widespread β-amyloid pathology in the form of extracellular plaques. These plaques did not contain alpha-synuclein. Tau pathology was minimal with spurious immunoreactive tangles observed in the hippocampus. Based on these results, antibodies 4G8, 6E10, D5N5H were selected for BAR. Dot blots of BAR-labeled fractions confirmed the enrichment for biotin for both TgF344-AD rat brains and meninges. CONCLUSION: Significant β-amyloid pathology in the brain of TgF344-AD rats will allow for the determination of AD-pathology interactome. In future studies, we will use liquid chromatography tandem mass spectrometry to identify the BAR captured proteins from TgF344-AD rats.

Poster Number: 146
Session: Poster Presentation
Category: Neuroscience
Trainee Rank: Rush Student GC: PhD

Robin Vroman, MSc Biochemistry and Biotechnology

Robin Vroman (Rush/Ghent), Rahel Hunter (Rush), Matthew J. Wood (Rush), Olivia C. Davis (UTDallas), Zoë Malfait (Ghent), Dale S. George (Northwestern U), Dongjun Ren (Northwestern U), Diana Tavares-Ferreira (UTDallas), Theodore J. Price (UTDallas), Richard J. Miller (Northwestern U), Anne-Marie Malfait (Rush), Fransiska Malfait (Ghent), Rachel E. Miller (Rush), Delfien Syx (Ghent)

ANALYSIS OF MATRISOME EXPRESSION PATTERNS IN MURINE AND HUMAN DORSAL ROOT GANGLIA

INTRODUCTION The extracellular matrix (ECM) is a dynamic structure composed of a large number of molecules that can be divided into six different categories and are collectively called the matrisome. The ECM plays pivotal roles in physiological processes in many tissues, including the nervous system. Intriguingly, alterations in ECM molecules/pathways are associated with painful human conditions and murine experimental pain models. Nevertheless, mechanistic insight into the interplay of normal or defective ECM and pain is largely lacking. METHODS We used a transcriptomal approach to investigate the expression and cellular origin of matrisome genes in murine and human dorsal root ganglia (DRG), containing the cell bodies of sensory neurons. We used bulk RNA sequencing (RNAseq), single cell RNAseq (scRNAseq) and spatial transcriptomics combined with RNAscope in situ hybridization and immunohistochemistry. RESULTS Bulk RNAseq showed that over 60% of all matrisome genes were expressed in both murine and human DRG, with proportionally more core matrisome genes (glycoproteins, collagens, and proteoglycans) expressed compared to matrisome-associated genes (ECM-affiliated genes, ECM regulators and secreted factors). Examination of the cellular origin of matrisome expression by scRNAseq on murine DRG revealed that core matrisome genes, especially collagens, were expressed by vascular leptomeningeal-like (fibroblast) cell types whereas matrisome-associated genes were predominantly expressed by neuronal cells. In silico cell-cell communication analysis using the CellChat software predicted an important role for the collagen signaling pathway in connecting vascular cell types and nociceptors in murine tissue, which we confirmed by analysis of spatial transcriptomic data from human DRG. RNAscope in situ hybridization and immunohistochemistry confirmed expression of collagens in fibroblasts surrounding nociceptors in human DRG. CONCLUSION This study supports the idea that the DRG matrisome may contribute to neuronal signaling in both mouse and human. The identification of the cellular distribution of murine and human matrisome genes provides a framework to study the role of the ECM in peripheral nervous tissue and its effects on pain signaling in for example heritable connective tissue disorders.

Poster Number: 147
Session: Poster Presentation
Category: Ophthalmology
Trainee Rank: Rush Student RMC: M3

Mohammed Abdul Sami, MS

PI: Vivek Chaturvedi, MD Co-collaborators: Mohammed Abdul Sami, BS (Presenting) Samuel Minaker, MD, MSc, FRCSC Prithvi Bomdica, MD, MBA

Patients Lost to Follow Up with Proliferative Diabetic Retinopathy & Diabetic Macular Edema: Visual and Anatomic Outcomes, Patient Characteristics, and Repeat Lost to Follow Up Rate

Purpose: There have been limited comparative studies on the treatment outcomes of patients with diabetic retinopathies such as proliferative diabetic retinopathy (PRP) or diabetic macular edema (DME), particularly in patients who are lost to follow-up (LTFU) for over 6 months. The hypothesis of this study is that patients with PDR or DME who received a greater number of treatments prior to their LTFU, regardless if they were treated with PRP or anti-VEGF injection, should reflect better outcomes in visual acuity. Methods: Our project is a retrospective cohort study intended to study patients with PDR or DME treated primarily with PRP, anti-VEGF injections, or focal laser at the Rush Eye Clinic at Rush University Medical Center (RUMC) between January 2013 to March 2020. Following patient data collection, we are utilizing R and SPSS to categorize variables and detect a significant difference between baseline compared to after an LTFU period. A significant difference will be considered with a p-value less than 0.05. Results: Our retrospective chart review found 37 patients to be LTFU out of a total patient cohort of 448 patients, leading to a LTFU rate of 8.3%. The mean age of LTFU patients was 58.5 years and the mean duration of the initial LTFU period was 12.4 mos. The mean pre LTFU A1c stood at 9.4% compared to the mean post LTFU A1c of 7.05%. The race of the LTFU patients was disproportionately split to be 46% Black, 40.5% Hispanic, 5.4% White, and 8.1% as Other. Conclusions: In conclusion, our retrospective cohort study reflected an 8.3% LTFU rate, a number consistent with previous studies conducted on patients who were LTFU after treatment of PDR or DME. The mean-pre LTFU A1c decreased from 9.4% to 7.05%, which is possibly a result of our small sample size. However, the differences in visual acuity as well as the patient population imply that patients who are LTFU may be prone to higher loss of visual acuity over time and that this may be a problem exacerbated by racial disparities in access to healthcare resources.

Poster Number: 148

Session: Poster Presentation

Category: Ophthalmology

Trainee Rank: Rush Student RMC: M2

Jake Lesher, BA

Jake Lesher (Rush) Dylan Raikar (Rush) Leah Greenfield (Rush) Fred Crawford (Rush) Anjali Hawkins (Rush)

A retrospective comparison of cataract surgery with or without MIGS on lowering IOP in patients with primary open angle glaucoma

INTRODUCTION Glaucoma is a leading cause of irreversible blindness worldwide. Primary open-angle glaucoma (POAG) is the most common type of glaucoma and intraocular pressure (IOP) is the only known modifiable risk factor. For patients who fail first-line treatment for POAG such as medicines and laser surgery, incisional procedures to lower IOP may be considered. Newer procedures named minimally invasive glaucoma surgeries (MIGS), are often performed as an adjunct treatment for POAG in patients requiring cataract surgery because they utilize the existing cataract incision and can lower IOP. However, the effectiveness of MIGS in lowering IOP in these patients is difficult to determine because cataract surgery alone has been well-demonstrated to lower IOP. The purpose of this study is to elucidate any added benefit of reduction in IOP or reduction in topical IOP-lowering drop usage with the addition of MIGS to cataract surgery in patients with POAG. METHODS Charts of all patients with a diagnosis of POAG who underwent cataract surgery alone or cataract surgery with MIGS at Rush University Eye Center Physicians from 2018- 2022 were reviewed. All cases were performed by resident physicians. Data on patients' IOP and topical drop usage was collected in both groups pre-operatively and up to three years post-operatively, and comparison of the groups with appropriate statistical testing is in process. RESULTS Our preliminary results show that over a one-year postoperative period, patients who received concomitant MIGS and cataract surgery achieved an average maximum IOP reduction of 4.47 (95% CI, [3.59, 5.34]), whereas patients who received only cataract surgery achieved an average maximum IOP reduction of 1.96 (95% CI, [1.12, 2.79]) when compared to pre-operative values. No significant postoperative change in the number of topical drops was observed in either study group. CONCLUSION The results of this study suggest that MIGS is a beneficial adjunct to cataract surgery in patients with co-occurring POAG and visually significant cataracts to further reduce IOP. Further inquiry is necessary to determine the comparative efficacy of different types of MIGS procedures, as well as variations in postoperative complications in patients diagnosed with POAG undergoing cataract surgery with or without MIGS.

Poster Number: 149

Session: Poster Presentation

Category: Ophthalmology

Trainee Rank: Rush Student RMC: M2

Omar Nabulsi, BA

Sarah Abdel-Hadi (Rush), Rhona Ke MD (Rush), Sahitya Raja (Rush), Omar Nabulsi (Rush), Daisy Pacelli (Rush), Mathew MacCumber MD, PhD (Rush)

UV-ACTIVATED FLUORESCENT LIGHTING IMAGES AS A SCREENING TOOL FOR NYCTALOPIA

PURPOSE: Dark adaptometry and electroretinography are currently used to evaluate nyctalopia; they present barriers in young children due to non-compliance and complexity. A more affordable, convenient, and age-appropriate screening tool was developed: a book consisting of black photo paper with pictures of animals in a UV-activated fluorescent ink. This study aims to evaluate the hypothesis that the book is an accurate and effective screening tool for nyctalopia. METHODS: A 3-log neutral density filter and a spectroradiometer were used to assess luminance over a range of fluorescent ink densities to target scotopic vision. The intensities incorporated were 5, 10, 25, 50, and 100%. Subjects with rod dystrophies and healthy controls were recruited. Following 15 minutes of dark adaptation, each eye was tested individually. Fluorescent ink was activated by a UV flashlight. Subjects were asked to identify the animal(s) on each page or to outline the image if fluorescence was recognized but no identification was made. Participants were also tested with dark adaptometry to compare the night blindness measured by the two techniques. RESULTS: Twenty controls (40 eyes) and twelve subjects (24 eyes) were recruited. Of the controls, 37 (92.5%) were able to first recognize fluorescence at 10% intensity or lower and the remaining 3 (7.5%) first recognized fluorescence at 25%. Of the subjects, none were able to recognize fluorescence at 5% intensity, only 1 eye (4%) first recognized fluorescence at 10%, and the remaining 23 (96%) first recognized fluorescence at 25% intensity or higher; of those, 1 eye (4%) was unable to recognize any fluorescence, 13 eyes (54%) first recognized fluorescence at 25%, 5 eyes (21%) at 50%, and 4 eyes (17%) at 100%. Stimulus intensity recognition with dark adaptometry at the 15-minute mark ranged from -54dB to -62dB in healthy controls vs -12dB to -60dB in affected subjects. CONCLUSION: Subjects with below average results on dark adaptometry were noted to require higher intensities of fluorescence at first recognition, which supports the use of the book as an evaluation tool. This fluorescence testing needs to be further validated using a larger sample to establish a correlation between stimulus intensity and fluorescence intensity at first recognized image.

Poster Number: 150

Session: Poster Presentation

Category: Ophthalmology

Trainee Rank: Rush Student RMC: M3

Kevin Toolan, BS

Kevin Toolan, BS - Rush Medical College Kaitlin Keenan, MD - Rush University Medical Center Jacob Fondriest, MD - Rush University Medical Center Milena Stosic, MD - Rush University Medical Center Thomas Mizen, MD - Rush University Medical Center

Linezolid Toxic Optic Neuropathy: A case report and review of visual prognosis

INTRODUCTION: Linezolid is frequently used to treat drug-resistant bacteria, including MRSA. It is well-tolerated, but side effects include gastrointestinal upset and serotonin syndrome. With prolonged use, there have been case reports of peripheral neuropathy and optic neuropathy. To add to this literature, we present a case of linezolid associated toxic optic neuropathy, as well as a brief review of the natural course of this condition. METHODS: Chart Review DESCRIPTION OF CASE/RESULTS: A 71 year old female was referred to neuro-ophthalmology for 3 weeks of bilateral symmetric vision loss. Examination was significant for bilateral subtle elevation of the superior optic nerves, successful prior cataract surgery, and 0/14 Ishihara plates. She did not have an afferent pupillary defect or pain with eye movements, and review of systems was negative for giant cell arteritis. She had taken pentosan polysulfate years prior for interstitial cystitis for a total duration of less than 2 years. She was currently taking linezolid 600mg by mouth daily, for approximately 12 months prior to the onset of symptoms for multi-drug resistant corynebacterium osteomyelitis. Initial treatment included admission to the hospital for intravenous steroids, and a broad workup, including inflammatory markers, lumbar puncture, MRI brain and orbits with and without contrast, NMO, and MOG testing was performed. This testing was unremarkable, and the patient's symptoms were unchanged. Retina evaluation was negative for pentosan polysulfate toxicity. Linezolid was empirically held, and the patient experienced gradual vision improvement over the subsequent months, confirming the diagnosis. Linezolid toxic optic neuropathy is rare and the prognosis is not well established. In addition to this case report, we present a summary of data on visual recovery after medication cessation. CONCLUSION: Toxic optic neuropathy is a rare complication of chronic linezolid use that has been previously documented in case reports. Owing to its rarity, prognosis after cessation is not well established. In our patient, prior pentosan polysufate use may have confounded the patient's clinical presentation, although we believe this effect was minimal. Our literature review suggests some patients may experience visual recovery with cessation of the linezolid after the onset of the toxic optic neuropathy.

Poster Number: 151
Session: Poster Presentation
Category: Research Administration
Trainee Rank: Clinical Fellow

Madeline Konsor, PhD

Madeline Konsor, Ph.D. (Rosalind Franklin University & Rush), Kristin L. Schneider, Ph.D. (Rosalind Franklin University), Lisa Sanchez-Johnsen, Ph.D. (Rush)

CULTURE-CENTERED ASSESSMENTS: A FRAMEWORK AND GUIDING PRINCIPLES

INTRODUCTION: Hispanics/Latinxs currently comprise 18% of the U.S. population and are increasingly included in research studies. However, there is limited guidance for examining the reliability and validity of measures and assessments across Latinx backgrounds that are used in research or clinical contexts. Moreover, there is even less research that examines whether the measured construct holds its meaning (i.e., measurement invariance) across and between different Latinx backgrounds and between women and men. The purpose of this presentation is to describe a process for examining the psychometric properties (e.g., reliability, validity, and measurement invariance) of measures with a Latinx community sample of Mexican and Puerto Rican women and men. METHOD: First, a model that considers Latinx background, sex, and language preference when evaluating the psychometric properties of a measure will be outlined. Second, lessons learned from a secondary data analysis evaluating the psychometric properties of a measure with a community-based sample of adult Mexican and Puerto Rican men and women will be described. Third, a call to action to develop guidelines for examining the psychometric properties of measures commonly used among diverse Latinx communities will be described. RESULTS: First, we will review guidance for measurement invariance analyses, including commonly used methods for evaluating for measurement invariance, newer methods for identifying non-invariant items, and ways to evaluate the impact of a non-invariant item on the measure. Second, we will review standards for demonstrating internal consistency, including using coefficient omega. Third, we will review considerations for establishing construct validity, including a consideration of adding culturally relevant items for Latinxs. Fourth, we will describe the importance of including Latinx background, sex, and language preference when conducting psychometric analyses of measures. CONCLUSIONS: To parallel the efforts to use diverse samples in research, a call to action is made to validate culture-centered assessments and advance guidelines for testing measurement invariance to develop valid and reliable measures for Latinxs. Future directions with respect to validating and establishing measurement invariance across Latinxs backgrounds are also described, with a focus on developing culture-centered assessments and measures.

Poster Number: 152
Session: Poster Presentation
Category: Research Administration
Trainee Rank: Rush Student RMC: M3

Grant Owen, B.A.

Grant Owen (RMC), Olivia Negris (RMC), Kyle Amber (Department of Dermatology, RUMC) , Adan Becerra (Department of Surgery, RUMC)

The Top 100 Most Disruptive and Developmental Papers in Dermatology

INTRODUCTION: Scientific output in the field of dermatology has increased at an exponential rate over the years, highlighting the need for bibliometric measures to prioritize publications. Disruption score is a novel and validated method to identify papers which are considered either disruptive or developmental to their field. It has been previously used in multiple surgical fields and may be considered an alternative to other bibliometric measures. This study aims to identify and compare the top 100 most disruptive and developmental publications in dermatology using the disruption score. METHODS: The PubMed Identifiers (PMID) for all articles published in twelve leading dermatology journals was extracted and compared to a publicly available and validated dataset of disruption scores of all papers with a PMID from 1954-2014. We identified the 100 most disruptive and developmental publications in dermatology, then filtered by citation count using the iCite National Institute of Health tool to identify the most disruptive and developmental papers with at least 50 citations. The primary outcome measures were the disruption score and citation count. We also identified the publication year, first author, and study design for each manuscript. RESULTS: A total of 78,365 published articles were included. The 100 most disruptive articles with a citation count of at least 50 had disruption scores ranging from 0.2095 to 0.8526 and a max citation count of 1,296. The 100 most developmental articles had disruption scores ranging from -0.2619 to -0.9706 and a maximum citation count of 278. The 100 most cited articles had citation counts ranging from 299 to 2,016. A total of eight articles were found on both the 100 most disruptive with 50 or greater citations list and the 100 most cited article list. None of the 100 most developmental articles appear in the most cited list. Citation count was weakly correlated with disruption score ($r = 0.20$). CONCLUSION: Utilizing the disruption scores, practice-changing studies in dermatology have been identified. The disruption score captures a unique bibliometric factor that identifies innovative discoveries and scholarly achievements in the field of dermatology.

Poster Number: 153
Session: Poster Presentation
Category: Surgery
Trainee Rank: Rush Student RMC: M3

Ali Baird, BS

Ali Baird, BS (Rush Medical College) Grant Owen, BA (Rush Medical College) Michael Hutz, MD (Department of Otorhinolaryngology-Head and Neck Surgery at Rush University Medical Center)

SOCIAL MEDIA ANALYSIS OF PATIENT PERCEPTIONS ON HYPOGLOSSAL NERVE STIMULATION

INTRODUCTION In the United States, 17.4% of women and 33.9% of men have Obstructive Sleep Apnea (OSA). Implantation of a hypoglossal nerve stimulator, also known as Inspire, is a surgical option for treating OSA in patients with poor response to continuous positive airway pressure (CPAP). Patients may turn to the internet or social media for information about hypoglossal nerve stimulation, as a prior study found "inspire sleep apnea" was searched on YouTube 2.48 times more in 2020 compared to 2018. The aim of this study is to search social media to obtain patient perceptions of hypoglossal nerve stimulation therapy for the treatment of OSA. A secondary aim is to determine the prevalence of posts about hypoglossal nerve stimulation shared by healthcare personnel. METHODS Public social media posts from Instagram and Twitter from June 1st - December 31st of 2022 are included in the study. Keywords such as hypoglossal nerve stimulation, upper airway stimulation, and inspire therapy were searched in Instagram and Twitter. A classification system was used to group posts based on perspective: patient, patient's friend or family, nurse or other healthcare worker, physician, healthcare organization, news outlet, or medical supply company. Media utilized, purpose for the post, and tone of the post (positive, negative, or neutral) were recorded. RESULTS 451 Twitter posts were included with 32.2% shared by a healthcare organization, 16.4% shared by patients, 14.6% shared by medical supply companies, and 7.1% shared by physicians. Of the 31 Instagram posts included, 51.6% were shared by a healthcare organization, 22.6% were shared by patients, 16.1% were shared by medical supply companies, and 3.2% were shared by physicians. Posts shared by patients (total n=95) on Twitter and Instagram were significantly more likely to have a positive overall tone, compared to posts shared by members of the medical community or news outlets (total n=386) (55.8% vs. 46.4%, p=0.001). CONCLUSION Patients with OSA demonstrate positive perceptions of the hypoglossal nerve stimulator device, Inspire, on social media. Posts written by physicians or other members of the healthcare community comprised the majority of public social media posts about Inspire.

Poster Number: 154
Session: Poster Presentation
Category: Surgery
Trainee Rank: Rush Student RMC: M2

Ashley Barry, MS

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EVALUATION OF 30-DAY POSTOPERATIVE HOSPITAL READMISSIONS FOR PREVENTABILITY IN PATIENTS WITH HEPATO-PANCREATO-BILIARY OR COLORECTAL CANCER

BACKGROUND Evaluation of early postoperative hospital readmissions can identify potential areas for improvement in patient care and education. We aimed to make determinations of preventability of postoperative readmissions in patients with hepato-pancreato-biliary (HPB) or colorectal cancer (CRC). METHODS We performed retrospective chart review of patients with HPB or CRC who underwent oncologic resection or related intra-abdominal surgery from 2015-2020 at a tertiary care center. We identified patients who had an unplanned 30-day readmission. Readmission complaint and diagnosis were identified for each case and were categorized as preventable, unpreventable, or not clinically related to the index admission using predetermined criteria. RESULTS There were 739 patients who met inclusion criteria. The average age was 62.3 years and 53% of patients were female. The overall rate of 30-day unplanned readmission was 18%. In our HBP cohort, 23.4% (n=55) of patients were readmitted and 55.8% of those were determined to be preventable. In the CRC cohort, the readmission rate was 16.7% (n=84) and 51.2% were determined to be preventable. In both cohorts, the most common patient complaint was abdominal pain (n=11, 21.1% in HBP group and n=21, 25.6% in CRC group). The most common readmission diagnosis was intra-abdominal fluid collection (n=12, 23.1%) in the HPB group and dehydration/acute kidney injury (n=13, 15.6%) in the CRC group. CONCLUSIONS Evaluation of preventability of hospital readmissions will allow providers to focus on issues that can be intervened upon in the perioperative period, hopefully resulting in decreased unplanned postoperative readmissions in overall improved patient outcomes.

Poster Number: 155

Session: Poster Presentation

Category: Surgery

Trainee Rank: Rush Student RMC: M3

Reilly Frauchiger-Ankers, BS

Reilly Frauchiger-Ankers BS1, Kelly A. Harmon BS1, Michelle Y. Seu BA1, Christina Tragos MD1, Soumya Padala DDS1, Alvaro Figueroa DDS1

Longitudinal Volumetric Analysis of Airway Changes in a Patient with Apert Syndrome Treated with LeFort III: A Review of Literature and Case Report

INTRODUCTION: Apert syndrome is a rare condition linked to mutation in the FGFR2 gene, characterized by syndactyly and craniosynostosis resulting in increased intracranial pressure, orbital proptosis, and obstructive sleep apnea. Management consists of LeFort I/II/III osteotomy or monobloc advancement to correct midface hypoplasia. Apert's patients with moderate midface deformity sometimes undergo LeFort III in adolescence as opposed to infancy. Delaying surgery allows full airway development, potentially optimizing outcomes. Long-term data on airway volume changes following surgical correction is scarce. This case reviews a 16-year-old female with Apert's who underwent LeFort III osteotomy during adolescence with resultant airway changes measured by 3D volumetric analysis. Significant improvements in airway volume and apnea-hypopnea indices (AHI) were observed. METHODS: This is a retrospective case report of a patient with Apert syndrome who underwent LeFort III at Rush University Medical Center. Sleep studies were analyzed to track the patient's OSA symptoms, as measured by the AHI. CT scans were compared to analyze airway changes using 3D volumetric analysis with Invivo6 (Anatomage, inc., Santa Clara, CA, USA). Sella Nasion (SN) measurements were taken to account for growth comparison to airway volume changes. Airway volume was measured from the spheno-occipital synchondrosis to the base of C3; the portion of the airway most affected in Apert syndrome and maxillary hypoplasia in adolescents. RESULTS: This patient's airway volume increased from 2.6cc to 4.7cc (80.8%) measured over 3 years postoperatively. OSA improved from a grading of severe (AHI>30) in all preoperative sleep studies to a postoperative grading of 23/hr, which is correlated with moderate OSA. The patient reported subjective improvement in breathing and sleeping uninterrupted throughout the night. CONCLUSION: Using 3D volumetric analysis to measure airway changes in Apert's patients following surgery allows a method of determining efficacy of LeFort III and provides clinicians a metric to track airway stability. In this case of a patient with mild Apert syndrome, delaying surgical correction until adolescence resulted in more permanent airway improvements which supports the literature. In addition to sleep studies, longitudinal 3D volumetric analysis to measure airway expansion after surgical correction can be a useful tool for tracking clinical progression.

Poster Number: 156
Session: Poster Presentation
Category: Surgery
Trainee Rank: Rush Student RMC: M3

Matthew Greydanus, BS

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Comparing Clinical Outcomes in Bone Particulate Autologous and Alloplastic Pediatric Cranioplasty

BACKGROUND: Cranioplasty in the pediatric population represents an understudied cohort due to anatomic plasticity, growth considerations, and numerous presenting conditions. Pediatric cranial reconstruction techniques are established within the adult population, yet there is a paucity of existing data reporting outcome measures and complications of pediatric bone particulate autologous and alloplastic cranioplasties. This meta-analysis aims to provide outcomes associated with pediatric cranioplasty as it relates to the type of materials used and associated rates of reoperation. METHODS: Our project followed PRISMA guidelines and GRADE criteria using PubMed/MEDLINE, Scopus, CINAHL, Cochrane Database of Controlled Trials and the Cochrane Database of Systematic Reviews Studies. Inclusion criteria incorporated age, material, and description of autologous or alloplastic cranioplasty. Studies published prior to 2000, of adult populations, utilizing other procedures, or with unratifiable data were excluded. A meta-analysis of risk differences was done to compare rates of reoperations between studies using the 'meta' package in R. RESULTS: We screened 1,338 articles, with 8 meeting criteria for quantitative synthesis. We analyzed 371 patients, with 119 (32%) undergoing alloplastic cranioplasty and 252 (68%) undergoing cranioplasty with other materials. Ages ranged from 4 months to 18 years and follow-up ranged from 9 months to 7 years. Analysis showed that alloplastic pediatric cranioplasties were associated with a statistically significant decrease in reoperations compared to bone particulate autologous techniques, with a risk difference of 0.17% ($p < 0.01$). Alloplastic cranioplasties also provided a significant decrease in reoperations when compared to all other materials combined, with a risk difference of 0.12% ($p < 0.01$). CONCLUSIONs: Our findings of a decreased risk of reoperation when using alloplastic materials for cranioplasties in the pediatric population is an important consideration when evaluating the rapidly growing skulls of pediatric patients and the potential risk that reoperations pose. The extremely limited literature on this population demands further exploration to better understand the ramifications of material type on the rate of reoperation for pediatric cranioplasties.

Poster Number: 157
Session: Poster Presentation
Category: Surgery
Trainee Rank: Rush Student RMC: M3

Kelly Harmon, BS

Kelly A. Harmon, BS (Rush); Sydney R. Horen, MD (Rush); Hossein E. Jazayeri (Michigan), DMD; Alvaro Figueroa, DDS, MS (Rush); Christina Tragos, MD (Rush)

MANAGEMENT OF A PATIENT WITH TMJ ANKYLOSIS RESULTING FROM MDO: SIMULTANEOUS MIDFACE EXTERNAL DISTRACTION AND BILATERAL TEMPOROMANDIBULAR JOINT REPLACEMENT

INTRODUCTION: Early mandibular distraction osteogenesis (MDO) can decrease upper airway and feeding complications in pediatric patients with micrognathia; however, temporomandibular joint (TMJ) complications, like TMJ ankylosis (TMJA), may occur. Ankylosis may result in mandibular retrognathia asymmetry, and limited mouth opening, resulting in breathing, feeding, and speech difficulties that may have deleterious effects on physical and psychosocial development. This report presents the case of a 17-year-old male with a severe craniofacial disorder who experienced MDO as a result of bilateral bony TMJA, which was treated with bilateral custom alloplastic TMJ replacements. Currently, no reports exist describing the treatment of iatrogenic TMJA due to MDO in a patient with a severe craniofacial disorder. METHODS: This is a retrospective case report of the treatment of a patient who underwent MDO with resultant TMJA. RESULTS: A 17-year-old male presented in September 2016 complaining of left maxillary pain and limited mouth opening with a maximal interincisal opening (MIO) of 1mm (Figure 1). The patient had a past medical history of a severe craniofacial anomaly with characteristics of Treacher Collins syndrome (TCS), micrognathia, and iatrogenic TMJA, which presented following MDO. In February 2017, he was treated with left zygoma resection and bilateral release of the TMJs, condylectomy, and ramus resection. Five months later, the patient underwent bilateral custom alloplastic TMJ replacements with simultaneous maxillary DO using a Rigid External Distraction (RED) device, which was removed 3 months later. At his most recent follow-up in December 2022, the patient's occlusion and range of motion remained stable with an MIO of 27mm. He and his family are satisfied with his facial appearance, facial symmetry, tolerance of a full diet, and ability to maintain adequate oral hygiene. CONCLUSION: The postoperative complications of early MDO, including TMJA, are of paramount importance to the craniomaxillofacial (CMF) surgeon. Patients' function and craniofacial growth can be disturbed, resulting in significant physical and psychosocial consequences, requiring additional surgical procedures, and increasing the burden of care. Patients and their families must be made aware of the potential complications of early TMJ surgery as well the potential solutions to these problems should they occur.

Poster Number: 158
Session: Poster Presentation
Category: Surgery
Trainee Rank: Rush Student RMC: M3

Ryan Hess, BS

Ryan A. Hess, BS (Rush); Kelly A. Harmon, BS (Rush); Brandon Alba, MD (Rush); Alvaro A. Figueroa, DDS (Rush); Christina Tragos, MD (Rush) First/presenting: Ryan A Hess

EXPANDING THE SURGICAL OPTIONS FOR YOUNG CRANIOFACIAL PATIENTS: BILATERAL ALLOPLASTIC TMJR

INTRODUCTION Temporomandibular joint (TMJ) reconstruction (TMJR) can be performed with costochondral grafts (CCG) or alloplastic prosthetic implants. CCG is considered the gold standard in skeletally immature patients, but such grafts are susceptible to resorption or ankylosis, thus potentially necessitating reoperation and increasing the risk of surgical morbidity. In skeletally mature patients, alloplastic implants are preferred; however, recent evidence demonstrates adequate long-term outcomes in pediatric patients without the feared complications of asymmetric mandibular growth or retrognathia. In this report, we present the case of an 8-year-old female with TMJ ankylosis who underwent bilateral TMJR with alloplastic implants, the youngest case reported in the literature. METHODS This is a retrospective case report of an 8-year-old female who underwent bilateral release of ankylosis and custom prosthetic TMJ replacement. Polysomnography was used to assess obstructive sleep apnea (OSA) severity. RESULTS A 4-year-old female patient presented with a history of TMJ ankylosis, ankyloglossia, tracheostomy-dependence, and bilateral microtia with parental concern for OSA and aspiration. Surgical history included gastrostomy tube placement and multiple failed prior mandibular distraction attempts. Preoperative polysomnography demonstrated severe OSA with an apnea-hypopnea index (AHI) of 69 events/hour. At age 5, the patient underwent serial bilateral mandibular distraction to correct mandibular deficiency and allow for fixation of the of the TMJ prosthesis' mandibular component to the patient's native bone. Six months after distraction device removal, polysomnography revealed an improved AHI of 31 events/hour. Repeat imaging was performed for surgical planning and design of a custom alloplastic TMJ prosthesis (TMJ Concepts, Ventura, CA). At age 8, the patient underwent bilateral release of ankylosis, condylectomy, and coronoidectomy with placement of the custom alloplastic prosthesis. The patient tolerated the procedure well and was discharged home on postoperative day 5. At 5 months postoperatively, AHI was 5.6 events/hour. On long-term follow-up, the patient demonstrated significant improvements in jaw opening, function, and occlusion without complications. CONCLUSIONS This case demonstrates the feasibility of TMJ reconstruction with alloplastic implants as a first-line treatment for TMJ ankylosis in properly selected skeletally immature patients. These implants can provide significant quality of life improvements with minimal morbidity and represent a promising new frontier in pediatric craniofacial reconstruction.

Poster Number: 159

Session: Poster Presentation

Category: Surgery

Trainee Rank: Rush Student RMC: M3

Kody Jones, BS

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TRENDS OF MEDICARE REIMBURSEMENT RATES FOR GENDER AFFIRMING PROCEDURES

INTRODUCTION: Nearly one in five Americans receive health insurance coverage through Medicare, making it one of the largest health insurance providers in the United States. Medicare reimbursement for a service is determined by the relative value unit (RVU) for that service and the current conversion factor, both of which are updated on a yearly basis. Literature suggests reimbursement is lagging inflation for many plastic surgery procedures. Here, we evaluate trends in Medicare reimbursement specifically for gender affirmation procedures. METHODS: The most common gender affirmation procedures performed at an urban academic medical center were identified. A standardized formula utilizing RVUs and conversion factors was used to convert monetary data to $USD. Differences in reimbursement between 2014 and 2021 were calculated for each procedure. The rate of inflation was then used to convert the monetary data to $USD in 2021. The differences in reimbursement were then calculated again for each procedure. A standardized formula utilizing RVUs from 2014 and 2021 was used to calculate compound annual growth rate (CAGR) for each procedure. RESULTS: Between 2014 and 2021, Medicare reimbursement for gender affirmation procedures had an inflation-unadjusted average change of -0.09% and an inflation-adjusted change of -10.03%. Trends in reimbursement varied based on category of gender affirmation procedure (i.e., facial feminization versus female top). The CAGR had an average change of -0.99%. The average changes in work RVUs, facility RVUs, and malpractice RVUs were -1.05%, +9.52%, and -0.93%, respectively. CONCLUSION: From 2014 to 2021, Medicare reimbursement for gender affirmation procedures lagged inflation. These results reflect trends in other common plastic surgery procedures. This decrease in reimbursement may impact access to gender affirming care.

Poster Number: 160

Session: Poster Presentation

Category: Surgery

Trainee Rank: Rush Student RMC: M2

Kaylee Lindahl, BS

Kaylee Lindahl (Rush Medical College); Nicole Rossi (Rush Medical College); Nicole Siparsky, MD (Rush)

Age as a Prognostic Tool in Outcomes of Advanced Pressure Ulcers

INTRODUCTION Pressure ulcers (PU) continue to disproportionately affect chronically ill patients with limited mobility. Despite the high incidence of PU, there remains a lack of information available on outcomes of patients with PU. Similarly, it remains unclear what impact, if any, demographic factors, such as age, have on PU outcome. Without this information, it is difficult for providers to accurately inform patients of what to expect, including the postoperative quality of life and likelihood of PU closure. METHODS We performed a retrospective study under Institutional Review Board approval (ORA #: 21112101-IRB01). Patients diagnosed with stages 3 and 4 PU of the sacrum, ischium, trochanter, leg, chest, and back were identified. These patients underwent surgical debridement of their PU with the Acute Care Surgery Service at Rush University Medical Center between 2017 and 2022. Both demographic and clinical information was collected. RESULTS We identified 76 patients who fit the inclusion criteria for the study. The study population was organized into the following age groups (in years): <20 (1.3%), 20-29 (1.3%), 30-39 (15.8%), 40-49 (9.0%), 50-59 (18.4%), 60-69 (15.8%), 70-79 (21.1%), 80-89 (13.2%), and 90-99 (3.9%). Follow up at 1 month, 3 months, 6 months, 9 months, 1 year, and 2 years among the age groups is presented in Figure 1. One PU achieved closure by 3 months among those 50-59; 1 additional PU achieved closure by 6 months in this age group. Another PU achieved closure by 6 months among those in the 40-49 age group. CONCLUSION This study highlights the poor prognosis of PU based on patient age. Closure of advanced PU across all age groups was rare; no patients ages 60+ had achieved PU closure by 2 years despite those patients representing >50% of the population examined. Long-term follow up was poor across all age groups. The greatest rates of short-term follow up were observed in those 40-49 and 50-59, which may coincide with their success in PU closure. For most patients with advanced pressure ulcers, especially those age 60+, an advanced PU becomes a chronic problem that they will live with for years to come, with early closure being a rare event.

Poster Number: 161

Session: Poster Presentation

Category: Surgery

Trainee Rank: Rush Student RMC: M2

Shavonne Osiakwan, BS Biology

Shavonne Osiakwan (RUSH); Kiana Jones (RUSH); Swathi Reddy (RUSH); Philip Omotosho (RUSH); Alfonso Torquati (RUSH); and Adan Becerra (RUSH) Shavonne Osiakwan will be the presenting/first author .

PREGNANCY AND BIRTH COMPLICATIONS AMONG WOMEN UNDERGOING BARIATRIC SURGERY: SLEEVE GASTRECTOMY VERSUS ROUX-EN-Y GASTRIC BYPASS

INTRODUCTION Obesity is an increasingly prevalent condition in the United States that threatens the health of millions of Americans. Bariatric surgery has been shown to be the most effective medical intervention for the treatment of severe obesity with procedures like the Roux-en-Y gastric bypass (RYGB) and sleeve gastrectomy (SG) achieving weight loss and reducing cardiovascular comorbidities. However, the safety of these procedures among women who give birth has become a topic of interest given that pregnancy induces anatomical changes in the abdomen that can compromise maternal health. This is important given that women of childbearing age make up 65% of individuals with obesity who undergo bariatric surgery. This national study compares pregnancy and obstetric outcomes between those who underwent SG versus RYGB among women who gave birth after bariatric surgery. METHODS This retrospective cohort study used the PearlDiver-Mariner database to identify patients who received either SG or RYGB between 2010-2020 according to Current Procedural Terminology codes and International Classification of Diseases procedure codes. The cohort was restricted to women between the ages of 18 and 52 who became pregnant within 2 years of undergoing bariatric surgery. We measured outcomes by the presence or absence of one or more complications, such as gestational diabetes, preeclampsia, eclampsia, and premature/preterm rupture of membranes. We performed a 1:1 matched analysis of the cohort using multivariable logistic regression. RESULTS A cohort of 16,911 individuals was assembled, with 10,675 (63.1%) and 6,236 (36.9%) having received SG and RYGB, respectively. In unadjusted analyses, 3,016/10,675 (28.3%) of SG patients vs. 2,002/6,236 (32.1%) of RYGB patients experienced an obstetric complication during pregnancy or birth ($p<0.01$). In matched analyses that adjusted for confounding, patients who underwent RYGB had a 26% increase in the relative odds of experiencing an obstetric complication, compared to those who underwent SG (Odds Ratio=1.26, 95% Confidence Interval=1.14,1.38). CONCLUSION This study found there was a 26% increase in the relative odds of obstetric complications in women who became pregnant after receiving RYGB compared to those receiving SG. These results may help women with decision making about which type of procedure to undergo.

Poster Number: 162
Session: Poster Presentation
Category: Surgery
Trainee Rank: Rush Student RMC: M2

Zachary Palmisano, BS
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Gastrojejunostomy Tubes Are an Increasingly Used Alternative to Fundoplication in Children

INTRODUCTION Fundoplication for the treatment of gastroesophageal reflux disease (GERD) in infants has decreased over the last decade as this disease is usually transient in this population and thus a permanent procedure is unnecessary. Temporary procedures, such as the placement of a gastrojejunostomy (GJ) tube, allow distal enteral access and control of reflux in children who cannot tolerate direct gastric feeds until they outgrow the issue. While it is well known that fundoplication has fallen out of favor, it is not known to what extent the use of GJ tubes has increased in this same time frame. METHODS The Pearldiver Mariner database was queried for children under eight years of age with a diagnosis of failure to thrive (FTT) from 2010-2020. Patients undergoing fundoplication, gastrostomy tube (GT) placement, and GJ tube placement were identified using ICD-9, ICD-10, and CPT codes, then grouped by procedure type. Rates of children receiving a GT and fundoplication within 6 months of each other were compared to the rates of children receiving a GJ tube over the course of the study period. RESULTS Of the 705,092 children under age 8 with a diagnosis of FTT in our database, the proportion that received a fundoplication and GT decreased from 0.29% to 0.05% (Mann-Kendall Trend Test $S=-49$, $p<.001$, $\alpha=.01$) over the study period (Figure). Over the same time period, the rate of converted or primary GJ tubes increased from 0.05% to 0.25% (Mann-Kendall Trend Test $S=45$, $p<.001$, $\alpha=.01$). This is associated with a Pearson correlation coefficient of -0.96 ($p<.001$). CONCLUSION While the proportion of children with a diagnosis of FTT undergoing GT placement and fundoplication decreased from 2010-2020, GJ tube placement has increased. GJ tubes avoid permanent modification of the gastroesophageal junction, giving time for natural maturation of the gastric anatomy which will eventually reduce GERD in most infants. While GJ tubes have complications of their own, it appears that clinicians have opted to utilize these devices with an increasing frequency as we move away from fundoplications.

Poster Number: 163
Session: Poster Presentation
Category: Surgery
Trainee Rank: Rush Student RMC: M2

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ABDOMINAL HERNIA AND BULGE RATES FOLLOWING DIEP FLAP BREAST RECONSTRUCTION: A META-ANALYSIS AND SYSTEMATIC REVIEW

INTRODUCTION: Abdominal hernia and bulge are known complications of autologous breast reconstruction, yet the literature is limited with regards to identifying risk factors for their development in patients undergoing breast reconstruction with deep inferior epigastric artery perforator (DIEP) flaps. This meta-analysis aims to investigate patient risk factors for hernia and bulge in DIEP flaps as well as the effect of prophylactic mesh placement on postoperative complications. METHODS: A systematic search was conducted in July, 2022 in alignment with the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines. Studies published between 2000 and 2022 were included. 87 studies met the inclusion criteria; 64 studies were included in the analysis for bulge and 72 studies were included in the analysis for hernia. Meta-regressions were run on the proportion of patients experiencing hernia or bulge. Proportions were transformed using the Freeman-Tukey double arcsine method. RESULTS: Increased age ($\beta = 0.006$, $p = 0.015$) and history of pregnancy ($\beta=0.0004$, $p=0.0001$) were significantly associated with hernia. Percentage of active smokers was found to be significantly associated with bulge ($\beta=0.003$, $p=0.036$). A significant association was also found between having both medial and lateral perforators harvested during the procedure with a decreased incidence of bulge ($\beta=-0.0039$, $p=0.0472$). No significant association was found between studies which included patients with prophylactic mesh placement and rates of hernia or bulge. CONCLUSION: Understanding morbidities associated with DIEP flap breast reconstruction allows surgeons to proactively identify patients at a higher risk for abdominal hernia or bulge, and prepare for a potential repair. This systematic review revealed that patients of advanced age or with a history of pregnancy are at an increased risk for an abdominal hernia, and patients who actively smoke are at an increased risk for an abdominal bulge. Patients who had both medial and lateral perforators harvested were associated with a decreased risk of bulging. Prophylactic mesh placement did not significantly impact the incidence of abdominal hernias and bulges. Future studies may further explore the associated risks and whether these patients may benefit from prophylactic mesh placement.

Poster Number: 164
Session: Poster Presentation
Category: Surgery
Trainee Rank: Rush Student RMC: M4

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THE BEHEMOTH PROBLEM OF PRESSURE ULCERS IN CRITICAL CARE PROGNOSTICATION

INTRODUCTION: Pressure ulcers (PU) remain a behemoth to overcome in the care of critically ill patients. Accurate prognostication is essential to provide realistic expectations for intensive care unit (ICU) patients, decisionmakers, and providers. However, very little current statistical data exists to guide these individuals. METHODS: We performed a retrospective study under Institutional Review Board approval (ORA #: 21112101-IRB01). We identified patients who received treatment in the ICU and were diagnosed with stages 3 and 4 PU of the sacrum, ischium, trochanter, knee, heel, back, and scapula. These patients received surgical wound care from the Acute Care Surgery Service at Rush University Medical Center between 2017 and 2022. We collected demographic and clinic information for these patients. RESULTS: We identified 40 patients who met the criteria for our study; 42.5% were male. The average age and body mass index at the time of debridement was 56 years and 30.4 kg/m2, respectively. 18.9%, 16.2%, 17.5%, and 67.5% of patients were admitted to the ICU with ulcer sepsis, urosepsis, acute respiratory failure, and other causes, respectively. Of these patients, 27.5% were bedridden due to paraplegia or quadriplegia. Commonly identified comorbidities included hypertension (67.5%) and type 2 diabetes mellitus (42.5%); 25% of patients endorsed prior tobacco use and 12.5% endorsed current tobacco use. Amongst the PU examined, the majority were sacral (60%). Most debridements were operative (62.5%) and excisional (95%). The prevalence of follow up at 1 month, 3 months, 6 months, 9 months, 1 year, and 2 years was 35%, 27.5%, 25%, 12.5%, 17.5%, and 22.5%, respectively. Closure by 6 months was achieved in 3 of the PU examined; no additional PU achieved closure at 9 months, 1 year, and 2 years. CONCLUSIONS: This study provides new and discouraging information regarding the outcomes of ICU patients with advanced PU. Comorbidities that decrease mobility and facilitate poor wound healing were commonly observed. Most patients do not receive adequate follow up care by their surgical team, which may reflect their institutionalized status, poor access to resources, and cost of care. Wound closure was rare; fewer than 10% of patients achieved wound closure within 2 years.

Poster Number: 165
Session: Poster Presentation
Category: Urogenital/Reproductive
Trainee Rank: Clinical Resident

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DOES KIDNEY STONE TREATMENT BEFORE PREGNANCY IMPACT SUBSEQUENT OBSTETRIC OUTCOMES?: ANALYSIS OF A CONTEMPORARY NATIONWIDE COHORT

INTRODUCTION Kidney stone events during pregnancy are associated with increased risk of maternal complications, but little is known about the risk of obstetric complications in women receiving upper tract stone (UTS) treatment pre-pregnancy. METHODS Adult female patients of childbearing age (18-52) treated for UTS between 2010-2021, who subsequently achieved pregnancies within 2 years of UTS treatment were identified from the Pearldiver-Mariner database, a nationwide all-payer claims database. UTS interventions, categorized as surgical vs. non-surgical, as well as obstetric complications were identified via appropriate billing codes. Associations between pre-pregnancy UTS intervention and obstetric complications were analyzed using chi-squared tests. RESULTS 184,221 women who conceived within 2 years of UTS treatment were identified; 72.6% managed conservatively. Overall obstetric complication rate was 9.8% for those treated surgically vs. 15.2% for those managed conservatively ($p<0.0001$). Obstetric complication rates after prior PCNL (19.1%) and temporizing interventions (17.7%) were significantly higher than for conservative management (each $p <0.002$), while those after prior URS (6.7%) were significantly lower ($p<0.0001$). CONCLUSIONS Our findings suggest that surgical intervention for kidney stones prior to pregnancy, specifically by URS, decreases subsequent maternal morbidity. Our findings could enhance counseling of patients with kidney stones who anticipate pregnancy.