

A1: Irina Katayeva

Advisor(s):Rauno Joks

Association of Peripheral Blood Naïve and Memory T cells markers from immigrants to Brooklyn who develop asthma/allergies with family history of cancer.

Immigrants to Brooklyn from regions of low allergy/asthma prevalence who develop asthma and allergy have a less robust Th1 responses than those who remain healthy. We determined whether this profile extends to history of familial malignancies, as malignancies are associated with defective immune surveillance of cancer. / Methods: Immigrants to Brooklyn (Chinese and Hispanic, n=112) with self-reported asthma and/or seasonal allergies and controls (asthma/allergy, n=57; control, n=55) had blood drawn for determination of total serum IgE (fluoroimmunoenzyme assay) and concurrent peripheral blood leukocyte memory markers: stem cells (CD35+), CD4+ and CD8+ T cells: naïve (CD4+, CD8+; CD45RO-CD62LhiCD11a^{lo}), and CD28-memory (CD28-CD45RO+)(flow cytometry, LSR Fortessa, BD). The history of cancer in first-degree relatives was obtained. Chi-square test and Pearson correlations were calculated. Results. Those with asthma/allergies had significantly higher levels of IgE (p=0.016) / Increased percent of naïve T cell significantly associated with decreased percent of memory T cells for the following subsets: asthma/allergy CD4+ and CD8+ (p=0.008 and 0.001, respectively) and control CD4+ (p=0.003). No significant association was found for control memory CD8+ cells (p=0.25). / There was no difference in total number of malignancies in control vs. allergy subjects (n=13,13, p=ns), paternal cancer (n=5,5, p=ns), and self, sibling, or children (p=ns). However, maternal cancer was reported by only 1 control but by 6 allergic subjects (p=0.057). Conclusion. Taken together, our findings suggest that a lack of robust Th1 responses in immigrants who develop allergic disease may be genetic and extend to defective cancer immune surveillance.

A2: Meng Shao

Advisor(s):David Schreiber

Definitive or Preoperative Chemoradiation for Esophageal Cancer: Patterns of Care and Survival Outcomes

Abstract: / Background: The optimal management of patients with localized esophageal cancer is uncertain. The objective of this study was to analyze contemporary patterns of care for esophageal cancer utilizing the National Cancer Database (NCDB). / Methods: Patients diagnosed with localized esophageal adenocarcinoma or squamous cell carcinoma from 2004-2011 and who received either preoperative chemoradiation followed by esophagectomy (trimodality) or definitive chemoradiation were identified in the NCDB. Only patients who received a radiation dose between 41.4Gy and 64.8Gy were included. Kaplan-Meier, Cox regression, and propensity-score matched survival analyses were performed to compare overall survival (OS) between those receiving chemoradiation versus trimodality therapy. Results: There were 8,064 patients, of which 44.9% received trimodality and 55.1% chemoradiation. Trimodality therapy was associated with improved OS (p<0.001). For patients receiving trimodality therapy, median OS was 35.6 months and 3-year OS was 49.6%, whereas for patients receiving chemoradiation median and 3-year OS were 16.8 months and 26.8%, respectively. For patients receiving chemoradiation, dose escalation beyond 50.4Gy was utilized 35.9% of the time but was not associated with an improvement in overall survival over those receiving 50Gy (p=0.62). The survival benefit of trimodality therapy remained after propensity-score matched analysis. / Conclusions: Definitive chemoradiation is more commonly utilized than trimodality therapy but trimodality treatment is associated with excellent survival outcomes on both propensity-matched and unmatched survival analysis. Dose escalation beyond 50 Gy remains frequently utilized but is not associated with a survival benefit. /

A3: Adam El Sehamy

Advisor(s):Rauno Joks

Peer Survey of Alert Fatigue in Resident Physicians in a Large Inner City Training Hospital: Does it affect drug allergy surveillance?

Rationale. Electronic decision support (e.g. CPOE Alerts) is designed to help prevent errors and promote efficiency and safety with EMR. However, physicians may overlook frequent notifications with resultant adverse effects, including drug allergic reactions. Prevalence of this alert fatigue (AF) in physicians-in-training is understudied. We determined knowledge and manifestations of AF in resident physicians at a large inner city hospital. / Methods. De-identified written surveys were completed by 105 resident MDs (PGY-1 to PGY-5), who were queried about 1) knowledge of, and 2), if knowledgeable, whether they “suffered” from AF. Percent of override of 1) drug interactions, 2) drug allergy, 3) duplicate order, and 4) discontinued orders and history of “near miss” (NM) was determined. / Data were analyzed using Mann-Whitney 2-sided test and Fisher’s exact test. / Results. About two-thirds (66/105) had knowledge of AF, which was associated with significant increase in override of alerts for duplicate ($p=0.02$) and discontinued ($p=0.02$), but not drug interactions ($p=0.90$) or drug allergy ($p=0.09$). Knowledge of AF was not associated with increased NM ($p=0.15$) or PGY level ($p=0.34$). / Of those with knowledge of AF, those who suffer (55/65), did not significantly override any type of alert more than those who don’t suffer ($p=0.81, 0.16, 0.12, \text{ and } 0.79$, respectively), have more NM ($p=1.0$), or be affected by PGY level ($p=0.12$). / Conclusion. Knowledge of, but not the emotional response to, AF was associated with increased overrides in orders which may decrease efficiency, but not result in adverse drug effects, including allergic drug reactions.

A4: Mili Shum

Advisor(s):Rauno Joks

A Retrospective Study of Clinical Shrimp Allergy in the Setting of Shrimp, Cockroach and Dust mite Sensitization

Introduction: The protein that commonly causes shrimp allergy, tropomyosin, is also found in cockroach and dust mite (DM). The presence of clinical shrimp allergy and immunologic sensitization amongst these allergens is underreported and therefore merits further investigation. Method: A retrospective chart review was conducted on patients ages 5 through 80 with allergy clinic visits from Jan 2012 through Jun 2015. Data was collected on shrimp, cockroach, and dustmite sensitization based on IgE skin prick (Dermapik®) or in-vitro (immunoCAP®) testing. A history of clinical reactivity to shrimp was recorded to determine the prevalence of shrimp allergic symptoms in the presence of shrimp, cockroach or DM sensitization. Results: Of 171 patients analyzed, 46 (27%) was sensitized to shrimp, 77 (45%) to cockroach, 89 (52%) to DM, 31 (18%) to SH+/CR+/DM+, and 2 (1.2%) to SH+/CR-/DM-. Clinical shrimp allergy was reported by 57% (26/46), 34% (26/77), and 34% (30/47), respectively, with sensitization as compared to 17% (21/124, $p<0.0001$), 22% (21/94, $p=0.10$), and 21% (17/82, $p=0.06$) without sensitization to shrimp (OR=6.4, 95% CI 3.0-13.6, $p<0.0001$), cockroach (OR=0.6, 95% CI 0.2-1.5, $p=0.29$), and DM (OR=1.1, 95% CI 0.5-2.5, $p=0.76$), respectively. Shrimp allergy was reported in 51% vs. 86% ($p=0.12$) with SH+/CR+ vs. SH+/CR- and 56% vs. 60% ($p=1.0$) with SH+/DM+ vs. SH+/DM-. Conclusion: Shrimp sensitization was the only predictor that is significantly associated with clinical shrimp allergy. Cockroach or DM sensitization was not found to significantly increase the odds of having a history of clinical shrimp allergy. /

A5: Kamilah Muhammad-Harris

Advisor(s):Marina Svyatets

Anesthetic Considerations for a Patient with an Aldosterone Secreting Adrenal Mass

Introduction: Adrenal masses represent a significant portion of “incidentalomas” found when CT scans are performed for unrelated pathology. An estimated 5-13% of hypertension is ultimately attributed to primary or incompletely suppressible, renin-independent hypersecretion of aldosterone. Treatment is focused on the correction and prevention of hypertension, hypokalemia, renal toxicity, and cardiovascular findings including myocardial infarction, stroke, atrial fibrillation, and increased left ventricular mass, which are independent of the associated hypokalemia. Case: A 49 year old female with past medical history of OSA on CPAP, hypertension, hyperlipidemia, GERD, hyperthyroidism, systemic lupus erythematosus (SLE), pregnancy related TIA, and hyperaldosteronism presented for laparoscopic adrenalectomy. CT scan revealed a 2mm left adrenal mass. Her aldosterone level was 564 (upper limit of normal is 30). Renin level was normal. Potassium values of 2.7 were normalized with spironolactone. The anesthesia plan included preparation of alpha blocking drugs, preoperative arterial line, and slow controlled induction, in anticipation of significant hemodynamic shifts. This level of preparation was due to concern for an undiagnosed pheochromocytoma accompanying the aldosteronoma. Ultimately, the left adrenal gland was extracted via laparoscopy without incident. Discussion: This case proved to be a valuable learning experience regarding the safe and practical treatment, and Anesthetic management of a patient with a hormone secreting adrenal mass.

A6: Sun Mei Liu

Advisor(s):Ming Zhang

Targeting Complement C3 to Inhibit Heart Ischemia/Reperfusion Injury

Ischemic injury to the heart during myocardial surgery, can occur and cause extensive tissue damage. It has been proven that complement C5 inhibition can limit inflammation. However, a recent study showed that mice who were deficient in C3 had significantly decreased myocardial necrosis as compared to wild types, implying that C3 is a crucial factor in myocardial ischemic injury. I hypothesize that specifically targeting C3 activation with novel antagonists may limit ischemia/reperfusion complement activation, abrogate post-ischemia inflammation, and improve outcome. Using a novel in vivo fluorescent tracking approach for necrotic cell death, studies of cardiac ischemia/reperfusion (I/R) injury in a mouse model showed that myocardial necrosis was significantly decreased in mice genetically deficient in complement C3 (C3^{-/-}) compared with WT mice. Furthermore, we attempt to identify inhibitory peptides for use in animal IR models. We screened a phage display library (New England BioLabs, Inc., MA) with human C3 as well as murine C3. After three runs of positive selections of both human and mouse C3, we have obtained 18 phage clones. Screened phages from each round were tittered and amplified for DNA sequencing. A competitive immunoassay is used to compare the C3-binding specificities of the phage clones. The study will provide a new platform for reducing the inflammation-induced tissue injury associated with cardiac surgery. The implications of successfully identifying effective C3 antagonists extend beyond clinical situations of heart ischemia, since C3-dependent complement activation contributes to various human diseases, including C3 nephropathies, age related macular degeneration and hemolytic uremic syndrome.

A7: Serphie Laguerre and Terry-Ann Lawrence

Advisor(s):Mary Valmont

Medical Informatics: Female Adolescents and Their Use of Technology for Health Related Purposes

Background: / Medical Informatics is the intersection of information science, computer science, and health care. It deals with the resources, devices, and methods required in optimizing the acquisition, storage, retrieval, and use of information in health and biomedicine. **Objective:** / The purpose of this research is to investigate how female adolescents ages 14 to 17 use their mobile devices for health-related purposes. Our study will focus on the usability of smartphones among adolescent females to see if a larger data plan ($\leq 8\text{GB}$ or $> 8\text{GB}$) would provide easier access to a health intervention apps (e.g., treatment, preventive care, test) designed to improve a particular health issue or problem. **Methodology:** / A survey was distributed to the attendees of Health Science Academy's Health Career Opportunity Program (HCOP). The population size was 49 adolescent females, ages 14 to 17. Chi square analysis was performed on the data to determine the association of utilization vs. data plan size. In addition chi square tests were also conducted for utilization vs. usefulness of apps and usefulness vs. knowledge that abusing alcohol/drugs is a risk factor for STIs. **Results:** / We found a non-statistical significance between the size of data plan and their usage of health apps ($p=0.878$). However, we found statistical significance between utilization of apps and usefulness of apps and usefulness of apps and knowledge of alcohol/drug abuse as a risk factor for STIs. **Conclusion:** / The results did not support our hypothesis. However, the significant associations that we obtained shows the importance of the usefulness of health apps in regards to health literacy. These findings can further inform the development of health apps targeting female adolescents.

A8: Haroun Aljalal and Tamelan Chauvet

Advisor(s):Mary Valmont

The Effect of HIV Interventions on Discussions of “Risky Sex” among African American Heterosexual Couples

Background: Human Immunodeficiency Virus (HIV) is a retrovirus that is prevalent throughout the world's population. HIV can be contracted through unprotected sexual activity or any blood to blood contact. HIV can lead to Acquired Immunodeficiency Syndrome (AIDS). AIDS can further lead to bacterial infections such as tuberculosis due to a suppressed immune system. Educating the public on HIV/AIDS helps increase awareness about the method and risks of the virus. **Objective:** To identify the effect of HIV interventions on discussions of “risky sex” among African American heterosexual couples / **Methods:** This study is part of the larger Barbershop Talk with Brothers (BTWB) project. The data was collected through recruitment in barbershops. Recruiters approached customers and asked them to take a screener to see if they were eligible to participate. Once eligible, the participants would take an Audio Computer Assisted Self Interview baseline survey. Then the participants were given an intervention. Then the same survey was given to the participants three and six months after the intervention. We performed McNemar test and chi square analysis to see the significance of the intervention and the discussion of “risky sex” among African American Heterosexual couples. **Results:** After the intervention, more men said they would have safe sex after talking with their partners about “risky sex” ($p=.4\%$). However, a McNemar test showed that there is insufficient evidence to support that BTWB's HIV intervention is the major factor in the change. **Conclusion:** The results did not support our hypothesis that men who have discussions about “risky sex” are more likely to report having safe sex. However since HIV is a very prominent issue, it is important that awareness regarding the virus is made available in our communities.

A9: Megane Nacier and Fairuz Sharmila

Advisor(s):Mary Valmont

The Effect of Lack of Sleep on End Stage Renal Disease (ESRD) Symptoms in Afro-Caribbean Adults on Hemodialysis

Background: / End Stage Renal Disease (ESRD) is the final stage of untreated Chronic Kidney Disease. This disease arises when one's kidneys can no longer filter blood leading to a build-up of fluid and toxins in the body. This can cause nausea, loss of appetite, fatigue, weakness and a decreased output of urine. Patients with ESRD undergo dialysis, a clinical purification of blood, since their kidneys aren't functioning properly. Objective: / The purpose of this study is to examine if lack of sleep will effect ESRD symptoms for patients on hemodialysis. Methodology: / This study, conducted by Dr. Cukor, consisted of 60 Afro-Caribbean ESRD patients, ages 18 and above. A survey was given to the participants where they were asked questions regarding how well they are maintaining their strict diet, how well they were able to sleep, and what symptoms they experience. The results were analyzed using chi square. Results / We found statistical significance between staying awake during the day and nausea ($p=0.011$), muscle soreness ($p=0.033$), shortness of breath ($p=0.004$), and faintness/dizziness ($p=0.005$). There was also statistical significance between the amount of sleep and appetite ($p=0.009$) and trouble falling asleep and nausea ($p=0.008$). Conclusion / Our hypothesis was supported because there was a relationship between self-reported amount of sleep in hemodialysis patients and appetite. /

A10: Moridiyat Kalejaiye and Na-Imah Taylor

Advisor(s):Mary Valmont

The Effects of Medication Adherence on Exhaled Nitric Oxide Levels in Afro-Caribbean Children in the Flatbush Area

Background: Asthma is a chronic inflammatory condition that obstructs the airways. This obstruction causes an increase in the deposit of nitric oxide. Nitric oxide (NO) is a gas that is released by the body to the lungs to fight inflammation in the lungs. Asthma is a prominent pediatric disease in minority communities. / Objective: This study seeks to determine if asthma medication adherence affects the levels of exhaled NO in the lungs. / Methods: The sample included African American/Afro-Caribbean children ages 5 to 18. First, background information regarding their date of birth and medications were taken. Two surveys were then conducted. One measured the patient's adherence to their asthma medication regimen and the other measured how well the patient's asthma is being controlled. After the surveys were completed, the patient was given the Niox exam using the Niox machine to find the NO levels in their lungs. This allowed us to determine the how inflamed the patient's airways are. / Results: There was a statistically significant association between the Adherence Estimator score and the levels of FeNO ($\chi^2=15.35$, $p=.004$). When comparing normal FeNO levels to the low levels ($\chi^2=7.84$, $p=0.02$) and high levels of FeNO ($\chi^2=14.71$, $p=.001$) compared to all the other levels. There was no statistically significant association between the Asthma Control Test and FeNO level ($p = .492$). / Conclusion: Our hypothesis was partially supported, the adherence estimator was lower when there were normal and higher levels of FeNO; However lower levels of FeNO did not show higher adherence.

A11: Jada Bedeau, Ashley Layne, Avani Saggi

Advisor(s): Mary Valmont

Probiotics Role in Influencing Albumin and Hemoglobin Levels in End Stage Renal Disease (ESRD) Patients

Background: End Stage Renal Disease (ESRD) is the last stage of Chronic Kidney Disease (CKD) where the kidneys do not function well enough for one to sustain a proper lifestyle. In the United States, the most common causes of ESRD are diabetes and high blood pressure. Patients with ESRD tend to urinate much less than normal and consequently, toxins are stored in their body. This is a major issue since the purpose of the kidneys is to filter out toxins and excess water from the body. Therefore, the only way to treat ESRD is to get a kidney transplant or undergo hemodialysis. Objective: To determine if probiotics influenced albumin and hemoglobin levels in ESRD patients. Methodology: This study, conducted by Dr. Saggi, consisted of 17 hemodialysis patients, ages 18 and above at the Parkside Dialysis Center. This study was conducted in a span of 6 months and the participants were involved in a double blind crossover study, utilizing probiotics and placebos. A blood test was administered before and after to measure the albumin and hemoglobin levels in the patients. The test was conducted at baseline and after each phase. Using the data, we performed a paired-samples t-test to compare levels of albumin and hemoglobin in the blood after the ESRD patients consumed probiotics. Results: The analysis shows no statistical significance between albumin and hemoglobin level in ESRD patients and using probiotics (albumin $p=.067$ and hemoglobin $p=.562$) Conclusion: The results did not support the hypothesis. However further studies with a larger sample size may show different results.

A12: Roya Noorishad

Advisor(s):

Psychogenic Non-epileptic Seizures (PNES) in Borderline Personality Disorder: A Case Report

Personality disorders are, arguably, defined as an enduring pattern of behavior causing marked impairment in different areas of functioning such as cognition, interpersonal relationships, and impulsivity. Borderline Personality Disorder (BPD) is not an uncommon disorder (estimated to be 1.6% of the general population) presenting as a challenge both on inpatient psychiatric units and medical wards (where it is estimated to be 15-20% of inpatient settings). Patients frequently present with bizarre pharmacological regimen and somatic, in addition to, psychiatric complaints. Psychogenic non-epileptic seizures (PNES, formerly referred to as 'pseudoseizures') are disorders of movement, behavior, or sensation that do not have a neurological origin and are not associated with abnormal EEG recordings. They are frequently associated with comorbid psychiatric disorders and personality pathology, in particular, borderline personality disorder. Previous work has focused on differentiation of seizure disorder vs. PNES. Early neurology referral and Video EEG is the preferred modality for ruling out seizure disorder. Unfortunately, prolactin level measurements have proved to have limited diagnostic utility. The following case presents an example of an opportunity to deescalate antiepileptic drugs (AEDs) to avoid exacerbating the psychiatric symptoms of Borderline Personality Disorder as well as avoid the iatrogenic somatic and long term effects of AEDs. /

A13: Tarah Scanlon

Advisor(s):

Orders of Protection: Utility, legislation, and ongoing challenges

Educational objective: / Appreciate function of orders of protection in law enforcement, healthcare and social services / Examine legislation mandating uniform enforcement and interstate portability of orders of protection / Address limitations including utility of orders of protection and ongoing challenges with international comparison / Abstract text: / Orders of protection are civil or criminal legal instruments that aim to provide protection to a party from another based on the allegation that a family offense has been committed by the one or more parties. Family offenses are defined according to the nature of the parties involved and commonly include offenses when parties are/were related by blood, marriage, an intimate relationship, or have a dependent in common. Orders of protection may be considered viable options to reduce violence and trauma re-exposure. They may also increase access to law enforcement, healthcare, and social services for affected populations and help mitigate risk and improve safety. The federal government passed the Violence Against Women Act in 1994 and this was most recently reauthorized in 2013. This legislation requires that full faith and credit be given to valid orders of protection regardless of issuing jurisdiction, effectively tying together a previously patch-worked system of state protections. Questions regarding the implications of a Supreme Court ruling that challenged mandatory arrest clauses in the federal legislation are raised and highlight ongoing challenges. We review the utility of orders of protection and consider ongoing challenges to victim protection and risk mitigation. We draw an international comparison to further highlight options that may complement the use of orders of protection in the USA.

A14: Kamala Anumukonda

Advisor(s): Christopher Roman

Role of TFEB/TFE3 in Macrophage Autophagy

Autophagy is important for macrophage development and their immunological functions. First, monocytes must up-regulate autophagy in order to differentiate into macrophages. Once mature, macrophages also need autophagy for efficient phagocytosis of intracellular bacteria, antigen presentation via MHC II to CD4 T cells, host antiviral defense, antifungal responses and activation of defense against gram-negative bacteria via TLR signaling. / Recently, a transcription factor we study in the lab, TFEB, has been implicated by others in the regulation of genes involved in autophagy and lysosomal biogenesis. TFEB and its close relative TFE3 belong to the MiT family of transcription factors. They share sequence homology and DNA binding properties. / Given the importance of autophagy to macrophage function, I have been studying the role of TFEB in autophagy in macrophages. One in vitro approach is using transformed RAW 264.7 macrophages in which autophagy and lysosome biogenesis can be activated. A second one is using primary bone marrow (BM) derived macrophages in vitro from mice conditionally deficient in TFEB alone or both TFEB and TFE3 (dko). Using these mice, I studied macrophage differentiation by inducing sterile peritonitis. / My preliminary studies show that in RAW cells, TFEB abundance and nuclear localization is responsive to multiple immunological stimuli that activate autophagy such as pathogen associated molecules like LPS from E.coli, cytokines like IFN- γ involved in antiviral defense, and the mTOR inhibitor Rapamycin. In contrast, using BM cells from conditional TFEB null mice and dko mice, I show that TFEB and TFE3 are dispensable for differentiation of monocytes into macrophages both in vitro and in vivo. I would like to investigate if TFEB/TFE3 mediated autophagy is important in antimicrobial defense.

A15: Nandadevi Lahiri

Advisor(s):Christopher Roman

Regulation of CD4 T cells by MiT family of proteins

The MiT family of transcription factors consists of four members: TFE3, TFEB, MiTF and TFEC. TFE3 and TFEB have been shown to be involved in the control of two genes which are critical for CD4 T cell function: CD40L and FoxP3. CD40L is necessary for protective antibody responses and cellular immunity because it activates B cells and macrophages, respectively, via the receptor for CD40L, CD40. FoxP3 is necessary for the generation of regulatory CD4 T cells (Tregs), which have an essential role in suppressing autoreactive and other undesirable immune reactions. My research will focus on establishing a clearer picture of the physiological importance and regulation of CD40L and FoxP3 by TFE3 and TFEB. To this end, I will be studying T cell function, such as in models for CD40L-dependent cellular immunity, in mice that are deficient in TFE3, TFEB or both. In addition, I will be using mouse models for spontaneous mucosal inflammation to test the importance of TFE3-dependent FoxP3 expression, because Tregs are important for preventing this process. In complementary studies, I will be examining TFE3- and TFEB-dependent CD40L and FoxP3 expression in primary human and mouse naive CD4+ T cells to examine under what conditions TFE3 and TFEB are needed. I will also be comparing TFE3 and TFEB expression in a cohort of CD4+ T cells from healthy individuals and patients suffering from Systemic lupus Erythematosus (SLE), because CD40L expression is abnormal in this autoimmune disease. Through my work I hope to provide greater insight in to the cause of autoreactive disorders.

A16: Rui Yang Zhen

Advisor(s):Christopher Roman

The Role of TFE3 and TFEB in the development of germinal center in Autoimmune disease

Complementary interactions between specific cell-surface receptors expressed by cognate T and B lymphocytes is a central event of adaptive immunity essential for protective antibody production. Among these, the interaction between the co-stimulatory receptor CD40, expressed by B cells and its ligand, CD40L, expressed by TH cells, plays a pivotal role in the activation of B cells that respond to specific (cognate) microbial antigens via their B cell receptor (BCR). Because of the essential role CD40-CD40L pathway plays in this process, insufficient CD40L expression could lead to immune deficiency, however, excessive CD40L expression can also cause autoimmune disease, such as Systemic Lupus Erythematosus (SLE). Thus, knowledge that allows for better understanding of CD40L expression is critical for understanding the molecular mechanism behind these immunological diseases and to identify potential therapeutic strategies. It was discovered by our laboratory that the transcription factors TFE3 and TFEB, members of the MiT family of transcription factors, are critical activators of CD40L gene expression in CD4+ T cells. In addition, our laboratory created a line of transgenic mice engineered to have T cell-specific inactivation of these MiT transcription factors (TDN-transgenic). In this study, the importance of MiT dependent CD40L expression in autoimmunity was explored by evaluating the impact of the TDN-transgene on disease manifestations in mouse strain that is genetically predisposed to autoimmune disease. Furthermore, the immune competence of TDN-transgenic mice was tested through T-cell dependent antigenic challenge to evaluate immunoglobulin isotype responses. From my studies, I found that GC B cell production was reduced when CD40L expression in T cells is inhibited in the autoimmune prone strain. In addition, we showed certain IgG subtype response are impaired in T-cell specific TDN-transgenic mice.

A17: Kaveri Arora

Advisor(s):Edward Quadros

The CD320/TCbIR KO mouse: A model to study the effects of vitamin B12 deficiency

Vitamin B12 (Cobalamin, Cbl) deficiency causes megaloblastic anemia, neurologic as well as psychiatric disorders. Most of the health risks can be prevented by administration of Cbl. However, many of the neurologic deficits are not fully reversible at later stages. The metabolic basis for the demyelinating disorder and functional deficits is not known. Therefore, we propose to study a mouse model that could shed light on the molecular basis of the neurologic deficits seen in Cbl deficiency. / Cbl uptake in tissue cells is mediated by a membrane receptor (TCbIR/CD320) with high affinity for the transcobalamin (TC)-Cbl complex. We have generated a CD320 knockout mouse model that is not embryonic lethal and develops Cbl deficiency in the central nervous system (CNS). CD320 KO mice are able to maintain a progeny. This indicates that the transport of Cbl from mother to fetus happens through an unknown alternate pathway in these mice. Study of the alternate pathway could help us understand the process of Cbl transport to the fetus with TC/ TCbIR polymorphism / mutations or with other inborn errors of cellular Cbl metabolism. / Although these mice can receive Cbl during fetal development, they develop severe CNS Cbl deficiency by 3 months of age. Therefore, the CD320 KO mouse provides a model to study the effects Cbl deficiency in the CNS. We aim to investigate the impact of CD320 null mutation on peripheral and central nervous system at the molecular, cellular and structural levels. We would also explore the impact of Cbl deficiency on behavioral and cognitive functions. / This study provides an animal model that can inform us about the metabolic basis of Cbl deficiency leading to neurologic deficits. This could lead to new approaches for the prevention and treatment of neurologic disorders due to Cbl deficiency.

A18: Alaa Sirwi

Advisor(s):M. Mahmood Hussain

The Role of Microsomal Triglyceride Transfer Protein in the Brain

The percentage of lipids in the brain is the highest among organs yet very little is known about lipid metabolism within the central nervous system. Microsomal triglyceride transfer protein (MTP) is an essential chaperone for the biosynthesis of apolipoprotein-B containing lipoproteins. Besides its predominant expression in the liver and intestine, MTP is also expressed in the brain but its function is unknown. To decipher its role, we first identified regions where MTP is expressed. MTP activity was the highest in the hypothalamus and cortex. Further, primary astrocytes and cortical neurons had measurable MTP activity and mRNA levels indicating that both major brain cell types express MTP. Since brain does not synthesize apoB, we looked for synthesis of other apolipoproteins. Consistent with published studies, we observed that cultured primary astrocytes secreted apoE and apoA1, but cortical neurons and neuronal cell line SH-SY5Y did not. We will test the hypothesis that MTP plays a role in the secretion of apoE and apoAI-containing lipoproteins by astrocytes. To find out its function in brain, we injected MTP inhibitor into the ventricles via stereotaxic microinjection. After 24 hours, there were significant decreases in plasma lipids as well as in hepatic and intestinal MTP activity. Furthermore, there were significant increases in hepatic lipids. We hypothesize that neuronal MTP regulates peripheral MTP activity to modulate systemic lipid metabolism.

A19: Olipriya Das

Advisor(s):Richard Kollmar

The Role of the C1q Domain of Zebrafish Otolin 1a in Otolith Morphogenesis

Otolins are constituent proteins of vertebrate otoliths and otoconia, acellular biominerals that are essential for detecting linear accelerations in the inner ear. Based on their sequence similarity to the atypical collagens VIII and X, the otolin peptides are predicted to comprise an N-terminal signal sequence, an internal collagen domain, and a C-terminal C1q domain. C1q domains have been shown to trimerize on their own as well as direct the trimerization of larger proteins. In the case of collagen VIII and X, the protein trimers then form a three-dimensional matrix, with the C1q and collagen domains as the hubs and spokes, respectively. By analogy, we propose that the C1q domain of otolins directs the assembly of protein trimers that are required to form the extracellular matrix of otoliths and otoconia. We will test whether the C1q domain confers trimerization on proteins that normally exist as monomers i.e investigate whether a fusion of the Otolin 1a C1q domain with thioredoxin (TrxC1q) also trimerizes. The zebrafish Otolin1a C1q domain was expressed in bacteria fused to thioredoxin. / Multimerization of purified recombinant fusion proteins was assessed by size-exclusion chromatography and gel electrophoresis. Under denaturing conditions, the recombinant fusion proteins formed monomers and trimers, but not dimers or higher- order complexes. Under native conditions, they formed only higher-order complexes. In contrast, thioredoxin alone only appeared as a monomer and a rare dimer. / Our results are consistent with the proposed ability of the Otolin C1q domain to form trimers that, in turn, assemble into higher-order complexes. Experiments are underway to characterize the various complexes in more detail and to test whether the C1q domain is necessary to trimerize of full-length Otolin1a. /

A20: Robert Colbourn

Advisor(s):Sabina Hrabetova

Changes in the Volume of the Brain's Extracellular Space during Epileptic Activity

Epilepsy's pathophysiology is characterized by an imbalance between tonic excitatory and inhibitory activity of neurons that leads to hyper-excitability. This understanding of the disease led to the development of drugs that quell hyper-excitement by affecting neurotransmitter and ion channel activity. Here, we investigate another aspect of epilepsy's pathophysiology: that of the role of changes in the volume of the extracellular space (ECS). Previously, it has been shown through light-scattering experiments on brain slices that a shrinking of the ECS occurs prior to the onset of seizure activity. We investigated this further by washing on tetramethylammonium (TMA, 0.5 mM), a cation that cell membranes are impermeable to, and measuring its concentration with TMA-selective microelectrodes in the neocortex of brain slices bathed in 4-aminopyridine (4AP, 100 μ M), a K⁺ channel blocker that induces seizures. Doing this, we were able to detect a rapid rise and fall of TMA's concentration concurrent with the ictal activity, indicating shrinking and swelling of the ECS. We continued to investigate this phenomenon by using two drugs: the diuretic, Furosemide, and the gliotoxin, DL-aminoadipic acid. These drugs blocked both the electrical activity of the seizure and the TMA concentration changes, hinting that both water movement and astrocytes play a role in the maintenance of a seizure. Because K⁺ movement can influence volume changes in the ECS, we measured K⁺ concentrations using K⁺-selective microelectrodes during 4AP application and saw a similar fluctuation in its concentration during the epileptic activity. If these changes are confirmed as the result of water movement, it would have high impact on the management of epilepsy: first on its treatment, potentially opening a new class of drugs to be used, and secondly on its diagnosis, by introducing a detectable phenomenon aside from electrical activity.

A21: Jiddu Guart

Advisor(s):Sabina Hrabetova and Robert Colbourn

Adrenergic Activation Modulates Extracellular Diffusion of Macromolecules in Mouse Visual Cortex

Brain extracellular space (ECS), the narrow channels separating cells, is essential for the distribution of neurotransmitters, nutrients, and therapeutics. Due to a lack of active transport, diffusion is the primary mode of molecule transport in the ECS. Hindrance to macromolecules (e.g., dextran, 3 kD) diffusing in brain ECS is quantified as tortuosity (λ -dex). Research from our lab has shown that λ -dex increased during adrenergic system activation, both with isoprenaline (β agonist), and a mix of phenylephrine & clonidine ($\alpha 1 + \alpha 2$ agonists). Here we asked two questions: 1) whether coactivation of $\alpha 1$, $\alpha 2$ and β will increase λ -dex in an additive fashion, and 2) whether activation of $\alpha 1$ alone, but not $\alpha 2$, will increase λ -dex, due to $\alpha 1$'s stimulatory action and $\alpha 2$'s inhibitory action of their respective signal transduction pathways. Integrative Optical Imaging (IOI), a method involving the pressure injection of fluorescently labeled dextran into male & female mice visual cortex, was used to quantify λ -dex. Under control conditions, no significant difference in λ -dex between males (1.68 ± 0.19 , mean \pm SD, n (records) =15, N (mice) =7) and females (1.75 ± 0.23 , n=11, N=5; t-test, p=0.36) was measured. Applying a mix of $\alpha 1$, $\alpha 2$, and β agonists resulted in λ -dex = 2.00 (n=3, N=1). Applying $\alpha 1$ agonist by itself resulted in λ -dex = 2.30 (n=3, N=1). Data on the adrenergic agonists are preliminary, and future experiments will gather more data, including the possibility of an inhibitory effect of $\alpha 2$ implied by $\alpha 1$ (λ -dex = 2.30) > $\alpha 1 + \alpha 2$ (λ -dex = 1.81). We found that hindrance to macromolecules significantly increased during activation of adrenergic system. Since the adrenergic system is known to be more active in the wake state than sleep state, our findings have implications in macromolecular diffusion and drug delivery in these two respective states.

A22: Inamul Kabir

Advisor(s):Xian-Cheng Jiang

Small intestine but not liver lysophosphatidylcholine acyltransferase 3 (Lpcat3) deficiency has a dominant effect on plasma lipid metabolism

Lysophosphatidylcholine acyltransferase 3 (Lpcat3) is involved in phosphatidylcholine (PC) remodeling in the small intestine and liver. The respective contribution of small intestine and liver Lpcat3 to plasma lipid levels remains unknown. We investigated lipid metabolism in inducible intestine-specific and liver-specific Lpcat3 gene knockout mice. We produced Lpcat3- Flox/Villin-Cre-ERT2 mice which were treated with tamoxifen (at day 1, 3, 5, and 7) to delete Lpcat3 specifically in the small intestine. At day 9 after the treatment, we found that Lpcat3 deficiency in enterocytes significantly reduced polyunsaturated PCs in the enterocyte plasma membrane and reduced Niemann-Pick C1-like 1 (NPC1L1), CD36, ATP-binding cassette transporter 1 (ABCA1), and ABCG8 levels on the membrane, thus significantly reduced lipid absorption, cholesterol secretion through apoB-dependent and apoB-independent pathways, and plasma triglyceride, cholesterol, and phospholipid levels, as well as body weight. Moreover, Lpcat3 deficiency did not cause significant lipid accumulation in the small intestine. We also utilized adeno-associated virus (AAV)-Cre to deplete Lpcat3 in the liver. We found that the liver deficiency only reduces plasma triglyceride but not other lipid levels. Furthermore, there was no significant lipid accumulation in the liver. Importantly, small intestine Lpcat3 deficiency has much bigger effect on plasma lipid levels than that of the liver deficiency. Thus, inhibition of small intestine Lpcat3 might constitute a novel therapeutic approach for treating hyperlipidemia. Kabir et., al, Journal of Biological Chemistry, 2016

A23: Sara Irani

Advisor(s):M. Mahmood Hussain

MicroRNA-30c mimic attenuates hypercholesterolemia and atherosclerosis in mice

Background: High plasma cholesterol levels are a major risk factor for atherosclerosis. Plasma cholesterol can be reduced by inhibiting lipoprotein production; however, this is associated with steatosis. Previously we showed that lentiviral mediated hepatic expression of microRNA-30c (miR-30c) reduced hyperlipidemia and atherosclerosis in mice without causing hepatosteatosis. Since viral therapy would be formidable, we tested the hypothesis that a miR-30c mimic can mitigate hyperlipidemia and atherosclerosis without inducing steatosis. / Methods and results: Delivery of a miR-30c mimic to the liver diminished diet-induced hypercholesterolemia in C57BL/6J wild type mice. Reductions in plasma cholesterol levels were significantly correlated with increases in hepatic miR-30c levels. Long term dose escalation studies showed that miR-30c mimic causes sustained reductions in plasma cholesterol with no obvious side effects. Further, miR-30c mimic significantly reduced hypercholesterolemia and atherosclerosis in Apoe^{-/-} mice. Mechanistic studies showed that miR-30c mimic had no effect on LDL clearance but reduced lipoprotein production. MiR-30c had no effect on fatty acid oxidation but reduced fatty acid and triglyceride syntheses. Whole transcriptome analysis revealed that miR-30c mimic significantly down-regulated hepatic lipid synthesis pathways. Additionally, miR-30c reduced cytokine production by reducing IKK α expression in macrophages. / Conclusions: miR-30c lowers plasma cholesterol by reducing MTP expression and lipoprotein production and avoids steatosis by diminishing lipid syntheses. It mitigates atherosclerosis most likely by reducing lipoprotein production by hepatocytes and cytokine productions by macrophages. These findings establish the potential utility of increasing hepatic miR-30c levels as a viable treatment modality for hypercholesterolemia and atherosclerosis. /

A24: Liye Zhou

Advisor(s):M. Mahmood Hussain

MiR-1200 Differentially Modulates Plasma LDL and HDL-cholesterol Levels to Reduce Hyperlipidemia and Atherosclerosis in Mice

High LDL and low HDL are risk factors for heart disease. Drugs that can lower LDL and increase HDL might be ideal for the treatment of cardiovascular diseases. We performed a high throughput screening of human microRNA (miR) mimic library to identify miRs that regulate apoB (LDL scaffolding protein) and apoAI (major HDL protein) secretion in human hepatoma Huh-7 cells. MiR-1200 potently decreased apoB and increased apoAI secretion. We found that seed sequence of miR-1200 interacts with the 3'-untranslated region of apoB mRNA to enhance posttranscriptional degradation and reduce apoB secretion. In contrast, miR-1200 increased apoAI protein and mRNA levels by increasing transcription. Mechanistic studies revealed that miR-1200 reduced the expression of B-Cell Lymphoma 11B (BCL11B), a repressor of apoAI transcription, to increase apoAI expression. In vivo studies showed that overexpression of miR-1200 significantly reduced LDL-cholesterol and increased HDL-cholesterol levels without causing hepatic steatosis in Western diet fed C57B16J mice. Additionally, miR-1200 reduced atherosclerosis in Western diet fed Apoe^{-/-} mice. Physiologic studies showed that miR-1200 reduced VLDL production. Further, HDL from miR-1200 injected mice showed increased cholesterol efflux capacity from lipid loaded macrophages suggesting increases in functionally adept HDL. In short, we have identified a novel miR-1200 that reduces dyslipidemia by reducing apoB-containing lipoproteins and increasing functional HDL and suggest that it can be useful in treating hyperlipidemia and atherosclerosis.

A25: Priyank Patel

Advisor(s): Stacy Blain

Targeting the Brk:p27kip1:Cdk4 Axis in Breast Cancer

The oncogenic Cyclin D-cdk4 (DK4) complex has been a highly sought after therapeutic target since it is required for tumorigenesis and maintenance of most breast cancers. The DK4 complex enhances cell proliferation by phosphorylating and inactivating the G1-S cell cycle phase gate keeper Rb. We explored the clinical implications of a recently discovered mechanism to modulate the activity of the DK4 complex through p27kip1 and its activator, Breast tumor Related Kinase (Brk). p27kip1 assembles the complex, and depending on its phosphorylation state, modulates its activity. When phosphorylated on Y88/89 residues, p27kip1 vacates the ATP binding pocket of cdk4, permitting catalytic activation of the DK4 complex. We demonstrated that p27kip1 is phosphorylated by Brk in breast cancer cells and its phosphorylation (pY) status correlated with DK4 activity suggesting that pY could act as a biomarker for cdk4. We found a catalytically inactive alternatively spliced variant of Brk, Alt Brk (ALT), which is endogenously expressed in breast cancer cells. ALT competitively binds to p27kip1; blocking pY, cdk4 and cdk2 activity. We showed that cdk2 compensates for the loss of cdk4 activity when treated with cdk4 inhibitor, Palbociclib (PD). Since ALT inhibits both cdk4 and cdk2, ALT-mediated arrest was more drug resistant. ALT synergized with PD to arrest the cell proliferation more durably and increased cellular senescence in vitro, and lead to reduction in tumor volume in vivo. In summary, p27kip1 pY may act as a prognostic marker by initially predicting cdk4 activity and patient's responsiveness to cdk4 inhibitors, and subsequently predicting drug resistance based on cdk2 activity. Blocking pY is a powerful approach to inhibit cell proliferation because it is the only approach that has achieved a long pursued goal in the field of targeted anti-cancer therapeutics: specific inhibition both, cdk4 and cdk2.

A26: Sonam Verma

Advisor(s): Joan Cracco and Ivan Hand

An uncommon presentation of a common microdeletion syndrome: Microcephaly with Phrenic neuropathy in a patient with 22q11 deletion syndrome

Background: Digeorge syndrome or 22q11.2 deletion syndrome is the most common microdeletion disorder where majority of individuals have the common 3Mb or a proximal 1.5Mb deletion. However, a subset of individuals harbor “distal deletions” which are located outside and distally to the common 3Mb deletion, and give rise to atypical presentation. The 22q chromosome is rich in low copy repeats (LCRs) which mediate non-allelic homologous recombinations and give rise to deletions and duplications of varying sizes depending on which LCRs are involved. A typical 3Mb deletion extends from LCR A - D (A being the most proximal). / Methods: A newborn baby with dysmorphic features, microcephaly, persistent hypotonia, elevation of right hemi-diaphragm who became ventilator dependent in the NICU was evaluated. On neurological evaluation, significant hypotonia could not be explained by any intrauterine/perinatal factors. Genetic testing via array comparative genomic hybridization (CGH) was followed by confirmation by FISH. Parental DNA was also analyzed for similar aberration using array CGH. EMG/NCS was performed for clinical suspicion of peripheral etiology of hypotonia and to evaluate the phrenic nerve. / Results: Array CGH identified a pathogenic 846.0 kb deletion on chromosome 22q11.21 between LCR blocks LCR22-B and LCR22-D, encompassing 3 known mendelian genes - SNAP29, SERPIND1, SCARF2. This deletion was found to be paternally inherited. EMG/NCS revealed demyelinating neuropathy involving the phrenic nerve. / Conclusion: This atypical microdeletion is likely to be causally associated with the proband's congenital anomalies. Mutation in SNAP29 gene has been associated with cerebral dysgenesis and neuropathy, but to our knowledge, involvement of phrenic nerve has not been previously reported. Interestingly, since this atypical deletion is inherited from an apparently healthy parent, it can be concluded that this deletion may have reduced penetrance and/or variable expressivity. /

A27: Marika Tanaka and Nancy Kline

Advisor(s):

Current Use of Cognitive Assessment in Occupational Therapy Practice

Occupational therapists use cognitive assessments to guide treatment, help families and patients make decisions about living and working environments, and to assess outcomes of interventions. An occupational therapist must consider the theoretical basis, specific purpose for measurement, clinical utility, reliability and validity of the assessment chosen. There are currently over 90 standardized cognitive assessments used by occupational therapists. The purpose of this study was to delineate which cognitive assessments were most commonly used by occupational therapists in the United States working with adult clients in the physical disability, mental health, and geriatric settings. In addition, this study was designed to understand the reasons occupational therapists choose specific assessments that they most frequently use with clients. We will present the current use of standardized, non-standardized, occupational based, performance based assessments, and the clinical reasoning behind the top ten standardized cognitive assessment use. We adapted an online survey from the Survey of Cognitive Assessments Used by Canadian Occupational Therapists by Alison Douglas (2007) to reach out to licensed occupational therapists. Data was collected from 205 responses, of which 115 were accepted based on a minimal criteria of demographic data and information on at least one cognitive assessment. Findings of our study identify the top three assessments used as the Montreal Cognitive Assessment (MOCA), Allen Cognitive Level Screen, and Mini Mental State Examination (MMSE). The results of this study suggest that currently, standardized assessments are not being used in a standardized method across the country. There is a significant number of clinicians using non-standardized assessments. It is recommended that standardized assessments be used to address the needs of the clients and strengthen evidence based practice.

A28: Hannah Koelbl

Advisor(s):Beth Elenko and Alisha M.Ohl

Occupational Therapists' Perceptions of STEPS-K: A Response to Intervention Program

This qualitative research study explored the experiences of occupational therapists who used The Specialized Teaching and Enhancement of Performance Skills for Kindergarteners (STEPS-K), program. STEPS-K is a 10- week Tier 1 Response to Intervention (RtI) program developed by two OTs in collaboration with general education kindergarten teachers to improve fine motor and visual-motor skills of general education kindergarten students early in the school year. The outcomes of a pilot study by Ohl et al (2013) demonstrated that STEPS-K has a statistically significant impact on fine motor skill improvement, thus supporting the efficacy of the program. The study also revealed that collaboration between OTs and teachers took place during the classroom lessons and continued consultations (Ohl et al, 2013); nevertheless, the study did not include any qualitative data regarding the experiences of OTs who used the program. / The purpose of the current study was to investigate how OTs regarded the STEPS-K RtI program in the general education classroom, focusing on OTs across the nation who had implemented the STEPS-K program in their school system. Narrative data were collected in the form of interviews with six occupational therapists who had used the program. Analysis of interviews revealed the primary theme of knowledge exchange as illustrated through three sub-themes: (1) “So I think the conversation is really important for both perspectives” (2) Camaraderie (3) Creating the best fit. Results provided evidence that STEPS-K facilitated knowledge exchange and enhanced collaboration between teachers and occupational therapist, and could be tailored to meet the needs of the classroom.

A29: Sheryl Zang and Veronica Arikian

Advisor(s):

A Comparative Study of the Efficacy of Multiple Daily Injections (MDI's) and Insulin Pump Therapy (CSII) in Adolescents in an Urban Setting

Recommendations from the Diabetes Control and Complication Trial (DCCT, 2005), indicate that adolescents with Type 1 diabetes should be treated with multiple daily insulin injections or insulin pump therapy to obtain glycemic control and prevent complications. Studies show that insulin pump therapy in the adolescent population improves glycemic control. What is unknown is the outcome when insulin delivery methods change from multiple daily injections (MDI) to pump therapy. The study will examine adolescents (ages 13-17) in the outpatient clinic setting. Several adolescents had been switched from MDI's to pump therapy, but there has been no evaluation to determine which treatment regimen more favorably affects clinical outcomes. / What is the effect on glycemic levels when adolescents are switched from multiple daily injections (MDI's) to pump therapy? Medical records of 60 adolescents (13-17) will comprise a convenience sample of those switched from MDIs to pump therapy. The HbA1c's during MDI use for one full year prior to using the pump, and during initial year of pump therapy will be recorded to capture four data points per year of MDI therapy and four data points of pump therapy. Outcomes will be evaluated by comparing HbA1c levels. Demographic information includes: gender, age, year in school, type of insurance, and place of birth. Paired t-tests will compare the difference in HbA1c values during MDI therapy with the values during insulin pump therapy. Confidence intervals will provide information about the precision of estimated differences. These data will be analyzed and the hypothesis tested at the 0.05 level of significance. The outcomes of MDI and pump therapy will then be examined with regard to the age, gender, year in school and place of birth of each adolescent to determine if these demographic variables affect glycemic outcomes.

A30: Iryna Rukliatsova

Advisor(s):Laila Sedhom

Optimal Number of Preoperative Chlorhexidine Gluconate (CHG) Baths for Reducing the Rate of Postoperative Surgical Site Infections

Background and Purpose: SSIs are associated with increased morbidity, longer length of hospitalization, and higher cost of care. The CDC guideline for prevention of SSI states that the use of CHG reduces bacterial colony counts nine fold. However, a review of the literature revealed that there is no clear evidence of the number of baths needed for the optimal minimization of infection risk. Therefore, the purpose of this EBP is to determine the optimal number of preoperative chlorhexidine gluconate (CHG) baths for reduction of post-operative surgical site infections. / Research Question: Is there a relationship between the number of preoperative CHG Baths and the incidence of post-operative surgical site infections? / Research Evidence: Review of literature revealed that there is a reduction in surgical site infection rates after only one CHG bath. However, current practice is to perform three to five CHG baths/showers prior to surgery. / Methods: A quasi-experimental design will be used. After obtaining IRB approval, a convenient sample of 120 patients undergoing surgery will be divided into two experimental groups and one control group. One experimental group will receive one preoperative CHG bath, and another will receive two, one the night before and the other the day of surgery. A control group will continue with the existing protocol of receiving CHG bath every day of hospital stay prior to surgery. Signs of post-operative infection will be assessed. / Implications: To establish a protocol to improve patients' outcomes, eliminate unnecessary work for nursing staff and lower expenses related to the cost of the CHG solution.

A31: Didier Juste

Advisor(s):Shirley Girourard

Management of airways in the prone position during surgical procedures

Objective: Compare Laryngeal Mask Airway (LMA) to endotracheal intubation (ETT) for surgical procedures requiring prone positioning. Lit Review: LMA in prone position under general anesthesia is adequate for ventilation, perfusion and airway maintenance. LMA decreases patient anxiety, increases comfort, decreases OR turnover time, and decreased staff time. LMA is an acceptable alternative to ETT for select patients due to high first attempt success rates and relative ease of re-insertion. Successful LMA placement exceeds that of ETT. Volatile agent dosage may be less with LMA in prone positioned patients. Project design: Descriptive study comparing 20 patients undergoing elective surgery to be performed in prone position; 10 patients will have procedures done using LMA, and 10, using ETT. Implementation: The project will be done in collaboration with an established, anesthesia group. Following IRB approval, data will be collected in relation to status during the procedure using written records and observation and a post-op patient survey. Results: Procedure length; adverse outcomes; estimated cost of procedure (case length and drug use); and, patient experience will be reported. Recommendations: If the conclusions support LMA use in patients prone for surgery, results will be published and shared at appropriate meetings and to promote this as best practice.

A32: Elizabeth Joseph

Advisor(s):Shirley Girourard

Supportive Caring: The Key to Reducing COPD Readmissions

/ Objective: to examine the impact of supportive interventions following hospitalization for COPD on readmissions and emergency room (ER) use within 30 days after discharge and patient care experience. Literature Review: Repeated hospitalizations secondary to exacerbations of COPD can negatively affect quality of life, increase morbidity and mortality, reduce hospital reimbursements and increase total costs of healthcare. Negative outcomes can be prevented through discharge services that promote self-management. / / Project design: A descriptive study design will be used. Patients with moderate to severe COPD will be identified through the hospital admission database and recruited. Health status will be monitored during hospitalization and after discharge. Readmissions, emergency room visits and experience with care will be assessed. Implementation: A nurse will initiate supportive care during hospitalization. When the patient is ready to transition back into the community, home care supports and services will be arranged including weekly follow-up phone calls for 30 days. Results: 30 day readmissions and ER visits will be measured. HCAHPS and Press Ganey survey results will be used to evaluate patient care experience. Recommendations: Results will inform efforts to decrease COPD related exacerbations and specify interventions most likely to correlate with a reduction in readmissions and ER use as well as increase positive care experiences. /

A33: Kathryn Peck

Advisor(s): Shirley Girourard

Cutting the cord: The importance of delaying umbilical cord clamping

Objective: to delay umbilical cord clamping (DCC) so newborns receive advantages of enhanced hematologic status and increased iron stores. Literature Review: Early umbilical cord clamping prevents a neonate from receiving full blood volume by up to 30%. DCC is associated with higher hemoglobin and ferritin levels for up to six months with short and long term effects on rates of iron deficiency, anemia and neurodevelopment. All neonates, including preterm and those requiring resuscitation, can benefit from DCC. Despite current WHO evidenced-based recommendations, current practice is to clamp and cut the umbilical cord immediately following delivery. Project Design: A continuing education program, including current research and standards of practice will be provided for labor and delivery staff in urban hospitals. Implementation: Hospitals and birthing centers will be contacted re their interest in an hour-long program provided. Relevant literature, sample policies and procedures will be made available electronically and a summary abstract, as a handout. Results: A post-presentation paper survey will include the demographics of participants; self-reports of knowledge gained and anticipated changes in practice. Recommendations: If educational intervention is successful, as measured by self-reported changes in practice, this will be shared at professional meetings and conferences and publications. /

A34: Jin Chen

Advisor(s): Dennis Dimaculangan and Aditya V. Maheshwari

The Effects of Patient Controlled Epidural Analgesia vs. Periarticular Single Shot Injection vs. Continuous Periarticular Infiltration on Pain and Rehabilitation Outcomes Following Total Hip Arthroplasty

Introduction: Patients undergoing total hip arthroplasty (THA) experience moderate to severe pain during the early postoperative period. Postoperative pain is traditionally managed with intravenous patient controlled analgesia (IVPCA) with morphine or multimodal analgesia and patient controlled epidural analgesia (PCEA) with local anesthetic. Two new methods have been recently introduced for postoperative pain control after THA at SUNY Downstate. Purpose: This study aims to compare pain and rehabilitation outcomes of PCEA against the two other novel methods: periarticular single shot injection (SSI) with bupivacaine, ketorolac, epinephrine and morphine, and continuous periarticular infiltration (CPI) with ropivacaine delivered via an infusion device. Methods: Ninety patients were intended to be included in this randomized controlled trial. All patients received a multimodal pain control regimen in addition to the three methods. Patients were randomly assigned to one of three treatment groups: 1) PCEA, 2) SSI, and 3) CPI. Pain control was determined using daily opioid consumption via IVPCA and daily pain scores during rest and movement using the visual analog scale from 0 to 10; and rehabilitation outcomes were measured by daily distance walked during physical therapy. Results: Nineteen patients have been randomized to the three groups so far: 7 in the PCEA group, 3 in the SSI group, and 9 in the CPI group. Preliminary results show that the SSI group provides the lowest morphine consumption and the best rehabilitation outcomes in postoperative day 1 to 3. Conclusion: Preliminary data show that SSI provides the lowest morphine consumption and longest distance walked. Further data are needed to assess which postoperative pain control method provides the least opioid requirements, lowest pain scores, best ambulation outcomes, and least opioid side effects. /

A35: Elna Kochummen

Advisor(s):

Large Non-Functioning Adrenal Incidentaloma in an Adolescent: Is surgical removal the only option?

Background: / Adrenal incidentaloma (AI) is an adrenal mass discovered on imaging to evaluate a problem unrelated to adrenal disease. Incidence of AI with imaging approaches 8.7% [1]. Prevalence of pediatric AI is 0.2% [2]. Approach to AI is focused on distinguishing benign non-functioning mass, from malignant or functioning, which require surgery. Risk of malignancy in non-functioning AI is 1:1000 [3]. Guidelines suggest surgical resection for non-functioning AI > 4 cm due to increased risk of cancer [1]. A pediatric study on AI, revealed malignancy in 30% and increased frequency among the younger, and no significant difference in size or radiological characteristics between benign and malignant AI [4]. No preoperative tumor markers are available to distinguish benign from malignant AI, thus necessitating surgery to confirm. / Clinical Case: / An adolescent female was evaluated for a large AI noted on CT, performed for chronic back pain. Two years ago, she was a pedestrian hit by a vehicle on the right flank and no imaging was done then. Laboratory tests revealed a non-functioning AI. CT revealed an 8 cm regular bordered, avascular, hypoechogenic cystic mass arising from the right adrenal with punctate foci wall calcifications suggestive of a chronic adrenal hematoma versus pseudocyst. She was referred to surgery, meanwhile clinical follow up revealed that the back pain subsided with no intervention. / Conclusion: / Pediatric AI is rare and its management represents a challenge. We describe an adolescent with a large non-functioning AI which is either a pseudocyst or chronic hematoma. Clinical dilemma arises on whether surgical resection must be performed, or can we safely follow laboratory and radiological studies due to history of trauma, now asymptomatic and non-functional status, and benign radiological characteristics. Guidelines in pediatric AI management are necessary to determine if there is a subset of AI that can be safely observed without surgical resection

A36: Virteeka Sinha

Advisor(s):Jennifer Chao

Asthma in the ED

BACKGROUND: Asthma affects approximately 1 in 11 children in the United States. The National Asthma Education and Prevention Program (NAEPP) expert panel guidelines provide recommendations for how to diagnose and treat childhood asthma. Initiation of controller medications in the Emergency Department is recommended in children with persistent asthma of any severity by NAEPP. OBJECTIVE: The aim of the study is to establish the prevalence of persistent asthmatics visiting an urban city hospital and the prescribing rates of controller medications in these patients. METHODS: A prospective cross sectional study was conducted in the pediatric ED over a one year period. Subjects were interviewed about their asthma symptoms using a Mini Pediatric Asthma Control Tool (MPACT). The final part of the questionnaire included disposition decision and rate of initiation or step up of controller medications. Asthma severity was assessed directly by patient/ parent interview and not from chart review. RESULTS: The baseline prevalence for asthma in the ED was 65% {95% CI: 0.65-0.75}. The proportion of patients previously on controller medications was 33%. The rate of initiation of controller medications in all poorly controlled asthmatics was 18.8% {95 % CI: 0.14-0.24}. Step up of current medications in poorly controlled asthmatics was achieved in 11.4% {95 % CI: 0.07-0.15}. 61.25% {95 % CI: 0.56-0.66} patients were given some form of education regarding their current medication use. CONCLUSIONS: The study results are consistent with the national prevalence rates for asthma. We found that the rate for prescribing controllers in the ED has significantly increased compared to older studies(18% VS 2% in previous studies) Use of MPACT in the ED may be a quick way to assess patient severity and initiate controller medications in the ED.

A37: Lorenzo Paladino

Advisor(s):Rich Sinert

Diagnosing Nephrolithiasis via Emergency Ultrasonography and Urinalysis

BACKGROUND: Nephrolithiasis is a common emergency department presentation. The current gold standard of diagnosis is either computed tomography scan (CT) or intravenous pyelography (IVP). The diagnostic accuracy of emergency physician performed ultrasound (EUS) and urinalysis has not been quantitatively described. **OBJECTIVES:** This is a systematic review to determine the utility of emergency ultrasound and urinalysis in diagnosing nephrolithiasis. **METHODS:** PUBMED and EMBASE databases were searched from 1965 to February 2015 using the following PICO format: patients were adult ED patients greater than 18 years of age suspected of having urolithiasis or nephrolithiasis. Interventions were urinalysis (dipstick or microscopic) for the presence of hematuria and EUS for the detection of hydronephrosis. The comparator was abdominal CT, IVP, or stone passed/surgically removed. **Outcome:** The operating characteristics of urinalysis and EUS for the detection of radiographically or surgically confirmed kidney stone. **RESULTS:** Eight studies were included for EUS with a pooled sensitivity of 80.1% (95% CI 77.5 – 82.5) and specificity of 64.5% (95% CI 61.8 - 67.2). They had a positive likelihood ratio of 2.92 (95% CI 2.12 - 4.03) and a negative likelihood ratio of 0.26 (95% CI 0.19 - 0.36) (see Abram table 1). Three studies were included for dipstick urinalysis with a pooled sensitivity 88.5% (95% CI 83 – 92.8) and specificity of 34.7% (95% CI 27.6 – 42.3). They had a positive likelihood ratio of 1.35 (95% CI 1.20 - 1.53) and a negative likelihood ratio of 0.26 (95% CI 0.08 - 0.85). Ten studies were included for microscopic urinalysis at varying diagnostic thresholds of red blood cells per high powered field, with varying results (see Abram table 3). **CONCLUSIONS:** EUS plus urinalysis can satisfactorily rule in or rule out urolithiasis obviating the need for CT. EUS can also be utilized to investigate more serious pathology in the differential of such symptoms.

A38: Lee Grodin

Advisor(s):Richard Sinert

COMPEL Study – COMPARISON of Antibigrams for Urinary Tract Infections Between Hospital-wide and Emergency Department-Specific Sampling

Background: ED physicians' empiric choice of antibiotics for Urinary Tract Infections (UTIs) before either discharge from or admission to the hospital is largely based on hospital-wide antibiograms, which report local antibiotic susceptibility patterns. Comingling of in- and ED patients in the same hospital-wide antibiogram potentially skews susceptibility patterns. **Objective:** We tested the null hypothesis that there would be no significant differences in antibiotic susceptibility of urinary Escherichia Coli (E.Coli) isolates sampled from ED and inpatients (hospital-wide) compared to inpatients (alone) and discharged ED patients (alone). **Methods:** A cross-sectional study in a tertiary care center with 75,000 annual ED visits. Published hospital-wide antibiogram often are organized by individual bacteria irrespective of culture site or sampling location (ED vs. inpatient). To produce a hospital-wide antibiogram representative of only E.Coli UTI's, we obtained electronic medical records of all E.Coli isolates exclusively from urine specimens and recorded antibiotic susceptibility patterns from a random sample of ED and inpatients. Data will be presented as medians with interquartile ranges (IQR) (25%,75%), or frequencies (%) with 95% confidence intervals (95%, CI). Group comparisons by Fisher's Exact test, alpha = 0.05, 2-tails. Estimated sample size required 143 isolates per group to detect a 10% difference in antibiotic susceptibility alpha = 0.05, power = 80%. **Results:** We reviewed 424 E.Coli urine culture isolates (ED n= 256) and (inpatients n=168) from patients with a median age 52 years (IRQ, 30.1, 72.3), 77% Female. Table #1, shows statistically significant differences in E.Coli susceptibility for multiple antibiotics between hospital-wide and both ED and inpatient samples. No significant differences in susceptibility between study groups for: Nitro, Tetra, or TMP/SMX. **Conclusions:** We found statistically significant

A39: Richard Sinert

Advisor(s):Richard Sinert

A Phase 3, Randomized, Double-Blind, Placebo-Controlled, Multicenter Clinical Study Evaluating the Safety and Efficacy of Icatibant for Angiotensin-Converting Enzyme Inhibitor-Induced Angioedema in Ad

Background: Upper aerodigestive tract angioedema is a rare, life-threatening complication of angiotensin-converting enzyme inhibitor (ACE-I) therapy with no accepted pharmacologic treatment. Icatibant, a bradykinin B2 receptor antagonist effective for hereditary angioedema, was recently shown to decrease ACE-I-induced angioedema in a phase 2 study. Objectives: To compare the efficacy and safety of icatibant with placebo in emergency patients with ACE-I-induced angioedema. Methods: This was a phase 3 randomized (1:1) double-blind trial of icatibant 30 mg vs placebo, as a single subcutaneous injection, in adults presenting with at least moderately severe angioedema of <12 hours duration (ClinicalTrials.gov NCT01919801). We excluded patients not on an ACE-I or imminent intubation, or urticaria or a family history of angioedema. The primary endpoint was Time to Meeting Discharge Criteria (TMDC) from study drug administration, assessed at least hourly by a physician, improving such that difficulty breathing and difficulty swallowing were deemed absent (severity=0 on a 0-4 scale) and voice change and tongue swelling were deemed mild/absent (0/1). The primary efficacy endpoint was tested using Kaplan-Meier curves. The estimated sample size was 118 patients $\alpha=0.05$, power $\geq 95\%$, assuming 15% of subjects unevaluable). Results: 121 patients were randomized at 31 sites. The median TMDC was 4.0 hours in both groups (Figure 1; $p=0.6$) with no difference on planned subgroup analyses (by age, sex, race, attack severity, geographic region, weight or body mass index). Of 118 treated patients, 65% of icatibant vs 31% of placebo patients had injection site reactions, none of which were severe. 45% of icatibant- vs 36% of placebo-treated patients had other, general adverse events, mostly mild/moderate (no deaths or treatment-related serious events). Conclusion: Icatibant offered no apparent benefit over placebo in the treatment of ACE-I-induced angioedema. No new safety signals were found. /

A40: Sathyaseelan Subramaniam

Advisor(s):Shahriar Zehtabchi

Operating Characteristics Of Point-Of-Care Ultrasound in Identifying Skin and Soft Tissue Abscesses in the Emergency Department

Background: Traditionally, ED physicians rely on their clinical exam (CE) to differentiate between cellulitis and abscess when evaluating skin and soft tissue infections (SSTI). Management of an abscess requires incision and drainage (I and D), whereas cellulitis requires a course of antibiotics. Misdiagnosis results in unnecessary I and D, sedations, or a return ED visit. Objectives: To measure the operating characteristics of point-of-care ultrasound (POCUS) compared to CE in identifying abscesses in ED patients with SSTI. Methods: We systematically searched the Medline, Web of Science, EMBASE, CINAHL and Cochrane Library databases from inception till July 2015. Trials comparing POCUS with CE to identify abscess when evaluating SSTI in the ED were included. Trials that included intraoral abscesses or abscess drainage in the operating room were excluded. Presence of an abscess was determined by pus drainage. Absence of an abscess was determined by no pus drainage on I and D, or resolution of SSTI without pus drainage at follow up. Quality of trials was assessed using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) criteria. Operating characteristics are reported as sensitivity, specificity, positive likelihood (LR+) and negative likelihood (LR-) ratios. Summary measures were calculated by generating a hierarchical summary receiver operating characteristic model (HSROC). Results: Of 3203 references identified, 6 observational studies (4 pediatric trials and 2 adult trials) with a total of 800 patients were included. We rated the quality of 4 trials as low and 2 as very low. Two trials compared CE to CE plus POCUS. The other 4 directly compared CE to POCUS. The POCUS HSROC revealed a sensitivity of 97% (95%CI 94-98%), specificity of 83% (95%CI 75-88%), LR+ of 5.5 (95%CI 3.7-8.2), and LR- of 0.04 (95%CI 0.02-0.08). Conclusion: Existing evidence indicates that POCUS is useful in identifying abscess in ED patients presenting with SSTI.

A41: Erin Andrews

Advisor(s):Michael Joseph

Is health insurance making us fat? : The Impact of Health Insurance Coverage on Overweight and Obesity in Young US Adults

Overweight and obesity are conditions of excess body weight that are risk factors for chronic cardiovascular diseases. Research shows that health insurance may provide prevent and reduce poor health outcomes, while U.S. policy addressed these health disparities with increased access to health care. The purpose of this analysis is to examine the relationship between health insurance coverage and overweight and obesity in young adults. Using the National Longitudinal Survey of Youth 1997 (NLSY97), two predictor groups were created: Insured (>6 years, n=1,466) and Underinsured (≤6 years, n=1518). A 1:2 nearest-neighbor matched sampling on propensity score with replacement was used to balance the predictor groups. Negative binomial regression analyses were used to estimate the risk of becoming overweight and obese in the matched groups and linear regression estimated the association between years of insurance coverage and body mass index. Results indicated marginal statistical significant associations between health insurance coverage and overweight (RR: 1.15, 95%CI: 0.99, 1.32) and obesity incidence (RR: 0.84, 95%CI: 0.71, 1.94). Also, for every year of health insurance, there was a 0.07 kg/m² increase in BMI (95% CI: 0.01,0.15). For every additional kg/m² in BMI as a teenager, there was a 10% increased risk (RR: 1.10, 95%CI: 1.07, 1.14) of being overweight as an adult and a 39% increased risk (RR: 1.39, 95%CI: 1.34, 1.45) of being obese as an adult. Moral hazard effect may lead people with health insurance to decrease healthy behaviors, but socioeconomic factors and health behaviors are likely the greatest predictors of excess weight.

A42: Asia Wynn

Advisor(s):Michael Joseph

Parental Influence on Adolescents' Ability to Resist Electronic Cigarettes

Author: / Asia Wynn Objective: / From 2013-2014 there was a 13.4% increase in e-cigarette usage among middle and high school students, affecting approximately 2 million children in the United States. An assessment of parental influence on Brooklyn teens' ability to resist the usage of electronic cigarettes was taken. Methods: / A 19-question survey targeted to adolescents ages 13-19 years was distributed over the summer of 2015 and completed by 200 teens in a sample frame of popular areas in Brooklyn, Kings Plaza Mall and Atlantic Terminal Mall yielding the most surveys. Results: / In comparison to teens who were not confident (56.1%), a greater percentage reported being confident in their ability to resist e-cigarettes and viewed their parent's opinion as important (71.0%), p = 0.003. A slightly greater percentage of teens reported not being confident in their ability to resist e-cigarettes and agreed that their parents lack the health knowledge to be able to address their questions concerning e-cigarettes (39.0%) versus teens who reported being confident (24.1%), p = 0.055. / Conclusion / Overall, educational programs regarding e-cigarettes need to be implemented within the school curriculum, which can lead to open and informative dialogue outside of the classroom, breaking the perception that "smoking is cool". It is also important to encourage and boost the confidence of the youth in making healthy lifestyle choices.

A43: Genesis Smith

Advisor(s):Michael Joseph

Gender Associated Perceptions and Attitudes Held By Flatbush Pedestrians Towards Extended Breastfeeding

Objective: Extended Breastfeeding is defined as breastfeeding a child beyond the age of one. Due to lack of knowledge, many people express negative attitudes and perceptions with regards to breastfeeding. We aim to assess perceptions and attitudes held by Flatbush pedestrians to determine if gender is associated with attitudes towards breastfeeding. Methods: The research population was sourced near community based organizations in the Flatbush area. There was no screening process for potential participants. A 30 statement survey was administered to 100 participants which consisted of 32% male and 68% female. Results: Initially, there were no significant differences between men and women when asked if breastfeeding a child beyond 1 is normal. However, when asked if it is acceptable for 1-2 year old children to be breastfed, 77.5% of those who disagreed were female (77.5% vs 22.5%, $p = 0.096$). This attitude is further shown regarding a child of age 3-4, where a greater percentage of men found it acceptable, in comparison to women (56.3% vs 43.8%, $p = 0.023$). Conclusion: The statistically significant differences between genders towards breastfeeding beyond the age of three are indicative of men being more in favor of extended breastfeeding than women amongst Flatbush pedestrians. Gender differences in attitudes towards extended breastfeeding calls for more dialogue and gender inclusive prenatal courses that are knowledge based to increase awareness of breastfeeding benefits. /

A44: Stephanie Myers

Advisor(s):Paul Landsbergis, Usha Govindarajulu, and Michael Joseph

Work Characteristics and Risk of Obesity: Preliminary Findings from the 2014 National NIOSH Quality of Work Life Study

Background: The adult obesity epidemic in the United States is a complex public health problem with many causal contributors, which may include working conditions. The Quality of Work Life (QWL) surveys were developed and conducted by the National Institute for Occupational Safety and Health (NIOSH) in 2002, 2006, 2010 and 2014 as part of the General Social Survey. This study examined psychosocial job stressors, work schedules and socioeconomic status in relation to risk of obesity using 2014 QWL data. / Methods: Eligibility criteria were participation in 2014 NIOSH QWL survey, English speaking, aged 18 years or older, and employed in civilian labor force for 20 or more hours per week. There were 1,420 QWL participants eligible for analysis. Associations between work characteristics and overweight/obesity categories (defined by CDC, 2015), adjusted for age, gender, race/ethnicity, education, marital status, and job physical exertion, were examined using multinomial logistic regression. / Results: After controlling for all potential confounders, night shift work (OR=2.22, 95% CI 1.09-4.55, $p=.03$) and “threatened or harassed on the job” (OR=1.67, 95% CI 1.01-2.79, $p=.048$) were associated with an increased risk of obesity. The obesity risk associated with blue-collar work was statistically significant (OR=2.60, 95% CI 1.06-6.36, $p=.04$), when not controlling for education. A suggestion of a substantial association was also observed for “perception of racial or ethnic discrimination at work”, (OR=2.47, 95% CI 0.85-7.18), however, the p-value was $p=.09$ due, in part, to the low prevalence of this stressor (3.8%). / Conclusion: Evidence was found for association of some psychosocial job stressors and work schedule characteristics and risk of obesity in a nationally representative sample of US workers. Thus, a comprehensive approach to addressing workplace risk factors for obesity could play an important role in reducing the prevalence of obesity in the US. /

A45: Marco Stillo

Advisor(s):Janet Rosenbaum

An Eye for an Eye: Carrying Weapons When Being Bullied; Evaluating the Association Between Bullying and Carrying Weapons Among a Nationally Representative Sample of Adolescents between 1993 and 2013

Background: / Bullying is recognized as a problem among pre-teens and teenagers internationally, well documented by, among others the American Academy of Pediatric. Research has found that victims of bullying tend to have greater health and substance abuse issues, and poorer social interactions and ability to emotionally adjust. One association of contemporary interest is between being bullied and carrying a weapon. This study investigates this, both in aggregate and over time. / Methods: / This study utilized nationally representative data from the Youth Behavior Risk Survey (YRBS), which was collected biannually between 1991–2013. Bivariate and multivariate logistic regression were used to evaluate associations between carrying weapons at school and being bullied, controlling for demographic variables and year, and whether the relationship is mediated by severity of bullying. / Results: / High school students who reported having been bullied had 42% greater odds of carrying a weapon (Odds ratio (OR) 1.42, 95% confidence interval (CI) (1.34, 1.50)) than students who did not report having been bullied. High school students who reported severe bullying had 3.5 times the odds of carrying weapons (OR 3.51, 95% CI (3.40, 3.63)) than those who reported no bullying. Over the past 20 yrs, there has been ~2% decline per year in the odds of carrying a weapon, while the rate of being bullied has stayed steady ~12%. Finally, time does not alter the association between carrying a weapon and being bullied. / Conclusions: / Being bullying significantly increases the odds of carrying a weapon among high schoolers, with higher odds associated with higher levels of bullying. Though weapons possession in high schools has declined over time, the association between being bullied and carrying a weapon has not altered. The implication is that schools, public health professionals, and clinicians need to work toward better policies to address bullying before it escalates into significant violence.

A46: Yakira David

Advisor(s):Shivakumar Vignesh

Clinical Characteristics and Survival of Esophageal Cancer in an Immigrant Afro-Caribbean Population at an Urban Safety Net Hospital

Background: Esophageal cancer only accounts for 1% of all cancers in the US but continues to have a dismal prognosis with 5 year survival rates of 17.9%. These rates have interestingly been lower in Caribbean countries compared with the US . Approximately half of the Black immigrant population in the US is of Caribbean origin and there is a paucity of data on the presentation, characteristics and survival in the immigrant Afro-Caribbean population. / Methods: A retrospective chart review was conducted on patients with a histological diagnosis of adenocarcinoma and squamous carcinoma of the esophagus between 2005-2015. Data points were collected including: race, age, sex, BMI, location, stage and histology of tumor, history of Helicobacter pylori, tobacco use, family history,treatment modalities and status at last contact. Results were statistically analyzed with Pearson chi-square testing, survival data was plotted using Kaplan-Meier curves and compared using log rank testing. / Results: 66 patients met the inclusion criteria; 50 were male and 16 were female. 91% of patients were Black with 64% of them being Afro-Caribbean and 36% African-American. Mean age at presentation was 61.6 years which is lower than the national mean of 67 years. Survival at 6 months after diagnosis was 47%. Amongst those that died, median time to death was 4.7 months. There was no statistically significant difference between African-American and Afro-Caribbean patients regarding age at diagnosis (p=0.339), histology(p=0.663),stage (p=0.648), tumor grade (p=0.347) or time to death(0.140). Survival was also not influenced by histology(p=0.560), tumor location (p=0.831), tobacco use (0.311) or stage at presentation (0.693). / Conclusion: Afro-Caribbean patients lose their health advantage with respect to esophageal cancer when they migrate.Further studies are needed to validate this result and evaluate the negative acculturation factors that are responsible for this observation.

A47: Michael Rose

Advisor(s):David Landman and John Quale

In Vivo Activity of a Novel Antisense Compound Against Multi-Drug Resistant *Acinetobacter baumannii*

Gram-negative bacterial resistance is looming as one of the greatest healthcare-related threats of this century, with New York City emerging as an epicenter of gram negative nosocomial infections over the last decade. One promising strategy for the treatment of multi-drug resistant (MDR) bacteria is the development of antisense nucleic acid analogs, which competitively bind to particular sequences within bacterial genomes, blocking the transcription of essential genes needed for bacterial growth and reproduction. We investigated the activity of one such compound in a known *Acinetobacter baumannii* isolate because this species is a growing contributor to the problem of gram-negative resistance in New York City. Our experimental compound [N-terminus (RXR) 4XB-cct cat att g C-terminus] is a peptide nucleic acid (PNA) that noncompetitively binds to *A.baumannii*'s *carA* gene. This gene, which is necessary for pyrimidine synthesis, was targeted because recent research has shown it to be essential for growth when studied in several different experimental systems: synthetic minimal media, human ascites, and within subcutaneous abscesses in rats. We tested the efficacy of this antisense compound in *Galleria mellonella* caterpillars that were inoculated with MDR *Acinetobacter baumannii*, and compared the results to controls that received *Acinetobacter* and phosphate-buffered saline (PBS), as well as third group that received PBS alone. Overall, we demonstrated a 53% ($p = .0154$) mortality reduction in our experimental group, when compared to our positive controls. These findings are promising for the future of using antisense technology against MDR bacteria. More studies using other animal models and additional bacterial strains are needed to elucidate the true promise of this approach.

A48: Sinead Brady

Advisor(s):Freny Nirappil

Challenges of Diagnosing Septic Pulmonary Emboli

42 year old male with uncontrolled diabetes and history of osteomyelitis of the right knee presented with a one day history of dizziness, malaise, pleuritic chest pain, abdominal pain and nausea without vomiting. In the ER, he had a heart rate of 115 beats per minute, temperature of 102 degrees Fahrenheit and a blood pressure of 92/55 mmHg. Physical exam was notable for pitting edema to the mid-calf of the right lower extremity with a painful erythematous ulcer on the dorsum of the right foot. Admission labs revealed a white blood cell count of 19.23K/uL with 19% bands, a creatinine of 1.08mg/dL, and hemoglobin A1C of 15%. Chest CT with contrast showed multiple, small, peripheral cavitory lesions in both lungs, the largest in the left upper lobe measuring 2.3 cm, suspicious for septic emboli(SPE). Patient remained hypotensive despite intravenous fluids. He was admitted to the MICU for treatment of severe sepsis due to cellulitis and started empirically on vancomycin and piperacillin-tazobactam. Blood cultures drawn on the day of admission grew out methicillin resistant staphylococcus aureus(MRSA), and the patient was continued on vancomycin. A workup for pulmonary cavitory lesions, as well as locating a source for SPE were negative. The patient improved with antibiotic therapy; repeat blood culture three days after the initial was negative. Infectious disease and pulmonary consultation agreed that cavitory lung lesions were likely SPE even without a classic source and advocated for a 6 week course of vancomycin for complicated MRSA bacteremia. / This case is a rare example of SPE with a lack of identifiable vascular sources and showcases the limitations of available imaging modalities. Our patient likely had a deep seated infection, undetectable by imaging, as his source of source of SPE. If a patient with MRSA bacteremia has both radiological and clinical presentations consistent with SPE, one should opt for the longer treatment duration, even without a known source.

A49: Jacqueline Bober

Advisor(s):Konstantinos Agoritsas and Richard Sinert

Pediatric Ambulance Use in the United States: The Role of Health Insurance

Rapidly rising healthcare costs require a thorough analysis of all the components of care. Ambulance utilization for low acuity cases represents significant healthcare costs. Multiple studies of adult patients with public insurance or without private insurance have shown that they are more likely than those with private insurance to use the ambulance and for non-urgent conditions. Multiple studies of pediatric ambulance use have been limited in generalizability because they rely on individual hospital or single statewide databases. The purpose of this study was to describe pediatric ambulance use and its association with specific health insurances and urgency using the National Hospital Ambulatory Medical Survey (NHAMCS) database. NHAMCS data between 2008 to 2010 for all pediatric (age <19 years) patients were analyzed. Multivariate logistic regression was used to model ambulance utilization on insurance status while controlling for variability. A total of 25,215 pediatric ED visits were included representing a national sample of about 97,341,191 million ED visits between 2008-2010. Non-insured (9.9%) compared to privately insured (6.6%) children had significantly higher rates of ambulance use. No significant difference in ambulance utilization was noted between those with public (5.9%) versus private (6.6%) insurance. Even after controlling for demographic and severity variables the adjusted odds ratio (1.64, 95% CI 1.28-2.10, $p < 0.0001$) identified insurance status as an independent predictor of ambulance utilization. Similar to adult patients, uninsured versus insured pediatric patients have increased ambulance utilization. Different from the adults, the type of insurance public versus private did not affect pediatric ambulance use. Health policies that facilitate continuous insurance coverage for children may be one way to maximize resource utilization in regards to ambulance use. /

A50: Gaurav Vishnoi

Advisor(s):

Genetic testing in refractory depression patients facilitates long-term psychotherapy

Background:10-30% of patients with major depression don't improve on pharmacotherapy or only show a partial response coupled with functional impairment, poor quality of life and high relapse rate. People often equate high doses of antidepressants with severity of depression but it correlates more with refractoriness to drug treatment. This case report highlights the importance of genetic testing in these patients. Method: The patient is an Irish-American female undergoing treatment with high doses of multiple medications for her depression with little response, if any. Augmentation with atypical anti-psychotic medications like olanzapine and Abilify did not work for this patient. On further evaluation, she has a lifelong history of unrecognized Adult ADHD and on genetic testing; she is found to be positive for Val/Val COMT gene, which is a marker for ADHD. Results of her genetic testing: She is ultra rapid CYP2D6 metabolizer and medications, which may benefit her included- 1. Des-venlafaxine – This is not a good option for her because she has already undergone failed trials with venlafaxine. 2.MAOIs – She did not want to take MAOIs because of dietary restrictions. 3.Bupropion – Has a ceiling of 450 mg as patient is a rapid metabolizer, so she would achieve sub therapeutic blood levels. 4.Methylphenidate may be used to augment and will help ADHD symptoms as well. 5.She needs and would benefit from good support from psychotherapy/CBT. She may also be persuaded to try MAOIs later during her CBT sessions. Conclusions: Most medications including augmentation agents won't help her symptoms because of her genetic profile except for Methylphenidate and MAOIs. This supports the use of long-term psychotherapy in this patient, which will help her symptoms much better than medication management. This case report highlights the importance of genetic testing in cases of refractory depression, which facilitates the use of beneficial long-term psychotherapy in such patients.

A51: Leah Timbang

Advisor(s): Shilpa Patel, Catherine Choy, and Shilpa Patel

Social norms influencing eating behavior in Filipino Americans (FA) in New York City

Intro: Filipino Americans (FAs) have higher prevalence of obesity and hypertension, risk factors for heart disease, than other Asian subgroups. There is great need for research addressing the risks for heart disease among FAs and more studies attempting to understand the social support that lead them to practice unhealthy eating behaviors. This study will explore the role of social support provided by family and friends in FA eating habits. / Methods: Data from a cross-sectional nutrition-related survey completed by FA adults from 3 churches in Queens, NY from June 2015 to January 2016 was examined (n=158). / Results: Participants were mostly female (57%), foreign-born (90%), and overweight or obese (59%). Most participants reported good to excellent health (88%), good to excellent diet (87%), and support from friends (81.3%) and family (88.3%) when making dietary changes. More of the participants who felt support from friends, compared to those who did not feel support, reported “usually” or “always” to trying fruit (87% vs. 63%), fresh vegetables (78% vs. 42%), and free water (91% vs. 67%) at church, $p < 0.05$. More of the participants who felt support from family, compared to those who did not feel support, reported “usually” or “always” to trying fruit (88% vs. 25%), fresh vegetables (78% vs. 25%), multigrain rice/bread (70% vs. 27%) and free water (92% vs. 27%) at church, $p < 0.05$. / Conclusion: This study demonstrates that social support, especially from friends and family, help FAs make healthier eating choices, and can be used in future interventions regarding FAs and eating behavior.

A52: Ankuri Desai

Advisor(s): Edward Quadros

A rat model for folate receptor antibody-mediated behavioral deficits: Implications of folate receptor autoantibodies in autism

Folate is essential for fetal brain development and function. Folate receptor alpha (FRA) plays a critical role in this process as a transporter. This work examines the role of antibodies against FRA on brain development and function to determine if a similar mechanism could operate in autism spectrum disorders (ASD) and other neurodevelopmental disorders. A previous study in our laboratory found that $>70\%$ of children with ASD are positive for serum FRA-autoantibodies. Mothers of children with ASD were also found to have a significantly higher prevalence of FRA-autoantibodies compared to controls. Consequently, we developed a rat model to study the behavioral and cognitive deficits induced by exposure to FRA-antibody during gestation. We focused particularly on behavioral deficits that mirror those seen in ASD. Effective interventions to help in the treatment of those with ASD and FRA-autoantibodies were considered, looking specifically at the efficacy of folic acid and dexamethasone in preventing the behavioral deficits induced by FRA antibodies in the rat model. Our results demonstrate that rats exposed to FRA antibodies on gestational day 8 display core ASD symptoms such as deficits in communication, sociability, and set-shifting tasks in adulthood. They also have learning and memory deficits. Treatment with folic acid and dexamethasone resulted in significant improvement of the deficits. FRA antibody exposure during gestation was found to decrease folate transport from mother to fetus with antibody localizing to embryo, placenta, uterine wall, yolk sac, and amnion. Dexamethasone treatment was found to increase folate uptake following FRA antibody exposure during gestation. Overall, these studies were aimed at understanding the effect of FRA antibodies on fetal brain development and function. The outcome of these studies could herald a paradigm shift in our understanding of ASD and other developmental disorders associated with FR autoimmune disorder.

A53: Muhammad Ihsan

Advisor(s): Jason Lazar and Louis Saliccioli

Relation between Adiposity and Microvascular Function in HIV Infected Women

Obesity is well known to be associated with microvascular dysfunction. Obesity and overweight status is common in the setting of HIV infection, which in turn is associated with microvascular abnormalities. The objective of this study was to determine whether body composition is related to microvascular function among HIV infected women. We prospectively examined 80 HIV infected women (Mean age 51 ± 9 yrs, BMI 32 ± 8 kg/m², SBP 127 ± 17 mmHg, CD4 Count 625 ± 280 , and Viral load 2000 ± 9000 IU/ml) in the Women's Interagency HIV Study. Post occlusive hyperemic changes were assessed by using near infrared spectroscopy (InSpectra 650). Hyperemia was induced by occluding the brachial artery for five minutes at 50 mmHg over the systolic blood pressure. The overshoot area (OSA) of the tissue oxygen saturation curve was used as an index of microvascular function. Body composition (lean mass, fat mass) was determined by dual energy X-ray absorptiometry (DEXA). On univariate analysis OSA was inversely correlated with percent android fat (AF) ($r = -0.30$, $p = 0.008$) but not with BMI ($r = -0.19$, $p = 0.07$), lean mass (L±M) ($r = -0.14$; $p = 0.22$) or gynoid fat (GF) ($r = -0.17$; $p = 0.15$). On multivariate analysis AF was independently associated with OSA after correcting for age, viral load, and CD4 count ($R^2 = 0.13$, $p = 0.006$). In conclusion impaired microvascular response was associated with AF but not with BMI, LM or GF among women with HIV infection.

A54: Pramod Kariyanna

Advisor(s): Jason Lazar and Louis Saliccioli

Arterial Aneurysms Associated with HIV

Arterial aneurysms (AA) are increasingly recognized as vascular manifestations of HIV infection, even in the absence of cardiovascular risk factors. The aging HIV population with atherogenic comorbidities, the atherogenic potential of cART, low-grade inflammation due to HIV and co-infections may potentially increase the propensity to vasculopathy. Factors related to AA formation in HIV patients have not been studied. We conducted a systematic review of 58 cases of HIV associated AA reported in English literature. The first case was reported in 1992; however 84% of cases were reported after the year 2000. Mean age at presentation was 36.5 ± 15 years and 81% of cases were in males. 15% of the cases were reported in the pediatric population. Most patients (81%) had no risk factors for aneurysm formation. Median CD4 count was 188 cells/mm³, and median viral load was 77706 copies/ml. 7.5% of the patients were taking ART at the time of presentation. 73% of AA were singular, whereas 27% of cases were multiple (2-12 aneurysms per subject). Cerebral circulation and aorta were the most commonly affected arteries. One patient was clinically noted to have immune IRIS. Vasculitis, intimal fibromuscular hyperplasia, and fragmented internal elastic lamina were the most characteristic histological findings. Cultures of the AA yielded growth in 35% of patients with pathogens such as syphilis, Salmonella, and Mycobacterium avian complex. Though the majority of the patients had endovascular or surgical repair, two patients were observed to exhibit spontaneous resolution of symptoms upon ART. / In summary, AA may represent an under-recognized clinical entity in HIV-infected patients. Factors associated with the presence of AA in reported cases include: male gender and low CD4 counts but not traditional cardiovascular risk factors. While the majority of AA are singular, nearly a quarter of cases had multiple AA. Spontaneous resolution of AA is possible. /

A55: Debashree Sengupta

Advisor(s):Kaiser Islam

Using Patient Flow Analysis to Understand Wait Times in a Student-Run Ambulatory Clinic

Background: A strong and inverse relationship between patient satisfaction and wait times in ambulatory care settings has been demonstrated. The goal of the quality improvement (QI) project described here was to identify bottlenecks in clinic operations that might contribute to long patient wait times at the student-run Brooklyn Free Clinic (BFC). Methods: Portions of the clinic visit contributing most to prolonged wait times were identified using Patient Flow Analysis (PFA). A flowchart was created to visually map the various components of the patient visit. Each time a patient moved from one portion of the visit to the next, a timestamp was recorded, thus enabling exact quantification of the amount of time a patient spent in each component of the visit. Timestamps were later aggregated and analyzed using Microsoft Excel. Results: Timestamps from 167 patient visits from May through September 2014 were collected. Patient type had enormous bearing on wait times at the BFC. New and walk-in patients spent the longest aggregate time in clinic (115.5 and 147.8 min, respectively). New patients waited much longer than follow-up patients to be processed by administrative officer (62.9 min vs. 23.4 min, $p < 0.0007$). Alternatively, follow-up patients waited longer than new patients to be processed by clinic officer staff. Amongst all patients, there was wide variability in total time depending on the attending physician on duty. Conclusion: The results of this study demonstrate the effectiveness of Patient Flow Analysis as a tool for better understanding patient wait times in ambulatory care settings. The findings provide opportunities for clinic staff to optimize existing processes, with specific targets based on patient type. It has yielded novel insights into BFC clinic operations and has provided a potential model for other student-run clinics who may want to attain a better understanding of their own operations.

A56: Arismendy Nunez

Advisor(s):Jason Lazar and Louis Saliccioli

Assessment of Arterial Stiffness From Pedal Artery Korotkoff Sound Recordings In Heart Failure Patients

Brachial artery (BA) Korotkoff Sound (KS) timing reflects arterial stiffness. The objective of this study was to evaluate the pedal artery to KS interval. We recorded the BA KS and pedal artery (PA) KS intervals in 25 heart failure (HF) and 50 healthy subjects (N) using an electronic stethoscope and electrocardiography. Time intervals between QRS and KS waveform peaks (QKD interval) were measured for 60s, averaged, and QKD velocity (v) calculated. Carotid → BA and carotid → PA pulse wave velocities (PWV) were measured by applanation tonometry. A cuff inflation pressure of diastolic BP+20mmHg was used since this was previously determined the optimal cuff pressure. The HF group was older with similar systolic BP, diastolic BP, and heart rate to the N group. BA QKDv was similar in the HF and N groups (2.9 ± 0.7 m/s vs. 2.8 ± 0.4 m/s, $p = .34$). PA QKD was higher in the HF group (5.0 ± 0.5 m/s vs. 4 ± 0.5 , $p < .001$). Carotid → BA PWV (9.0 ± 1.5 vs. 7.0 ± 1.1 m/s, $p < .001$) and carotid PA PWV (8.6 ± 0.9 vs 7.0 ± 0.9 m/s, $p < .001$) were higher in the HF group. PA QKDv correlated with its corresponding PWV ($r = -.68$, $p < .001$) stronger than BA QKDv ($r = -.10$, $p = .30$). PA QKD was correlated with age ($r = .58$, $p < .001$), whereas BA QKDv was not ($r = -.07$, $p = .38$). In conclusion, PA QKDv but not BA QKDv is higher in HF subjects than in controls. PA QKDv correlates with age and better correlates with PWV than does BA QKDv. The PA QKDv technique may provide a simple measure of arterial stiffness.

A57: Attiya Haque

Advisor(s): Jason Lazar and Louis Saliccioli

Differential Effects of Hyperemia and Passive Leg Raising on QRS to Korotkoff Sound Time Intervals

Both brachial artery post-occlusive hyperemia and passive leg raising (PLR) elicit arterial vasodilation. The QRS complex of the ECG to Korotkoff sound interval (QKD) is a measure of the pulse transit time and therefore arterial stiffness. Changes in arterial tone are known to alter local arterial stiffness. We compared the effects of these two provocations on brachial artery QKD in 42 normal participants. To obtain the Korotkoff sound a blood pressure cuff inflation pressure of diastolic BP + 20mmHg was used since previously determined the optimal cuff pressure. The QKD was first obtained at rest. To measure QKD with hyperemia, a Hokanson rapidly deflating blood pressure (BP) cuff was applied to the right upper arm, inflated 50 mmHg above systolic BP for 5 minutes, and released to induce hyperemia. PLR while supine to 60 degrees was done to measure PLR induced changes. The QKD was measured at 1 minute post PLR and 1 minute post cuff deflation, and the QKD velocity (QKDv) was calculated to correct for distance. Baseline subject characteristics were as follows: mean age 40 ± 13 years, systolic BP 118 ± 13 mmHg, heart rate 70 ± 13 bpm, height 1.7 ± 0.9 m, weight 77 ± 19 kg. At 1 minute into PLR, QKDv increased (2.96 ± 0.4 to $3.1 \text{ms} \pm 0.5$ m/s, $p=0.001$), while hyperemia decreased QKDv (2.97 ± 0.4 to 2.87 ± 0.4 m/s, $p=0.02$). In summary, these provocative maneuvers have inverse effects on QKDv. PLR increased QKDv by 5% and hyperemia decreased QKDv by 3.4%. PLR induced increases in QKDv may represent the net effect of increased brachial artery shear stress and dilation in the setting of extrinsic brachial artery compression by the blood pressure cuff. QKDv responses to PLR and hyperemia may reflect arterial vasodilatory reserve however opposing effects are elicited by the two provocations.

A58: Clive Goulbourne

Advisor(s): Jason Lazar and Louis Saliccioli

Passive Leg Raising Induced Brachial Artery Dilation Is Impaired In Sickle Cell Disease Patients

Passive leg raising (PLR) is a simple diagnostic maneuver that has been proposed as a measure of arterial vasodilator reserve and possibly endothelial function. PLR has previously been shown to lower blood pressure, increase brachial artery (BA) flow velocity and elicit BA dilation. As an alternative provocation to post-occlusion hyperemia, PLR is well suited towards evaluating patients in which arterial occlusion may be contraindicated such as sickle cell disease (SCD), a disorder in which vascular abnormalities are increasingly being recognized. The effects of PLR on BA flow and dimensions have not been studied in the setting of SCD. We compared changes (Δ) in mean flow velocity (MFV) and BA dimensions induced by PLR in 40 SCD patients and 40 healthy subjects. Age, gender, heart rate and systolic blood pressure were similar among the 2 groups, whereas diastolic BP was lower in the SCD group ($p<.001$). As compared to controls, the SCD group exhibited less of an increase in MFV ($21.0 \pm 34.1\%$ vs $6.4 \pm 18.3\%$, $p=.02$) and less marked BA dilation ($5.8 \pm 5.3\%$ vs $3.5 \pm 3.9\%$, $p=.03$). On multivariate analyses after adjusting for age and blood pressure, SCD was an independent predictor of Δ MFV ($R^2=.13$, $p=.02$ for model). Among the SCD group, there was a trend towards a correlation between hemoglobin level and Δ MFV ($r=.25$, $p=.08$) but not between hemoglobin and BA dilation. In conclusion, SCD patients exhibit less of an increase in MFV and in BA dilation in response to PLR. Δ MFV may be related to the degree of anemia.

A59: Joseph Kim

Advisor(s): Jason Lazar and Louis Saliccioli

Discontinuation and Reduction of Renin-Angiotensin Inhibitors During Hospitalization in Patients with Heart Failure with Reduced Ejection Fraction

Angiotensin-converting-enzyme inhibitors (ACEI) and receptor blockers (ARB) reduce morbidity and mortality in patients with heart failure with reduced ejection fraction (HFrEF). Yet, ACEI/ARB treatment is underutilized possibly due to perceived contraindications. Reduction of beta-blocker dose in this setting worsens clinical outcomes but this is unknown for ACEI/ARB. We retrospectively studied patient admissions for acute HFrEF exacerbation to determine the frequency of and reasons for ACEI/ARB dose reduction/discontinuation. / Among 584 patients admitted to our institution for HFrEF exacerbation over 1 year, 175 were age ≥ 18 years, had EF $< 40\%$ and were taking ACEI/ARB and beta-blocker therapy upon admission. ACEI/ARB doses were reduced or discontinued (r/d) in 18.3% of patients (r/d group). Remaining patients had ACEI/ARB continued or increased (c/i group). Most commonly reported reasons for ACEI/ARB r/d included: acute kidney injury or worsening renal function (43.8%), hyperkalemia (6.3%) and hypotension (18.8%). Age, gender, ejection fraction, B-type natriuretic peptide level (BNP), history of chronic kidney disease, atrial fibrillation, coronary disease and hypertension were similar between groups. Admission and discharge creatinine and discharge potassium levels were higher in the r/d group. On multivariate analysis, admission creatinine and blood pressures were also found to be significant predictors of d/r. The d/r group showed a trend towards greater length of stay in (6.7 vs. 5.0 days $p=.097$). / In summary, dose reduction/discontinuation ACEI/ARB occurs in nearly a fifth of HFrEF admissions and is related to lower admission and discharge renal function and lower blood pressure. ACEI/ARB r/d may be associated with longer length of stay. Reasons for ACEI/ARB r/d decision making and effect on outcomes merits further study. /

A60: Ryan Massay

Advisor(s): Jason Lazar and Louis Saliccioli

Brachial Artery Flow and Dimension Responses to Lower Body Positive Pressure In Healthy and Heart Failure Subjects

Positive pressure (PP) treadmills are used to rehabilitate orthopedic/neurological patients. Lower body (LB) PP lowers musculoskeletal strain and load, compresses the lower body and increases intrathoracic volume. These changes result in baroreceptor activation, which in turn may evoke bradycardia and arterial vasodilation. We hypothesized that LB PP would elicit brachial arterial (BA) vasodilation and decrease BA mean flow velocity (MFV) in normal subjects, and that patients with heart failure (HF) would exhibit blunted responses. We prospectively studied the short-term effects of progressive LB PP of 25%, 50%, and 75% of body weight on heart rate (HR), and BA MFV and BA dimensions in 21 healthy male subjects (N) and 28 male patients with HF. At baseline, MFV was lower (14 ± 4 cm/s vs 23 ± 10 cm/s, $p < .001$) and there was a trend towards larger baseline BA diameter ($.417 \pm .098$ vs $.383 \pm .054$ cm, $p = .14$) in the HF group. After age adjustment, BA dimension increased more upon LB PP in N compared to HF subjects ($12 \pm 2\%$, vs $2 \pm 2\%$, $p = .011$). MFV responses did not significantly differ between the 2 groups ($-10 \pm 11\%$, vs $+1 \pm 8\%$, $p = .56$). Heart rate decreased in both groups, but less so in the HF group ($13 \pm 8\%$ vs $8 \pm 7\%$, $p = .013$), whereas systolic and diastolic blood pressures remained unchanged in either group. In conclusion, progressive LB PP elicits a decrease in HR and BA dilation in the N group whereas HR lowering is blunted and BA MFV and BA dimension remain unchanged in HF patients. These differential responses likely represent differences in baroreceptor activation and suggest the potential for LB PP to be used to assess baroreceptor mediated arterial vasodilation.

A61: Sarah Gaballah

Advisor(s): Jason Lazar and Louis Saliccioli

Assessment of Arterial Stiffness From Pedal Artery Korotkoff Sound Recordings In Hypertensive Patients

Brachial artery (BA) Korotkoff Sound (KS) timing reflects arterial stiffness. We recorded pedal artery (PA) KS in 50 healthy subjects (N) and 50 hypertensive (HTN) patients using an electronic stethoscope and electrocardiography. Time intervals between QRS and KS waveform peaks (QKD interval) were measured for 60 s, averaged and QKD velocity (v) calculated. Carotid \rightarrow BA and carotid \rightarrow PA pulse wave velocities (PWV) were measured. A cuff inflation pressure of diastolic BP+20mmHg was used as determined optimal previously. The HTN group was older, had higher blood pressures but similar heart rate and height as compare to the N group. BA QKDv was higher in the HTN group as compare to the N group (3.1 ± 0.6 m/s vs 2.8 ± 0.4 m/s, $p = 0.006$). PA QKD was higher in the HTN group (5.1 ± 0.7 m/s vs 4.4 ± 0.7 , $p < 0.001$). Carotid \rightarrow BA PWV (8.4 ± 1.8 vs 7.4 ± 1.2 m/s, $p < 0.001$) and carotid PA PWV (8.7 ± 1.3 vs 7.7 ± 1.4 m/s, $p < 0.001$) were higher in the HTN group. PA QKDv correlated with its corresponding PWV ($r = -0.45$, $p < 0.001$) and BA PWV ($r = -0.37$, $p < 0.001$). BA QKDv correlated only with its corresponding PWV ($r = 0.42$, $p < 0.001$) and not with PA PWV ($r = 0.19$, $p = 0.06$). Age correlated with both PA QKDv ($r = 0.44$, $p < 0.001$) and BA QKDv ($r = 0.30$, $p < 0.002$). On multivariate analysis with hypertension, gender, age, and weight as covariates BA QKDv was independently associated with weight ($\beta = 0.39$; $p < 0.001$) and age ($\beta = 0.214$; $p = 0.02$) but not with hypertension status ($p = 0.50$). PA QKDv was associated with hypertension ($B = 0.604$; $p < 0.001$) after correcting for age, weight and gender. / In conclusion both BA QKDv and PA QKDv were higher in the HTN group. PA QKDv correlates with age and PWV better than BA QKDv. The PA QKDv was also independently associated with hypertension status whereas BA QKDv was not. PA QKDv is a novel and simple way of assessing arterial stiffness. /

A62: Sophia Russ

Advisor(s): Jason Lazar and Louis Saliccioli

Relation of the Ankle Brachial Index to Left Ventricular Ejection Fraction

The Ankle Brachial Index (ABI) assesses for peripheral arterial disease and abnormal values are associated with higher cardiovascular disease event rates. The objective of the present study was to determine whether the ABI is influenced by left ventricular systolic function. We prospectively studied 56 patients (age 58 ± 13 years, 48 % female) referred for coronary arteriography that were found to have normal coronary arteries, and therefore at low risk for peripheral arterial disease. The ABI was measured in all the subjects by using a Doppler ultrasound on the same day as the coronary angiogram. Left ventricular ejection fraction (LVEF) was determined using echocardiography or angiography. On univariate analysis ABI correlated with LVEF ($r = 0.29$, $p = 0.03$), and inversely correlated with B-type natriuretic peptide level (BNP) ($r = -0.42$, $p = 0.02$). In addition, the cohort was dichotomized into those with normal ABI (> 0.9 and < 1.4) and those with low ABI (≤ 0.9). The mean LVEF was found to be higher in the normal ABI as compare to the low ABI group ($52\% \pm 15$ vs. $34\% \pm 15$, $p = 0.002$). On ordinal logistic regression analysis with age, height, and systolic blood pressure as co-variants, ABI status was independently related to LVEF ($R^2 = 0.240$, $p = 0.01$). In conclusion, the ABI is influenced by left ventricular systolic function. LVEF should be considered when ABI values are used to evaluate patients for the presence of peripheral artery disease.

A63: Jacqueline Tin

Advisor(s): Jason Lazar, Louis Salciccioli and Peter Gillette

Cognitive Dysfunction Is Related to Impaired Cerebrovascular Reactivity In Sickle Cell Patients

Sickle cell anemia (SCA) is an inherited hemoglobinopathy associated with early cognitive decline. We hypothesize that this decline is related to cerebrovascular dysfunction. The study objective was to investigate the relationship between cerebrovascular reactivity (CVR) and cognitive function in adult patients with SCA. Methods: We prospectively studied 40 SCA patients and 40 healthy controls. CVR was assessed using the breath holding index (BHI), a measure of % change in transcranial Doppler velocities of the middle cerebral artery induced by permissive hypercapnia and provoked by passive breath holding. Cognitive function was measured using a battery of standardized tests: the letter-number sequencing, Stroop interference test and symbol digit modality. Results: The SCA group (age 41 ± 13 years; 76% female) was similar in age but had a greater proportion of females, significantly lower mean systolic and diastolic BPs, and lower mean education scores. BHI was significantly lower in the SCA than control group ($.32 \pm .67$ vs. $.80 \pm .58$, $p = .001$). On multivariate analysis, LNS was significantly associated with SCA ($p < .001$) after adjusting for age, gender and education level ($R^2 = .44$, $p < .001$ for model). Similar results were obtained using Stroop interference time and symbol digit modality tests as the dependent variables. Among the 40 SCA patients, letter number sequencing test was significantly associated with BHI ($p < .001$) after adjusting for age, gender and education level ($R^2 = .25$, $p = .008$). Conclusion: SCA is significantly associated with lower measures of cognitive impairment. Among SCA patients, lower cognition may be associated with impaired cerebrovascular reactivity.

A64: Maria Munoz-Sagastibelza

Advisor(s): Laura Martello-Rooney

Gemcitabine-loaded microparticles promote cancer cell death in subcutaneous pancreatic cancer xenografts.

Pancreatic cancer is the fourth leading cause of cancer death in the United States with only 7% of patients surviving 5 years. Current systemic chemotherapies have not been very effective at decreasing tumor burden primarily due to poor systemic drug uptake resulting from the dense stromal nature of pancreatic tumors. Poly(lactic-co-glycolic acid)-based (PLGA) microparticles (MPs) are a promising tool for localized drug delivery within the tumor due to their biocompatibility, flexibility in encapsulation and extended drug release inside the tumor. The present study investigated the in vivo effects of gemcitabine-loaded microparticles (GMPs), on established subcutaneous pancreatic tumors. In vitro studies with PANC-1 and MIAPaCa-2 human pancreatic cancer cell lines treated with different PLGA co-polymer ratios used to encapsulate gemcitabine showed decreased colony formation in the longer release co-polymer ratio after 2 weeks. Subsequently, we tested the efficacy by direct injection of GMPs into established subcutaneous MIAPaCa-2 tumors in nude mice, in comparison with blank (no drug) MPs (BMPs), saline intraperitoneal injection (SIP) and gemcitabine intraperitoneal injection (GIP). Following two weeks of treatment, there was a trending decrease in tumor volume in the GMPs-injected MIAPaCa-2 tumors compared to the BMPs-injected tumors. When comparing the SIP to GIP groups, there was no difference in final tumor volume emphasizing the lack of effective penetration of systemic gemcitabine into the tumor. Interestingly, we observed a significant increase in apoptosis in the tumors treated with GMPs compared to the BMP tumors as well as the SIP and GIP tumors ($p < 0.05$). In conclusion, our data suggest GMPs could decrease tumor volume and increase local pancreatic tumor cell death. The described drug delivery method has the potential to be a more efficient local treatment modality than systemic gemcitabine against pancreatic cancer.

A65: Ketevan Berekashvili

Advisor(s):Adrian Marchidann

Non-Traumatic Convexal Subarachnoid Hemorrhage: case report with associated cerebral amyloid angiopathy.

Introduction: 85 % cases of non-traumatic subarachnoid hemorrhage(SAH) are secondary to aneurysmal rupture. 15% of cases of acute non traumatic SAH are along the convexity of brain one or more sulci, convexity SAH(cSAH); cSAH can be caused by broad spectrum of vascular and even nonvascular pathologies. We report a case of cSAH associated with possible cerebral amyloid angiopathy (CAA). / Case report: 66 yo woman presented multiple times with TIA like symptoms: left hemisensory deficit, hemiparesis and left sensory neglect. / The symptom onset was sudden, associated with mild headache and nausea. Headaches were left temporal, no associated photophobia or phonophobia (no thunderclap quality. Resolved with tylenol). Symptoms resolved within 24hours. / Past medical history significant for HTN, HLD, left breast cancer s/p mastectomy. Her father deceased from MI at age 58 and mother from stroke at 77. Patient was taking pravastatin and aspirin. There was no history of use OTC or herbal supplements. / Accumulating data from previous mostly retrospective studies suggests that reversible cerebral vasoconstriction syndrome (RCVS) is the predominant cause of cSAH in individuals below age 60 years and CAA predominant cause of cSAH >60 years of age. / Clinical presentation of cSAH secondary to CAA are rarely with headaches. Typically they are TIA mimics-sensory or motor symptoms or mixed, seizures, migraine aura-like symptoms. The exact origin of cSAH in CAA remains unknown, but rupture of leptomeningeal arteries weakened by amyloid deposits may be a cause. / Conclusion: This case highlights the need to maintain a broad differential diagnosis in patients who present with multiple TIA-like symptoms. Work up includes: MRI of brain, MRA head and neck, MRV, EEG, and lumbar puncture. Depending on the etiology of presenting symptoms management includes: strict control of risk factors: HTN, DM, HLD. Further consideration of anti epileptic medications especially if cSAH is secondary to CAA

A66: Mikhail Goman

Advisor(s):Charles Abrams

Identifying Functional Consequences of Alternate Start Codons of Connexin 47

The gene for Cx47 contains a downstream ATG start codon (leading to Cx47 Met1) that is currently accepted as the start codon of Cx47, however there is an additional ATG sequence found 9 nucleotides upstream (leading to Cx47 Met-3). Comparison of data from the Abrams laboratory on the Met1 variant and another group (the Bai Lab) studying a Met-3 variant suggested that the properties of the Met1 and Met-3 variants might differ. We examined the properties of these variants as well as the Met1Leu variant using immunofluorescence and dual-patch clamp recording. Met1Leu contains the additional 9 upstream nucleotides with a mutation of the downstream start codon, changing the methionine to leucine. We found that: 1. There is no statistically significant difference between the expression levels of the three variants; 2. Functional properties of Cx47 Met1 and Met-3 are virtually identical, opposing the claim proposed by the Bai group; 3. The properties of the Cx47 Met1Leu construct suggests that the upstream start codon can function as a start codon and is capable of making a stable protein with normal subcellular distribution. It is likely that the dramatically altered functional properties of the Met1Leu variant are due to the Met1Leu mutation rather than to the addition of three amino acids to the C terminus. However, further control studies are required to definitively show that cells transfected with the Met-3 construct are expressing Cx47 with the longer N terminus. /

A67: Sofya Glazman

Advisor(s):Ivan Bodis-Wollner

Does levodopa modify neurodegeneration in the retina?

Objective: To evaluate the relationship between dopaminergic medications and inner retinal layer thickness in the eye Parkinson's disease (PD) patients. / Background: / PD is a progressive disease with continued loss of dopaminergic (DA) neurons. DA neurons have high affinity uptake of levodopa and convert it to dopamine. Direct dopamine receptor agonists should maintain their efficacy. / Methods: We reviewed data of 52 subjects (50%) on levodopa; 14 subjects (13.5%) on dopamine (DA) agonist and 22 subjects (21.2%) on combination therapy and 16 subjects (15.4%) were untreated or on adjunctive therapy. There was no significant difference between the treatment groups in age (mean 67.2 ± 8.3 years), gender, ethnicity, PD duration (mean 5.6 ± 4.4 years), stage (mean 2.4 ± 0.4), and UPDRS motor score (mean 28.0 ± 6.0). IRL (inner retinal layer) thickness of OCT was compared between groups. SPSS 21.0 was used for t analysis. / Results: The retina was significantly thicker in perifoveolar annular zone in the levodopa treated group. Other IRL measures were not different among the three groups. UPDRS motor score negatively correlated with temporal IRL thickness (inner radius 0.75 to 1.75 mm) ($P < 0.05$). Untreated patients had thinner retina at radial distances of 0.25-1 mm from the foveola in the annular zone where dopaminergic amacrine cells are located in the fovea. Significant interocular asymmetry (IOA) of retinal thickness was observed in the nasal (inner radius 0.75mm, outer radius 1.75mm); temporal (1.5mm-1.75mm); and anterior segments (1mm-1.75mm). IOA correlated with UPDRS motor score and PD duration. / Discussion: Dopaminergic neurons have presynaptic autoreceptors with actually higher affinity for D2 agonists, than postsynaptic neurons do. Thus our results imply that D2 autoreceptor activation may accelerate, compared to levodopa, progressive neuronal loss. / Conclusion: The levodopa treated group fared better than those who were on direct dopamine receptor agonist treatment. /

A68: Neil Patel

Advisor(s):Jonathan Perk and Rachna Malani

A Rare & Complex Case of Multiple Neurological Diseases: Spinal Cord Glioblastoma Multiforme and Multiple Strokes

Introduction: Primary spinal glioblastomas (GBM) are a rare entity and we present a case of a newly diagnosed spinal cord GBM. Our patient exhibits the natural history and complications (systemic and neurologic) that arise because of such a lesion. This case highlights the importance of many core principles in medicine. It epitomizes the significance of localization in neurology, diagnostic challenges, approaching patient care with a multi-disciplinary approach, and making intricate treatment choices. Results: An extensive work up revealed: spinal cord GBM, multiple strokes in various vascular territories, large anterior cerebral artery aneurysm, pulmonary emboli (PE), NSTEMI and septicemia. Discussion: Typically spinal tumors are approached from the characterization of extradural, intradural extramedullary, and intramedullary tumors. Intramedullary tumors are relatively uncommon among all central nervous system tumors – approximately 5%. Additionally, spinal GBM account for roughly 7% of intramedullary gliomas. Characteristically spinal cord GBMs have a predilection for the cervical region and occur in younger patients. Furthermore they are typically metastatic from an intracranial GBM. What made our patient unique and complex was that not only was she elderly but she also had an atypical location for a primary spinal cord GBM. She also had multiple neurological and systemic complications which were sequelae of her spinal cord lesion. The presence of the malignancy predisposed her to a hypercoagulable state which led to the complications of strokes, PE and a NSTEMI. Treatment decisions were complicated by the necessitation for anticoagulation for NSTEMI and PE, and given her acute stroke and unsecured aneurysm, placed her at a higher risk for cerebral hemorrhage. Through this patient we were able to localize her lesion in order to explain her symptoms and with a multi-disciplinary approach, tailor her work up and management. /

A69: David Mao

Advisor(s): Steven Levine and Jonathan Perk

A case of CJD diagnosis during pre-op stage for meningioma resection

OBJECTIVE: / To raise awareness of risk of undiagnosed Creutzfeldt-Jakob disease (CJD) before major neurosurgical procedures
Background / Creutzfeldt-Jakob disease is a rapidly fatal neurodegenerative disorder that can be disseminated through contact with contaminated medical equipment or infected tissue. Specifically, tissues from brain, spine, and eye have high risk of transmission. Furthermore, the infectious agent has relative resistance to conventional chemical and physical decontamination methods.
DESIGN/METHODS: / Case Report Presentation of case / A 64 year old left-handed woman, previously high-functioning individual, present with subacute onset of until progressive cognitive deficits. CT head showed left frontotemporal and right tentorial meningiomas with minimal midline shift and edema. She was referred to neurosurgery service with plan for resection within 2-3 days. / On admission, a detailed neurological exam significant for mixed transcortical aphasia, severe apraxia, left sided extinction, and alien limb phenomenon in left arm. Further studies were ordered. EEG demonstrated intermittent right posterior temporal sharp waves and PLEDS with independent right greater than left hemispheric slowing. Dedicated DWI sequences were repeated, and show subtle areas of diffusion hyperintensity and ADC hypointensity in the right cerebral cortex and basal ganglia. These findings were consistent with CJD. The operation was cancelled. Patient was referred to palliative care.
Discussion / Only two cases in literature of patients with concurrent meningioma and CJD. CJD is a relatively uncommon disease with potentially disastrous consequences when its symptoms are not recognized before neurosurgery. MRI and EEG are robust tools for diagnosis and should be incorporated in screening patients with unusual presentation prior to surgery. When the lesion does not explain the symptoms, further investigation is warranted.

A70: Oyewole Olanrewaju

Advisor(s): Steven Levine, Alla Akivis, and Richard Sadovsky

Primary Stroke Prevention in Women

Background: Stroke is the third leading cause of death in women. Women experience over half of all strokes and over 60% of stroke-related deaths. Although stroke rate in men over 60 has remarkably decreased, the rate in women has a much less significant decline; 26% vs 11%. The AHA/ASA Guidelines on Stroke Prevention (PSP) in Women application falls mainly to the PCP, about 50% of whom are OB/GYN. / **Objectives:** Evaluate awareness of PSP guidelines among OB/GYNs, Internists (IM), and Family Medicine (FM) Practitioners. Identify barriers to improving PSP in women. / **Methods:** Pilot survey of OB/GYN, IM, and FM from academic medical centers, community hospitals and attendees of two regional conferences. Demographics, type of practice, and existing barriers of effective PSP were queried. Awareness of PSP was assessed using 2011 AHA/ASA guidelines. True/false, multiple-choice and case scenarios were distributed by SurveyMonkey® and paper. Statistical analysis employed pair-wise t-tests with Satterthwaite correction for unequal variance, / **Results:** 361 PCP participated: 188 OB/GYN (52%), 98 FM (27%), and 75 IM (21%). Mean knowledge scores for OB/GYN (48.5%) were significantly above IM (35%) ($p < 0.001$), but not FM (46%) ($p = 0.213$). OB/GYNs (55%) were more likely to refer to specialists than IM (13%) and FM (4%), $p = 0.0001$. IM and FM tend to be more knowledgeable about diabetics vs. OB/GYN (52% and 57%, respectively, vs 18% $p = 0.0001$). OB/GYNs were more knowledgeable about oral contraceptives use in migraine with aura vs. IM and FM (80% vs 36% and 60%, respectively, $p = 0.0001$). Identified barriers include inadequate awareness and familiarity with PSP guidelines (43% IM vs 58% OB/GYN, $p = 0.29$) while 40% of FM attributed lack of adherence to external barriers. / **Conclusions:** Our pilot data suggest that OB/GYN, IM and FM have moderate awareness of PSP guidelines with significant increased sense of awareness among OB/GYN and FM. Educational gaps and barriers were identified in all groups. /

A71: Afsana Rahman

Advisor(s):Yaacov Anziska

Permethrin- induced ocular myasthenia gravis exacerbation in a 7 year-old girl

This is a case of a 7 year-old girl with seropositive ocular myasthenia gravis who presented with an exacerbation of her ptosis after the use of Permethrin shampoo for a lice infestation. Her ptosis resolved after the use of IVIG, in addition to her usual prednisolone and Imuran. It is proposed that Permethrin's ability to block sodium influx channels extended to the muscle membrane, which led to the prevention of depolarization via sodium channels and release of Ca⁺⁺ from the sarcoplasmic reticulum, resulting in exacerbation of this patient's myasthenia. There have been no recorded instances of Permethrin- induced ocular myasthenia gravis exacerbation in the literature.

A72: Rafael Flores-Obando

Advisor(s):Charles Abrams and Ivan Hernandez

The role of mutations in connexin47 (Cx47) in myelinating cells of the central nervous system (CNS)

Connexin47 (Cx47) forms homotypic gap junction communication channels between oligodendrocytes (OLs), the myelinating cells of the CNS and forms heterotypic channels with Cx43 in astrocytes. Pelizaeus-Merzbacher-like disease 1 (PMLD1) arises in patients with mutations in GJC2 -encoding Cx47- causing nystagmus, cerebral ataxia, and spasticity within the first 6 years of life. One mutation (p.Ile33Met) has been associated with a much milder phenotype, hereditary spastic paraplegia type 44 (SPG44). In cell lines, PMLD1 mutants such as Cx47P87S cause defective protein trafficking, endoplasmic reticulum (ER) retention and loss-of-function. These studies have not been conducted in OLs, where ER retention of Cx47P87S could lead to cell type-specific cellular stress, activation of unfolded protein response (UPR) pathways and apoptosis. We hypothesize that mutations in Cx47 associated with severe phenotype (Cx47P87S) cause toxic gain of function compared to the milder Cx47I33M mutation. We have optimized the isolation and culture of primary OLs from neonatal Cx47 knockout mice pups using immunomagnetic beads. OLs were lentivirally transduced to express Cx47WT and mutants. Using immunofluorescence (IF) studies we show that Cx47P87S exhibited a diffuse cytoplasmic staining compared to the puncta staining of Cx47WT and Cx47I33M. Also, IF staining for Cx47 and ER resident chaperone Grp94 showed that Cx47P87S staining colocalized with Grp94 compared to Cx47WT and Cx47I33M. Finally, IF staining for C/EBP homologous protein (CHOP) -a component of the UPR mediated apoptosis pathway- and ZsGreen -a reporter of lentiviral transduction- showed an increased CHOP activation in OLs expressing Cx47P87S compared to Cx47WT and Cx47I33M. These results indicate that in primary OLs Cx47P87S protein, but not Cx47I33M, is retained in the ER and activates the UPR pathway. Ongoing studies will determine if the activation of the UPR pathway induces apoptosis in primary OLs expressing Cx47P87S.

A73: Arman Fesharaki

Advisor(s):Peter Bergold

Comorbid TBI & PTSD: A Neurobehavioral Assessment and Inflammation Based Study

Introduction: There is an increasing level of awareness regarding the comorbidity of PTSD, TBI (Rosenfeld et al. 2013). Our study aims to investigate the resulting neurocognitive deficits, as well as affective symptoms using C57bl/6 mice. / **Methods:** The C57bl/6 mice were divided into 4 groups of sham, TBI, PTSD, and comorbid TBI & PTSD. The TBI group underwent closed head injury (CHI), using a magnetic piston. The PTSD group, were exposed to series of aversive stimuli, using the chronic variable stress model (CVS) (McQuire et al. 2010). The comorbid TBI/PTSD group, were injured first, and subsequently underwent CVS. A series of neurocognitive testing, including Barnes Maze (BM), Elevate Plus Maze (EPM), Active Place Avoidance (APA), and Acoustic Startle Response (ASR) were done. The mice were bled at two different time points, in order to measure their cortisol level. / **Result:** There were no significant difference between all groups based upon day 4 trial 4 latency or primary errors on Barnes test. There were no significant differences between all groups based upon errors in the final trial. In the EPM test, there was a trend toward significance in time percentage time in the open arms, with deficits in the PTSD group and TBI/PTSD groups. In the ASR group, the TBI displayed significant impairment, as per amplitude of their movement. In terms of cortisol levels, there was a strong trend toward group effect, with TBI & PTSD groups trending lower than TBI/PTSD. / **Discussion:** Our investigation has demonstrated affective differences amongst the four studied groups as per results of EPM and ASR. This was reflected in terms of cortisol levels amongst 4 groups. There were no significant neurocognitive differences amongst the 4 groups as noted by the APA and Barnes Maze results. / This in turn could potentially point to unique neuroinflammatory mechanisms involving these two seemingly disparate, and yet overlapping neuropsychiatric illnesses. /

A74: Dennis Robins

Advisor(s):Bruce Gilbert and Jeffrey Weiss

The use of Penile Doppler Ultrasonography as an Indicator of Hemoglobin A1c levels in Non-Diabetic Patients with Vasculogenic Erectile Dysfunction

Introduction and Objective: Vasculogenic erectile dysfunction (VED) is regarded as an early sign of cardiovascular disease (CVD). Furthermore, many cardiovascular risk factors including diabetes mellitus (DM) are associated with an increased risk of VED. Cavernal artery peak systolic velocity (PSV) as measured on penile Doppler ultrasound (PDU) is used as an indicator of VED as well as an early indicator of CVD. We sought to determine if Cavernal artery PSV measured via PDU correlates with a patient's HbA1c level in addition to its use in demonstrating arterial dysfunction. / **Methods:** The cohort was 57 men > 18 years old who underwent PDU as a part of their ED workup. Patients with psychogenic, neurogenic, or post prostatectomy ED and patients with DM or on DM medications were excluded. Patients were separated into two groups, those with PSV < 25 cm/s (VED), and those with PSV > 25 cm/s (non-VED). PSV was the maximum of a series of PSV values taken at 5-minute intervals after being given TriMix. This was done for the left and right Cavernal arteries. The maximum PSV (PSVmax) is the average of the left and right Cavernal artery maximum PSV values. HbA1c values were derived from patient records from within 3 months of PDU. Average HbA1c of both groups were compared with the Student's t-test. / **Results:** Patients with a PSVmax > 25 cm/s had an average HbA1c of 5.5%, and PSVmax < 25 patients had an average HbA1c of 5.7%, (p: 0.048). / **Conclusions:** To our knowledge, this is the first use of PDU as a predictor of a patient's blood sugar control. A PSV cutoff value of 25 cm/s can be used as an indicator of a patient's HbA1c level in non-diabetic patients. A patient with a PSV < 25 cm/s will have an HbA1c level at the level of a pre-diabetic individual on average (5.7%), whereas a patient with a PSV > 25 cm/s will have a normal HbA1c level (5.5%) on average. Therefore, a PSV < 25 cm/s may warrant additional screening or counseling for DM prevention. /

A75: Aninditha Vengassery

Advisor(s):

Evaluation of symptoms in persons with Mild Cognitive Impairment

Abstract: / 'Subjective Cognitive Impairment' (SCI) persons have the subjective belief that memory is impaired, but show normal performance on psychometric tests. In this study, we aim to assess the nature of cognitive and affective symptoms of SCI, and develop tools to identify early predictors of cognitive decline in the evolution towards MCI and AD. / METHOD: 136 healthy subjects, aged ≥ 50 years, presenting at the NYU Alzheimer's Disease Center were evaluated through self-reported scales: A Visual Analog Scale (VAS), (Guillo Benarous, 2013), the Brief Questionnaire Regarding Severity of Memory & Emotional Problems (BQRS-M&E =S1), (Reisberg, 2013), and the Memory Complaint Questionnaire (MAC-Q). Alternating subjects were evaluated on time related scales: the ADNI Cognitive Change Index =S2 (Saykin, 2012), the Sahlgrenska Academy Self-Reported Cognitive Impairment Questionnaire (SASCI-Q = S5) or on a severity based questionnaire SEVCOG =S3 and an Emotional Questionnaire =S4; on depression and anxiety scales: Geriatric Depression Scale, Hamilton; and on psychometric measures: MMSE, Logic1, Digit Span F&B, TMT, DSST, Paired Associates Recall and the Boston Naming Test. The evaluations at baseline were studied. / Table1: Baseline Characteristics Table 2: Comparison of affective and psychometric tests with demographic and subjective measures (P-values) RESULTS: Very few significant relationships are found between objective testing and subjective evaluations. We found a robust correlation between depression scales and all of the subjective self-reported scales, stronger with severity based self-reported scales. / CONCLUSION: Affective symptoms might be early indicators of cognitive and associated physiologic brain changes and could point to prevention strategies. /

A76: Shirley Mei

Advisor(s):Nagaraj Gabbur

Empiric Indomethacin Use with Cerclage Placement

Introduction: Cerclage placement is often performed for cervical incompetency to prevent preterm birth. However, it is unknown if empiric Indomethacin provides additional benefits. The objective is to investigate whether Indomethacin use with cerclage decreases the number of preterm births. Methods: A chart review of patients who received a cerclage with and without indomethacin at SUNY Downstate Medical Center from January 2013 to August 2015. The inclusion criteria included singleton pregnancies requiring cerclage, age ≥ 18 , cerclage and delivery at same hospital, and delivery by the time of chart review. The main outcomes were term at time of delivery and birth weight. A negative outcome was defined as a pregnancy that resulted in fetal demise or only reached preterm or late preterm. Results: A total of 130 patients (Control: n=39, Indomethacin: n=91) were included. The groups were demographically similar. Results in the Control and Indomethacin group were respectively: Fetal demise: 12.82% vs. 9.89%(p=0.77), Early Preterm (GA <34w0d): 15.38% vs. 9.89%(p=0.53), Late Preterm (34w0d to 36w6d): 15.38% vs. 14.29%(p=0.550), Early Term (GA 37w0d to 38w6d): 46.16% vs. 53.85%(p=0.58) and Full Term (GA 39w0d to 40w6d): 10.26% vs. 12.09%(p=0.60). There was no statistical difference between the two groups in terms of term at delivery (p = 0.893). The mean gestational age was 35.76 ± 4.06 weeks for those who received Indomethacin vs. 35.42 ± 4.38 weeks for those who did not receive Indomethacin (p = 0.692). Also, there was no statistical difference between the two groups in terms of birth weight (p = 0.690). The mean birth weight was 2665.76 ± 807.88 g for those who received Indomethacin vs. 2692.31 ± 953.67 g for those who did not receive Indomethacin (p = 0.878). Conclusion: There is no association between empiric indomethacin use with cerclage and prolonging gestation or increasing birth weight. /

A77: Mariel Zaken

Advisor(s):Joyce Sabari

Occupational Therapy Contributions to Home Health Services at VNSNY: A Qualitative Study

The purpose of this study was to add to current knowledge of the occupational therapist's role in home health care. Home health care provides a variety of services to individuals dealing with illness, injury, and/or chronic conditions, in their own home environment. This study includes in-person interviews with occupational therapists from Visiting Nurse Services of New York, which is an organization that provides home health care services throughout the five boroughs of New York City. The data from these interviews has been analyzed using standard methods used in qualitative research. Our goal was to determine themes that represent the participants' reflections about their roles as home health care professionals and current factors which impact upon their professional contributions.

A78: Eleanor Strehl

Advisor(s):Richard Sabel, Sonia Reiter and Thomas Pearl

The Easy Does It = SAFE Program: A multimodal approach to fall prevention

Falling is a major public health issue for older adults in the United States. Intervention programs that target falling and fear of falling (FOF) not only decrease the injuries and fatalities associated with this public health threat, they may also save billions of dollars in medical costs. Research has shown that exercise and movement programs that focus on building body awareness, strength, and mindfulness can increase balance and reduce falling and FOF. The purpose of this study was to evaluate the efficacy of the Easy Does It = SAFE fall prevention program for community-dwelling older adults. Easy Does It = SAFE is a movement education program that employs exercises from Feldenkrais, yoga, Qigong, Tai Chi, and meditation to promote strength, awareness, flexibility, and energy (SAFE). Body awareness training and carryover into functional activity are hallmarks of the program. The focus is on participants' awareness of how the exercises impact the individual physically and cognitively. The content of the Easy Does It program required a level of engagement and awareness that reinforced its effectiveness. The types of modalities used specifically increased kinesthetic awareness and allowed participants to be "in their body" in novel ways. The study employed the Activities Balance Confidence (ABC) Scale, the Timed Get Up and Go (TUG) Test, and participant questionnaires to collect data. This data was used to examine changes in participants' level of balance confidence, FOF, and engagement in daily activity after taking part in the Easy Does It program. Pre and post intervention TUG and ABC scores showed a statistically significant change indicating that the Easy Does it program increases balance confidence and reduces FOF in community-dwelling older adults. Qualitative data gathered from open-ended questionnaires indicated that participants were able to integrate the lessons of the program into their daily lives, and provided suggestions for improving the program. /

A79: Linda Chen

Advisor(s):Joyce Sabari

Impact of Wheelchair Seat Height on Neck and Shoulder Range of Motion During Functional Task Performance

Wheelchair users are at high risk for developing repetitive stress disorders (RSD) of the cervical spine and glenohumeral joints due to increased demands on active range of motion (AROM) when performing functional tasks from a seated position. The addition of a seat elevation device may alleviate the risk factors that lead to the development of RSD. However, there are no studies which establish that wheelchair seat height impacts upon arthrokinematic requirements at vulnerable joints. Additionally, Medicare and most insurance carriers do not cover the cost of power seat elevators because this feature has not been shown to be a “medical necessity”. This study examined differences in AROM at the cervical spine and glenohumeral joint during performance of two functional tasks while seated in a wheelchair with the seat elevation feature at minimum and maximum height. Results revealed statistically significant differences in AROM requirements for cervical extension and shoulder abduction between the two wheelchair seat heights. Additionally, results revealed that, when comparing performance at the lower seat height as compared to the elevated seat position, participants exhibited higher frequencies of AROM values that pose risk for developing repetitive stress disorders over time. These findings provide preliminary support for the value of the power seat elevation function in minimizing the risk of repetitive stress disorders at the shoulder complex and cervical spine in wheelchair users.

A80: Gabrielle Fridman and Jesse Sengillo

Advisor(s):Amilia Schrier and Ashley Rohr

Initiation of systemic anti-neoplastic agents contributing to corneal transplant rejection? A case series

Purpose: To report a case series of three patients that presented with episodes of corneal transplant rejection after recent initiation of systemic anti-neoplastic agents for various types of malignancies. **Methods:** Case 1 is an 85-year-old female with a history of Descemet’s stripping automated endothelial keratoplasty in the right eye in 2012 for pseudophakic bullous keratopathy. She presented in July 2015 complaining of decreased vision in the right eye after initiation of systemic chemotherapy (platinum/taxane compounds) for metastatic ovarian cancer. Exam was significant for decreased visual acuity and corneal edema. Case 2 is a 60-year-old female with history of a penetrating keratoplasty in the left eye for keratoconus in 1997. She presented in April 2015 complaining of irritation in the left eye after starting immunotherapy (NYESO1) for melanoma. Exam showed decreased visual acuity, and trace cell and keratic precipitates in the left eye anterior segment. Case 3 is a 68-year-old female with history of bilateral penetrating keratoplasties in the 1970s for keratoconus, with repeat penetrating graft in the left eye in 2006. In June 2012, she complained of decreased vision in both eyes after initiation of hormone therapy (tamoxifen) for breast cancer. Exam demonstrated bilateral decreased visual acuity, corneal edema, and anterior chamber reaction. **Results:** All three cases were diagnosed with corneal transplant rejection (1 DSAEK, 3 PKs) within 4 weeks of initiation of various systemic anti-neoplastic therapies. All cases of rejection were treated with topical prednisolone acetate 1% four times a day in the affected eye +/- muro 128. Case 2 and 3 grafts recovered with treatment; case 1 follow-up is pending. **Conclusions:** Patients with a history of a corneal transplant that start systemic anti-neoplastic therapy may be at greater risk for rejection episodes. Close ophthalmology follow-up shortly after initiation of anti-cancer therapy may be warranted.

B1: Kultida Soontarapornchai

Advisor(s): Jacob Aranda and Kay Beharry

High Versus. Therapeutic Doses of Caffeine Effects on Lipid Peroxidation and Oxidative RNA/DNA Damage in Immature Rat Brains Exposed to Hyperoxia and Intermittent Hypoxia

Background: Therapeutic doses of caffeine (TDC) protects neuronal degeneration in hypoxic condition in animal studies and has been used for neuroprotection in premature neonates. The comparative effects of high-dose caffeine (HDC) has not been studied. / Objective: To examine and compare the effects of TDC and HDC on oxidative stress and RNA/DNA damage in the neonatal rat brain exposed to hyperoxia and intermittent hypoxia. / Materials/Methods: Newborn rat pups (P0) were randomized to room air (RA), 50%O₂ or IH (50% O₂ with brief episodes of 12%O₂), during which they received: 1) HDC: 80 mg/kg on day 0, followed by 20 mg/kg on days 1-14; 2) TDC: 20 mg/kg on day 0, with 5 mg/kg on days 1-14; or 3) equivalent volume sterile normal saline (NS) on days 0-14. Lipid peroxidation (8-isoPGF₂ α), oxidative RNA/DNA damage (8-OHdG), caspase-3 and caspase-9, were determined in brain homogenates using ELISA. H&E stain assessed cellular changes in the hippocampus. / Results: 8-isoPGF₂ α was increased in the NS and TDC groups exposed to 50% O₂ ($p < 0.01$) vs. RA, but not with HDC. In contrast, OHdG was higher in the HDC group exposed to 50% O₂ and IH ($p < 0.05$) vs. NS and RA. Caspase-3 was suppressed in all treatment groups exposed to 50% O₂ and IH ($p < 0.01$), while caspase-9 was elevated in all IH groups ($p < 0.01$) vs. RA. H&E revealed increased eosinophilic and contracted neurons, with cytoplasmic vacuolar alterations, increased vascularization, and areas of hemorrhage in the hippocampus of TDC and HCD groups exposed to 50% O₂. These morphological changes are characteristic for apoptosis. / Conclusions: Treatment with high doses of caffeine in combination with hyperoxia and IH may result in RNA/DNA damage which correlated with degenerating neurons in hippocampus. This suggests that high caffeine doses may not be neuroprotective. Further studies are needed to define the appropriate dose of caffeine that can minimize the injury in premature neonates exposed to hyperoxia and IH.

B2: Gavriel Feuer

Advisor(s):

Microhardness in Cortical Bone From Osteoporotic Sheep Treated with Synthetic Bone Mineral

The goal of the present project was to assess the efficacy of a synthetic bone mineral (SBM) with and without fluoride that could be used to prevent and treat osteoporosis. This study characterized the material properties of cortical bone from osteoporotic sheep treated orally with SBM by means of microhardness and determined whether these effects act on the material level, the structural level. / Twenty-eight female sheep were randomly allocated into one of four treatment groups, sham surgery (sham), ovariectomy without treatment (OVX), treatment with SBM without additional fluoride (SBM), treatment with additional fluoride (FSBM). Osteoporosis was induced using a combination of ovariectomy, corticosteroid injections, and a low mineral diet. Cortical bone samples were harvested from the mid-diaphysis of each sheep femur and wet-apparent density was measured. A 100g load was applied to the samples for 10s using a pyramid-shaped diamond indenter. Hardness was calculated from the diagonals of the indent. Statistical analysis was performed using analysis of variance (ANOVA). / There was no statistically significant relationship in any of the groups for either wet-density or hardness ($P > 0.3$). There was a significant and positive correlation between hardness and wet-density ($R = 0.6583$, $P < 0.0005$, $N = 25$). / SBM has previously been shown to increase the mechanical response of trabecular bone shear strength and long bone bending strength but it was unclear whether it increased the overall material performance of bone tissue or triggered a type of modeling or remodeling which increased bone mass in certain regions. Since there was no statistically significant difference between the groups for either density or hardness, it is unlikely that SBM affects bone at the material level. These results indicate that the material performance due to SBM treatment and the mechanism by which SBM acts is most likely due to an increase in bone mass at the structural level. /

B3: Carlos A Buitrago

Advisor(s):Aditya V Maheshwari

Conversion of a surgically arthrodesed knee to a total knee arthroplasty - Is it worth it? A Meta Analysis

Introduction: / Conversion of a surgically arthrodesed knee to total knee arthroplasty (TKA) is an option for a select group of patients who are not satisfied with their results. However there is a paucity of literature on this topic. A systematic review of literature was performed to (1) describe the overall demographic characteristics; (2) evaluate the clinical outcomes; (3) determine the overall rate of complications; and (4) evaluate the overall satisfaction of patients who underwent conversion of an arthrodesed knee to TKA. **Methods:** / A comprehensive literature search was systematically performed to evaluate all studies included in the literature until July 2015. The specific search terms utilized were “fusion knee” and “arthrodesis knee”, which revealed a total of 2,206 studies. A review and selection of these abstracts was then performed based on an inclusion/exclusion criteria; a total of 10 articles were used for final review. **Results:** There were a total of 98 surgically-arthrodesed knees that subsequently underwent TKA. Patients had a mean age of 55 years and were followed-up for a mean of 5 years. Using a random effects model, there was an overall complication rate of 47%, an overall revision rate of 25%, and an overall failure rate of 11%. However, most patients were overall satisfied with the procedure. **Conclusion:** Fusion takedown is a challenging procedure that should only be performed by experienced surgeons after extensive discussion with the patients. The clinical outcomes are good with overall patient satisfaction, but complication rates are high including risk of repeat fusion or amputation. /

B4: Christopher Yiachos

Advisor(s):Aditya V Maheshwari

Long-Term Implications of Hemiresurfacing: Viability Analysis of a Retrieved Femoral Head and Neck

Introduction: Hip hemiresurfacing (HH) is the application of an artificial surface to the femoral head while leaving the acetabulum unaltered. This aims to preserve femoral bone stock to facilitate future conversion to total hip arthroplasty (THA). One mode of failure is the progression of osteonecrosis and collapse of the femoral head. We analyzed the underlying bone of a hemiresurfaced femoral head resected during conversion to a THA. **Methods:** A patient with SLE and right HH complained of worsening right groin pain for 4-5 years and opted conversion to THA. During the surgery the acetabulum appeared shallow. Superior and posterior bone loss was confirmed. Femoral component of the THA were implanted without complications. **Implant processing:** A median section was performed through the stem of the implant and ground to 25 microns. **Results:** Histologic evaluation did not reveal evidence of fracture or osteonecrosis. Granular debris consistent with metal was present within histiocytes. Significant thickening of the bone trabeculae toward the femoral neck was visible. Osteolysis around the stem was negligible. Metallosis and stress shielding were minimal. At 1 year FU the preoperative symptoms had disappeared. **Discussion:** When joint preservation is not feasible due to advanced stage osteonecrosis with intact acetabular cartilage, HH is a viable alternative to THA. Previous studies have warned about femoral neck fractures and loosening. During the explantation process the implant was found to be well fixed. Evaluation of a ground section did not reveal evidence of fracture, osteonecrosis, inflammation or excessive stress shielding. Abundant osteoid formation indicated the bone was turning over. One concern was the presence of mild metallosis. However, after 23 years of service this was expected. The patient was pain-free at follow-up one year postoperatively. Acetabular chondrolysis and joint space narrowing were the likely cause of the patient's symptoms.

B5: Dean C Perfetti

Advisor(s):Aditya V Maheshwari

Is Down Syndrome Associated with Short-Term Complications Following Total Hip Arthroplasty?

Background: Down syndrome is the most common chromosomal abnormality and is associated with degenerative hip disease. Because of the recent increase in life expectancy for patients with this syndrome, orthopaedic surgeons are likely to see an increasing number of these patients who are candidates for total hip arthroplasty (THA). / Methods: Using Nationwide Inpatient Sample (NIS) data from 1998 to 2010, we compared the short-term adverse outcomes of THA among 241 patients with Down syndrome and a matched 723-patient cohort. Specifically, we assessed: (1) incidence of THA; (2) perioperative medical and surgical complications during the primary hospitalization; (3) length of stay; and (4) hospital charges. / Results: The annual mean number of patients with Down syndrome undergoing THA was 19. Compared to matched controls, Down syndrome patients had an increased risk of perioperative (OR=4.33, p=0.001), medical (OR=4.59, p=0.001) and surgical (OR=3.51, p=0.001) complications during the primary hospitalization. Down syndrome patients had significantly higher incidence rates of pneumonia (p= 0.001), urinary tract infection (p=0.001), and wound hemorrhage (p=0.027). The mean length of stay for Down syndrome patients was 26% longer (p=0.001), but there were no differences in hospital charges (p=0.599). / Conclusion: During the initial evaluation and pre-operative consultation for a patient with Down syndrome who is a candidate for THA, orthopaedic surgeons should educate the patient, family and their clinical decision makers about the increased risk of medical complications (pneumonia and urinary tract infections), surgical complications (wound hemorrhage), and length of stay compared to the general population. /

B6: Karen Paltoo

Advisor(s):Aditya V Maheshwari

Are ‘Smart-Phone’ Cameras Efficient And Safe For Intraoperative Photography In Orthopaedic Oncology?

Introduction: Safety of ‘smart-phone-cameras’ in the operating-room is unknown. Do they increase rate of postoperative wound infection and do they enhance overall education? Methods: Consecutive orthopaedic oncology surgeries (Group-I) were compared prospectively to non-oncology orthopaedic surgeries (Group-II) performed by one surgeon at a single institution. Primary infections and open injuries were excluded (n=47). Only in Group-I intraoperative photography using a single ‘smart-phone-camera’ was performed. For each case the phone was cleaned with antiseptic wipes and new sterile gloves were used. Enhancement of education was surveyed by residents and patients through a questionnaire. Results: There were 474 procedures in Group-I and 592 in Group-II. Both groups were demographically similar, except for younger patients in Group-I (48 vs. 64 years). Per procedure 3.1 (range, 1-12) photographs were taken. There was no significant difference (p=0.2) in the postoperative infection rate. Eighteen patients in Group-I had a primary negative pressure wound dressing and/or plastic surgical procedure. One patient developed a postoperative seroma requiring drainage. Three patients in Group II needed a negative pressure dressing. These patients were never diagnosed/treated as ‘infections’. Patients and residents reported improved education regarding the disease process and surgical technique through the photographs. Discussion: Our preliminary results suggest that ‘smart-phone-cameras’ can be safely used for intraoperative photography. Moreover, it enhances education for residents and patients. Larger studies are needed to confirm our findings. HIPAA-compliant patient data storage applies to smart phone cameras. Many “cloud” services, which auto-upload images, are not HIPAA-compliant. CMS mandated 128-bit data encryption is not industry standard.

B7: Omid Amidi

Advisor(s):Aditya V Maheshwari

Complications of Delayed Total Hip Arthroplasty Following Acetabular Fractures: A Meta Analysis

Introduction: Posttraumatic hip arthritis following an acetabular fracture may develop in 12-57% of patients. Delayed total hip arthroplasty (THA) is an effective surgical procedure for pain control and functional restoration. However, THA may be associated with several unique perioperative problems. The specific complications have not been properly investigated. Thus, the purpose of our study was to determine the incidence of peri-operative and post-operative complications of this procedure. **Methods:** A comprehensive literature search was performed to assess all studies in current literature until August 2015. Utilizing Boolean search strings 2,543-studies were evaluated. Using a random effect model to determine the overall rate of the most commonly reported complications following this procedure. **Results:** A total of 840-THAs (18-studies) in patients were included for analysis. Patients had a mean of 53-years. The mean interval between the initial fracture and THA was 72-months and the mean follow-up time since THA surgery was 82-months. Five percent developed dislocation (95%CI 2.4-7.5%), 3% developed prosthetic joint infection (95%CI 1.3-4.9%), 2% developed neurologic complications (95%CI 1.1%-3.3%), 8% underwent revisions (95%CI 4.0-13.5%), 4% developed aseptic-loosening (95%CI 2.0-7.6%), and 2% of the patients developed venous-thrombo-embolic-events (95%CI 0.8-3.4%). **Conclusion:** The likelihood of achieving good outcomes with THA in a setting of post-acetabular fracture depends on several-factors. These arthroplasties have higher complications than the usual primary or even revision THAs. However, the positive functional outcomes and improvements in quality-of-life may outweigh the potential risk for complications. Nonetheless, surgeons and patients should discuss these potential complications and together make a well-informed decision.

B8: Peter Zhou

Advisor(s):Aditya V Maheshwari

Does Preadmission Cutaneous Chlorhexidine Preparation Reduce Surgical Site Infections After Total Knee Arthroplasty?

Introduction: Many preventive methodologies seek to reduce the risk of surgical site infections after total knee arthroplasty (TKA). We investigate the efficacy of preoperative chlorhexidine baths and cloths. **Methods:** 3717 patients who underwent primary or revision TKA at a single institution between January 1, 2007, and December 31, 2013 were identified. All patients were provided cloths with instructions before surgery; however, as a result of a lack of compliance, we were able to stratify patients into treatment (991) and control (2726) cohorts. Additionally, we stratified patients by NHSN risk category to determine differences in infection between the two cohorts. Patient medical records and an infection-tracking database were reviewed to determine the development of periprosthetic infection (patients who had superficial infections were excluded from our study) in both groups after 1 year surveillance. We then calculated relative risk reductions with use of chlorhexidine gluconate and stratified results based on NHSN risk category. **Results:** Use of a preoperative chlorhexidine cloth skin preparation protocol is associated with reduced relative risk of periprosthetic infection after TKA [0.3%] as compared without [1.9%] (relative risk [RR]: 6.3 [95% CI, 1.9-20.1]; p = 0.002). When stratified by NHSN risk category, periprosthetic infection risk reduction was seen in the medium-risk category (protocol: [0.3%]; control: [2.0%]; RR, 8.3 [CI, 1.1-60.7]; p = 0.038), but no significant difference was detected in the low- and medium-risk groups (RR, 2.1 [CI, 0.5-9.6; p = 0.33] and RR, 11.3 [CI, 0.7-186.7; p = 0.09]). **Discussion:** A prehospital chlorhexidine gluconate wipe protocol reduced the risk of periprosthetic infections after TKA, in patients with medium and high risk. Future multicenter randomized trials will need to confirm these preliminary findings. The intervention is inexpensive and unlikely to be risky and has potential to improve outcomes.

B9: Samantha J Yarmis

Advisor(s):Carl B Paulino

Fasciotomy Closure Techniques: A Meta-Analysis

Introduction: We evaluated the three major techniques for compartment syndrome fasciotomy closure by reviewing all literature published to date. We aimed to provide personnel in the orthopaedic world with an understanding of the risks and success rates of the different fasciotomy wound closure techniques. / **Methods:** Following the PRISMA guidelines we systematically evaluated the Medline (PubMed) database until July 2015. This was performed utilizing the Boolean search sting “compartment syndrome OR fasciotomy closure.” The inclusion criteria were: (1) full-text reports; (2) randomized controlled trials (RCTs), cohort studies, case-control studies, and case series with 2 or more patients; (3) studies involving patients with acute compartment syndrome of the extremities treated with fasciotomy; (4) studies describing the method of fasciotomy closure; and (5) studies that reported time to closure as an outcome measure. / **Data Extraction:** Two authors (JJ, SY) independently assessed all studies published in the literature to ensure validity of extracted data. The data was compiled into an electronic spreadsheet, and then utilizing a proportion random model effect, the wound closure rate with each technique was assessed. Success was defined as all wounds that could be closed without skin grafting, amputation, or death. / **Conclusions:** The highest success rate was observed for dynamic dermatotraction and gradual suture approximation, whereas VAC had the lowest complication rate. /

B10: Joshua Gorski

Advisor(s):Emmanuel Illical

Conversion total hip arthroplasty for a fused hip. - Is it Worth it? A Meta Analysis

Introduction: Patients with surgically or spontaneously fused hips are often dissatisfied with their overall function and debilitating effect on adjacent joints. Therefore, in a properly selected group of patients, hip fusion takedown and conversion to an arthroplasty can provide increased function and decreased pain. Although there are some studies evaluating this procedure, the exact complications have not been determined. Therefore, a meta-analysis of the literature was performed to (1) evaluate the indications for conversion, (2) evaluate the clinical outcomes of the procedure, (3) and analyze the overall complications of the conversion procedure. **Methods:** A systematic and all-inclusive literature search was performed to analyze all studies pertinent to conversion hip-arthrodesis. After reviewing 3,882 studies, 21 total studies (958 hips) met our inclusion/exclusion criteria. Random effects model of proportions were utilized to assess overall complication rates. **Results:** We found that the overall clinical outcomes improved as measured by Harris Hip Score from 58.7 to 80.2 points. The specific complication rates were 4.4% for infection, 2.2% for instability, 6.0% for loosening, 2.2% for heterotopic ossification, 4.2% for nerve-related complications, 1.0% for venous thrombotic events. These complications led to an overall revision rate of 12.3%. **Conclusion:** Takedown of an arthrodesis hip can be a challenging procedure. Although patients may benefit functionally and the load on adjacent joints may be reduced, both the patients and their surgeons need to be aware of the complications and increased risk of further revision procedures. Physicians should also discuss alternatives with patients prior to choosing this treatment option.

B11: Patrick Narcisse

Advisor(s):Emmanuel Illical

Unicompartmental Knee arthroplasty for spontaneous osteonecrosis of the knee

Introduction / Spontaneous osteonecrosis of the knee (SONK) is a poorly understood but debilitating disease entity. While total knee arthroplasty (TKA) is the standard of care for those patients who fail conservative management, another option does exist. Considering SONK's predilection for effecting a single compartment (usually medial), unicompartmental knee arthroplasty (UKA) appears to be a more tailored option. In comparison to TKA, UKA facilitates more native joint kinematics and proprioception by allowing for preservation of the unaffected compartments of the knee. These factors considered, conflicting data exists on the utility of UKA in SONK, hence, the purpose of this study was to evaluate the outcomes and revision rates. / Methods / For the purpose of comparing these two treatment modalities, clinical outcomes, survivorship, and complications must be assessed. In order to make this comparison we performed a systematic literature search of the MEDLINE library to evaluate all studies examining patients who underwent UKA for SONK. Screening of the articles was performed using multiple Boolean search strings Further screening was done with the use of a specific inclusion and exclusion criteria. / Results / The 7 articles analyzed produced a final cohort of UKA procedures performed on SONK patients (n=276). Data extracted from this cohort included demographics such as age, gender, BMI, and follow up length. Values for the ROM showed favorable results. Statistically significant clinical improvement was also shown by VAS score improvement and a standardized mean difference of clinical improvement pre and post outcome. Additionally revision rates, for patients who underwent unicompartmental knee implantation for SONK was found to be acceptable. / Conclusion / Our results showed that in properly selected SONK patients UKA is an excellent alternative with few complications, excellent functional outcomes and great survivorship. /

B12: Ross Ingber

Advisor(s):Hiroyuki Yoshihara

Diagnosing early postoperative spinal infection - a systematic review

Introduction: Early postoperative spinal infection (EPSI) is a potentially catastrophic complication following spinal surgery. Although critically important, diagnosing spinal infection in the early postoperative period is challenging due to the inherent elevation of serologic markers caused by invasive surgery. The purpose of this study is to find blood test indicators to aid in the diagnosis of EPSI. Methods: We systematically reviewed the PubMed, Embase, and Ovid peer-reviewed library databases to assess all studies through July 2015. Studies were included when reporting on white blood cell (WBC) count, erythrocyte sedimentation rate (ESR), or C-reactive protein (CRP) values for early postoperative spinal infection (first 4 months). Results: Only one study described the sensitivity and specificity for WBC of 21% and 77%, respectively. ESR values for infected patients were two times higher than non-infected patients. These studies evaluating ESR reported sensitivities ranging from 57-78% and specificities ranging from 38-90%. Mean CRP was 168% higher in infected patients compared to non-infected patients, with sensitivities and specificities ranging between 53 to 100% and 68 to 97%, respectively. Conclusion: Based on our systematic review, it is difficult to recommend a specific marker or a specific level to determine EPSI. However, a combination of these markers in adjunction with clinical examination and imaging studies may aid in the determination of EPSI. Studies are necessary to investigate the serologic markers based on the specific days after surgery and the size of spinal surgery. Finally, blood test results may be just supplemental information for determination of EPSI. /

B13: Vidushan Nadarajah

Advisor(s):Hiroyuki Yoshihara

What are the Trends, Demographics, and Economics in Sports-related Pediatric Spinal Cord Injuries?

Introduction: Pediatric spinal cord injury (PSCI) is a devastating injury that can cause significant long-term consequences. The purpose of this study is to report on the prevalence of PSCI, identify risk factors for sports-related PSCI, and evaluate associated factors. **Materials and Methods:** The five most recent data sets of the HCUP KID sets were utilized: 2000, 2003, 2006, 2009, and 2012. We used ICD-9-CM external cause of injury codes to identify the mechanism of injury contributing to PSCI hospitalization. We extracted demographic data on each admission including age, gender, race, and year of admission. We further stratified by sports-related cases of injury. Multivariate logistic regression analyses were used to identify independent risk factors. **Results:** Of our study population, 0.8% had a documented diagnosis of spinal cord injury (SCI). The most common documented external cause of injury code was motor vehicle accidents, representing roughly half of all mechanisms of injury in 0 to 9 year olds ($p < 0.001$). PSCI due to sports as an external cause of injury was more relevant in 10 to 17 year olds, and was especially prevalent in the 10 to 13 year old age category in which sports-related PSCI reached a high of 26.0%. Risk factors for traumatic PSCI after a sports-related external cause included older age, male sex and white race. When compared to non-sports related PSCI, the sports-related external cause of injury cohort had a length of stay estimate that was 20.3% shorter (18.0% - 22.6%) and total hospital charges that were 23.6% less expensive (21.7% - 25.6%). **Conclusions:** Although relatively rare, injuries to the spinal cord in pediatric patients can result in devastating physiologic, psychosocial, and economic consequences. Given the popularity of youth sports in the United States, parents and sports officials must be made aware of the increased risk of sports-related PSCI among 10-17 year olds. /

B14: Christopher Blum

Advisor(s):Jaime Uribe

Strength of Syndesmosis Fixation: Two Tight-Rope Versus One Tightrope with Plate-and-Screw Construct

Introduction: Injuries involving the distal tibiofibular syndesmosis can lead to critical destabilization of the ankle mortise. Accurate reduction of the syndesmosis correlates with the best functional outcomes. A novel technique of syndesmotic fixation involves the use of a knotless TightRope alone or a plate-and-screw construct with a TightRope. The purpose of this study was to evaluate the maximum torque and rotation to failure following fixation. / **Methods:** Seven pairs of embalmed cadaveric lower legs, disarticulated at the knee, were obtained. Each pair was randomly assigned to receive either two TightRopes or a plate-and-screw construct with one TightRope. All samples were mechanically tested in torsion to determine peak torque, torsional stiffness, and the maximum rotation angle at which failure occurred. Differences between the groups were compared using paired Student's t test. / **Results:** The maximum torque to failure after fixation was not significantly different between the two TightRopes (28.8 N*m; range, 7.3 to 49.7 N*m) and the one TightRope group (29.5 N*m; range, 9.2 to 44.9 N*m; $p = 0.92$). The maximum rotation to fracture after fixation was not significantly different between the two TightRopes (33.3 degree; range, 21.6 to 57.0 degree) and one TightRope group (38.6 degree; range, 23.0 to 73.9 degree). / **Discussion:** The similar load to failure of the two TightRope and the one TightRope and plate-and-screw plate suggested similar stiffness between the two constructs. Addition of plate may improve distribution of forces at the level of syndesmosis, reducing stress risers and decreasing the risk of failure, as demonstrated by a lower rotation to failure of the one TightRope construct. Additionally, this construct is not likely to be associated with any substantial cost increase. Further clinical studies may further elucidate the role of plate and TightRope augmentation to syndesmosis fixation. /

B15: Anthony V Ventimiglia

Advisor(s):Khalid Hesham

Regenerate Bone Stimulation Following Bone Lengthening: A Meta-analysis

Introduction: / Limb lengthening is performed to treat patients with leg length discrepancy or short stature. Although the procedure has a high rate of success, one potential drawback from limb lengthening is the amount of time spent in the fixation device while regenerate bone consolidates. Although some studies have assessed different treatment modalities, there has not been a study that has systematically evaluated whether low intensity pulsed ultrasound (LIPUS) or pulsed electromagnetic fields (PEMF) have significant effects on regenerate bone growth. The purpose of this study was to determine the potential non-pharmacological treatment options to stimulate regenerate bone, and to assess whether they affect the treatment time in limb lengthening. / **Methods:** / Utilizing the electronic databases Medline, Embase and Ovid, we performed a literature search for studies describing the application of LIPUS or PEMF following limb lengthening. With the aid of a statistical software package, Forest-Plots were generated to compare the differences in bone healing index with and without the use of regenerate bone stimulation. / **Results:** / A total of 7 studies assessed these two bone stimulation modalities in a cohort of 153 patients. Overall, a standardized mean difference favoring the stimulation cohort of 1.16 (95% Confidence Intervals of 0.40 to 1.91; p=0.003) was calculated when compared to the control groups. / **Conclusion:** / Amongst the drawbacks from limb lengthening is the relatively high rate of non- and delayed-union. Several methods, both pharmacological and non-pharmacological, have been investigated for their potential to stimulate the growth of regenerate bone. By systematically evaluating all current literature, we found that LIPUS and PEMF decreased the time for bone healing (healing index in days/cm) of the newly formed regenerate bone in an adequately selected cohort of patients that underwent limb lengthening. /

B16: Sherwin A Barvarz

Advisor(s):Khalid Hesham

Avascular Necrosis With Modified Dunn in SCFE Patients: A meta-analysis

Introduction: / Surgical stabilization with in-situ pinning is a widely accepted treatment for slipped capital femoral epiphysis (SCFE), despite the risks of avascular necrosis (AVN) and femoroacetabular impingement (FAI). The modified Dunn procedure with a surgical hip dislocation maintains intraoperative epiphyseal perfusion and allows anatomic repositioning of the epiphysis, in principle reducing risks of AVN and FAI. We systematically evaluated the literature to elucidate overall and stability-stratified rates of AVN following the procedure, the revision rate in non-AVN patients, and clinical outcomes. / **Methods:** / Using Ovid and MEDLINE (PubMed), we evaluated studies involving the modified Dunn procedure. Age, stability, preoperative slip (Southwick angle), ROM at follow-up, outcome metrics, and revisions were recorded. Utilizing a random effect model of proportions, we determined overall and stability-stratified AVN rates, and revision rates in patients who never developed AVN. / **Results:** / Overall, 285 patients (287 SCFEs) managed with the modified Dunn procedure were included. The overall AVN rate was 11.97% with a 95% Confidence Interval (CI) of 5.16 to 21.11%. AVN rate in stable slips was 7.26% (95% CI: 2.32 to 14.65%), and was 19.15% (95% CI: 8.87% to 32.2%) in unstable slips. Revision rate in non-AVN patients was 12.11 (95% CI: 5.86% to 20.22%). Fixation failures occurred following fixation with K wires and/or screws with caliber less than 6.5mm. / The overall mean Harris Hip Score was excellent (>90 points). Mean HHS was 96.5 points (range of means: 90 to 99 points) in stable cases, and 93.8 points (range of means: 88 to 98 points) in unstable cases. / **Conclusion:** / Patients who underwent the modified Dunn procedure had excellent clinical outcomes, and a relatively low incidence of AVN. Further studies are necessary to support the modified Dunn osteotomy with surgical hip dislocation as a viable alternative to in-situ pinning for treatment of severe SCFE.

B17: Edward Seger

Advisor(s):Michael A Stracher

Treatment of the Non-united Scaphoid: A Meta-analysis of the Last 20-Years

Introduction: / Fractures of the scaphoid are frequent injuries and although primary conservative treatment of these fractures remains efficient, 10% may still progress to nonunion which may derive in increased morbidity and disability. Currently, most of these nonunions are managed operatively, but other treatment modalities have been proposed. The purpose of this study is to compare the effectiveness of this treatment options to determine the optimal management of scaphoid nonunion. Methods: / We conducted a literature search of 10,823 studies over the last 20 years, concerning the management and union rates of scaphoid fractures. After numerous inclusion/exclusion criteria, 20 studies were identified. Of these, 13 included surgical management and 8 were non-surgical. Using a random model effect, we determined: 1) the union rates for each of these procedures; 2) range of motion outcomes for vascular and nonvascular grafts. Results: / Operative management of these fractures, stratified into vascularized and non-vascularized grafts had rates of union (92.1% and 88.7%, respectively). In contrast, non-surgical low intensity pulsed ultrasound (LIPUS) and extracorporeal shock wave therapy (ESWT) achieved rates of (82.5% and 76% respectively). Of the surgical methods the use of vascularized grafting reported a faster union time (2.6 months) compared to non-vascularized grafting, which reported a slower union time (3.4 months). Conclusion: / We found that, amongst the numerous treatment options, all operative modalities have overall higher union rates than the non-operative alternatives. In the surgical group we found that the use of vascularized grafting may have the highest rate of union and the fastest union time, compared to non-vascularized grafting. In the non-surgical approaches we found out that the LIPUS method may have better union rates compared to the ESWT method but they both may be inferior to the surgical approaches stated above. /

B18: Vaughn Hodges

Advisor(s):Michael A Stracher

Non-operative Management of Scaphoid Nonunions: A Meta-analysis

Introduction: Scaphoid fractures progress to nonunion at relatively high rates. Standard treatment is surgery, however individuals unable to undergo this operation, or for those in which previous surgery has failed, there may benefit from non-operative options. Of these, Low-intensity pulsed ultrasound (LIPUS), and extracorporeal shock wave therapy (ESWT) have been shown to improve fracture nonunion healing. The purpose of this study was to perform a comprehensive meta-analysis of relevant literature to compare success of these non-operative treatments for scaphoid nonunion. / Methods: Utilizing PUBMED, Embase, and Ovid databases we performed a literature search. 710 studies met initial search criteria. Studies reporting less than 5 cases, those not published in English, those not related to non-operative scaphoid nonunion treatment, and those without sufficient data were excluded. 5 LIPUS studies and 3 ESWT studies met these criteria and statistical analysis was performed to determine overall union rates and compare treatments. / Results: The use of LIPUS on 166 nonunions reported a mean healing index of 78.6% (95% CI of 62.8 to 90.9%). Ninety-six nonunions were treated using ESWT, and reported a mean healing index of 81.3% (95% CI of 57.6 to 96.6%). There was no statistically significant difference between LIPUS and ESWT healing rates (P=0.4). / Conclusion: Both LIPUS and ESWT show similar union rates and may serve as non-operative alternatives to scaphoid nonunion surgery. The results are encouraging in that these problematic fracture nonunions can heal without further surgical intervention in 78.6-81.3% of patients overall. /

B19: Michael Montuori

Advisor(s):Subrata Saha

Current Concepts in Sports Related Concussion: A Review of the Literature

Traumatic brain injury, specifically concussion, is prevalent in contact sports. In the US each year, 170 million adults participate in physical recreational activities and 38 million children and adolescents participate in organized sports. The CDC estimates that from this group, approximately 1.6-3.8 million concussions occur annually. Recent class-action lawsuits in the US filed by professional athletes against their respective leagues allege negligence in protecting them from concussions, and have contributed to the attention received in the popular media. In response, concussion-related publications have increased exponentially over the last years. Recent studies have challenged earlier assumptions that the effects of concussion are transient. Stronger links between concussion and neurodegenerative processes like Alzheimer disease-like conditions, depression, and heightened risk for suicide are being elucidated. In this study we explore the current knowledge on concussion, including pathophysiology, management, and long-term effects. We conclude that more evidence-based results regarding guidelines for diagnosis, treatment, and return to play are needed and should be the focus of future investigations. Attributing the etiology of certain neurodegenerative conditions to a history of concussion has been suggested, but more quantitative data regarding the pathophysiology and causality are needed as well. Bioengineers can play an important role in measuring the dynamic forces encountered during head impacts and its effects on our brain. They can also be effective in designing better helmets as well as improved playing surfaces to reduce the impact of such injuries. At this time, groups of people with heightened risk for concussion should be followed closely over longer periods of time and compared to matched controls. Such long-term studies are urgently needed to develop appropriate guidelines for safety and to protect our young and adult athletes in the future.

B20: Talha Khan

Advisor(s):Subrata Saha

The role of the Sunshine Act in reducing conflict of interest in medical research and patient care: A review of the literature

Financial ties between medical industry and health care professionals have a long history. It is recognized that this relationship is a vital part driving innovations in patient care. However, it is feared such relationships may pose a conflict of interest influencing medical education, research, and even decisions regarding patient care. Also this conflict of interest might be contributing to rising health care costs. Most medical journals require that physicians disclose conflicts of interest when publishing their research results. To increase transparency and shed light on the often-underreported ties between industry and physicians, congress has passed the Sunshine Act. Applicable manufacturers and Group Purchasing Organizations have to report payments and other transfers of value to covered physicians and teaching hospitals. Ownership and investment interest of physicians and immediate family members are to be reported as well. CMS will post this information annually on a public website. The goal of the Sunshine Act is not to undermine beneficial relationships, but to provide public information regarding payments, so that bias due to conflict-of-interest issues can be considered. The law stipulates that failure to report accurately and without delay will incur civil monetary penalties. Hopefully this will increase objectivity in published medical literature.

B21: Ahmed Eldib

Advisor(s):William P Urban

A Radiographic Analysis of Closed Reduction of Distal Radius Fractures

Introduction: Distal Radius Fractures account for a significant percentage (18%) of all fractures across the U.S. Assessments of radiographic parameters in the coronal plane (radial height, radial inclination) and sagittal plane (volar tilt and teardrop angle) are usually made on initial injury films; however, they are generally not measured on postreduction films or on films at time of union. More insight into the way these distal radius fractures heal, may allow us to better quantify the efficacy of closed reduction and casting as a form of definitive treatment. / **Methods:** A retrospective radiographic analysis was conducted on 42 patients who had undergone closed reduction and casting as definitive treatment employing the same radiographic software. Four radiographic parameters in the coronal plane (radial height, radial inclination) and sagittal plane (volar tilt and teardrop angle) were measured on initial injury and postreduction films. Another set of measurements was taken on films at time of fracture union at a mean followup of 5.8 months (range, 2-12.8). These measurements were compared for each patient. Differences between groups were compared using a paired Student's t test. / **Results:** The radiographic measurements revealed a mean prereluction height of 7.5mm (range, 3.9 to 16.2), an inclination of 14.4° (range, - 8 to 28.8), a tilt of - 9.9° (range, - 35.0 to 15), and a teardrop of 34.1° (range, 0 to 60). At the time of union height, inclination, tilt, and teardrop were significantly different from postreduction measurements (9.1 vs. 10.4, p=0.002; 17.3 vs. 19.4, p=0.003; 1.1 vs. 7.9; p<0.001; 44.5 vs. 49.9, p=0.002). / **Conclusion:** Although closed reduction allows for significant improvement in coronal and sagittal alignment on postreduction radiographs, there was regression of all parameters toward initial injury measurements at time of union. Future studies with correlation of radiographic parameters and clinical outcomes are warranted. /

B22: Devan VanLanen-Wanek

Advisor(s):William P Urban

Does the Saline Load Test Still Have a Role in the Orthopaedic World? A systematic review of the literature.

Introduction: Periarticular injuries are important to evaluate as joint penetration may result in septic arthritis. Although the gold-standard to evaluate the integrity of the joint capsule is surgical exploration, this requires extensive operative resources and is costly. Saline Load Tests (SLTs) have consequently been used in emergent settings to evaluate extension of periarticular wounds into capsule. Since no study has comprehensively evaluated the ability of SLT to detect open wound injuries within different joints, we systematically evaluated all literature. / **Methods:** We systematically evaluated the accuracy of the SLT in diagnosing penetrating joint injuries in the elbow, wrist, shoulder, knee, or ankle utilizing specific inclusion/exclusion criteria. / **Results:** The SLT values to determine knee arthrotomies vary from 73.8 mL to 194 mL with sensitivities ranging from 91%-99% depending on the size of the laceration. A SLT of 30 mLs in the ankle yields sensitivities ranging from 95-99% in assessing joint penetration. A SLT of 45 mL in the elbow yields a sensitivity of 95% in assessing joint penetration. The addition of methylene blue does not change the sensitivity of the SLT. / **Conclusion:** Penetrating joint injuries require prompt diagnosis to avoid deleterious sequelae. Several groups have demonstrated the utility of the SLT as a diagnostic modality for such injuries. However, the literature analyzed in this study was inconclusive and more studies are required to make definitive recommendations. In addition, more studies will be needed on joints other than the knee, pediatric patients, and the use of methylene blue dye in conjunction with SLT.

B23: James Messina

Advisor(s): William P Urban

The Effects of Meniscal Geometry on Susceptibility for Meniscal and ACL Injury in Non-Arthritic Knees

Introduction: It is hypothesized that gender, age, and body mass index may be risk factors associated with ACL and meniscal injuries. However, the relationship between intrinsic morphology and risk of injury is unclear. The majority of studies have focused on meniscal morphology/geometry and its association with degenerative tears in patients with end-stage osteoarthritis (OA), rather than acute meniscoligamentous injury. This study evaluated whether meniscal morphology was different in patients with intact menisci compared to those with meniscal or combined meniscal/ACL tears in non-OA knees. Methods: The clinical records and MRI of 120 non-OA patients who had either both intact menisci and ACL (Group 1), isolated meniscal tears (Group 2) or combined meniscal/ACL tears (Group3), were reviewed. MRI sequences of the knee were obtained in each group visualizing the menisci. The parameters assessed included height (mm), width (mm), diagonal (mm), slope (degrees), and cross sectional area (CSA) (mm²) for medial anterior (MA), medial posterior (MP), lateral anterior (LA), and lateral posterior (LP) horns of the menisci. Results: Differences in meniscal slope of patients with and without meniscal tears was not significant ($p=0.77-1.0$). Differences in height ($p=0.000-0.024$) and width ($p=0.000-0.046$) were significant. CSA was found to be significant. MA CSA (27.6mm² vs 34.9mm² (26% difference; $p<0.0001$)). MP CSA (43.5mm² vs 52.1mm² (19%; $p<0.0001$)). LA CSA (21.5mm² vs 27.8mm² (29%; $p<0.0001$)). LP CSA 24.9mm² vs 34.6mm² (39%; $p=0.012$). Discussion: We found no difference in meniscal size between isolated meniscal tears and concurrent meniscus/ACL tears. We conclude that a larger CSA is associated with meniscal tears regardless of a concurrent ACL tear. This indicates that meniscal tears are positively correlated with meniscal size.

B24: Zachary Berliner

Advisor(s): William P Urban

Longterm MRI-Followup and Quantification of Biodegradable Suture Anchor Drill Holes

Introduction: We followed drill-hole consolidation of poly-L-DL-lactic acid suture anchors on MRI of the humeral head. No other study has reported morphometry of biodegradable suture anchor drill-holes. Methods: After rotator cuff repair by insertion of suture anchors, patients returned to MRI follow-ups (FU) at 1, 3, and 10 years. Using Photoshop the drill-holes were categorized into 4 groups according to their shape, and the area of the drill-hole was measured. Results: At 16 months all 38 patients returned for the 1st FU. 45 threaded, 9 cylindrical, and 7 cystic drill-holes, yet no irregular contours, were seen. Of the initial 61 drill-holes a total of 39 were suitable for morphometry at the 1st FU. Compared to the original anchor, the drill-hole area of the 5mm diameter anchors increased by 55% and in case of the 6.5mm diameter anchor by 18%. At 36 months 15 of the original patients returned for the 2nd FU. 2 of the initial 21 threaded drill-holes remained threaded. Cylindric shapes had increased from 1 to 17 and 1 drill-hole had remained cystic. However, an irregular group emerged with 3 drill-holes. At the 2nd FU the area of 14 of the 23 drill-holes was measured. Compared to the original anchor, a decrease in drill-hole size by 28% and 53% was evident for the 5mm and 6.5mm anchors, respectively ($p=0.005$). At 10 years 10 patients, with originally 14 anchors inserted, were reevaluated. All but 2 drill-holes were consolidated. The remaining drill-holes were categorized as irregular and the area further diminished to 13% and 81% of the original anchor. Discussion: For up to 42 months all anchors remained visible. Hence, biodegradation and replacement by bone takes much longer than suggested by the manufacturer. After initial enlargement the drill-hole size tends to diminish. Degradation started at the peripheral threads of the suture anchors. Subsequent bone ingrowth from the defect wall most likely explains the shift from threaded to cylindrical drill-hole shape.

B25: Dipal Chatterjee

Advisor(s):Yoshihara Hiroyuki

Revision Surgery for “Real” Recurrent Lumbar Disk Herniation - A Systematic Review

Objective: To systematically review the previous literature regarding / revision surgery for real recurrent lumbar disk herniation. / Summary of Background Data: “Real” recurrent lumbar disk / herniation means the presence of herniated disk material at the / same level and side as the primary disk herniation. If conservative / treatment fails, revision surgery, a major concern, is / indicated. It is important for both patients and spine surgeons to / understand epidemiology trends and outcomes of revision surgery / for real recurrent lumbar disk herniation (real-RLDH). / Methods: The electronic databases PubMed, the Cochrane library, / and EMBASE were queried for English articles regarding / revision surgery for real-RLDH, published between January / 1980 and May 2014. The incidence, interval between primary / and revision surgery, risk factors, surgery type, complications, / and clinical outcomes of revision surgery for real-RLDH were / summarized. / Results: The reported incidence of revision surgery, specifically / for real-RLDH, lies between 1.4% and 11.4%. The complication / rate is reported between 0% and 34.6%, with dural tear / being the most common complication. Previous studies revealed / that satisfactory or successful clinical outcome was achieved in / 60%–100% of patients after revision surgery for real-RLDH. / Several studies reported similar clinical outcomes between primary / and revision surgery. / Conclusions: The incidence of revision surgery for real-RLDH is / relatively low. It is essential to pay careful attention to prevent a / dural tear. Patients may expect clinical outcomes similar to / those following primary discectomy. /

B26: Amir Momeni Boroujeni

Advisor(s):Alejandro Zuretti

Designing a probabilistic model for improving the diagnostic accuracy of troponin in patients with acute coronary events

We hypothesize that inclusion of clinical and paraclinical modifiers in the pretest probability of quantitative troponin testing and including them as an index in reporting of troponin results can be used to improve the diagnostic accuracy of troponin in identifying acute coronary events. The medical records of patients presenting to emergency department with a clinical suspicion of acute coronary event was reviewed and from them all patients who had troponin levels checked were included in the study. The positive end point was defined as either positive evidence in coronary angiography, ST segment elevation in ECG or sudden cardiac arrest within 7 days of presentation. A set of 22 clinical and paraclinical variables were evaluated in all patients. Bayesian model averaging was used and based on the posterior effect probability of the variables a probabilistic index was developed and the accuracy of including the probabilistic index value in reporting Troponin result was evaluated. 200 patients were included in the study. 36 patients had one of the positive end points (18%) and were considered as having suffered from an acute coronary event. The index assigned weights to each variable based on the posterior effect probability and the combined score was multiplied by the quantitative troponin assay. The internal validity of the index was tested by bootstrap model. Our results showed that quantitative troponin assay had a sensitivity of 72% and a specificity of 88%. By including the probabilistic index the sensitivity increased to 91% and the specificity increased to 93% which shows that using a pretest probabilistic index in reporting cardiac troponin results can significantly increase the diagnostic accuracy of the test.

B27: Joshua Kagan

Advisor(s):Jennifer Libien

c-Kit+ Uterine Myxoid Leiomyosarcoma in the Setting of a JAK3 Germline Mutation

Uterine myxoid leiomyosarcoma (UML) is a neoplasm arising from the smooth muscle cells of the myometrium. Although uterine leiomyomas are common, the malignant counterpart is exceedingly rare (1.3% of uterine malignancies), and its atypical variants are quite unique. In this case, a 66-year-old, African American woman presented with irregular postmenopausal bleeding and was subsequently diagnosed with a UML after a hysterectomy. Histologically, the tumor was composed of abundant aggressive, malignant, spindle cells in a myxoid background with extensive lymphovascular invasion (Figure 219). Further analysis of the tumor proved it was positive for desmin and smooth muscle actin and negative for CD10, supporting UML. In an effort to further characterize this neoplasm, c-Kit and Dog1 were found to be positive, and a JAK3 P132T missense germline mutation was found via next-generation sequencing. A literature review revealed no previous reports of a UML found to be positive for c-Kit or in the setting of a JAK3 mutation. It has been suggested that UML occurs in 4 of 1 000 000 women; although the more conventional variant is more common, this mesenchymal tumor has not been extensively studied. The therapeutic options of chemotherapy and radiotherapy have been shown to be ineffective at this time. Given the highly aggressive nature of this tumor and the lack of therapeutic options, c-Kit–targeted therapy should be pursued. This JAK3 mutation may prove to be a prognostic marker (as recently found in clear cell renal cell carcinoma) or to be just a bystander, but further case study is needed.

B28: Ahmed Gilani

Advisor(s):Jenny Libien

Characterizing GABAergic interneuron deficit in Holoprosencephaly

Normal brain function requires an intricate balance of excitation and inhibition. Local interneurons that secrete GABA contribute the major inhibitory input to pyramidal neurons in the cerebral cortex. These neurons also regulate excitatory inputs, spike timing of pyramidal neurons and are necessary for synchrony among excitatory neurons. Not surprisingly, alterations in GABAergic function have been implicated in various psychiatric and neurological conditions, most notably in epilepsy, schizophrenia, and autism. In spite of these clues, GABAergic interneuron function is seldom studied in neuro pathological analyses of pediatric neuro-developmental disorders. Majority of cortical GABAergic interneurons are produced in a neuroproliferative zone overlying the future basal ganglia, called the ganglionic eminence (GE). Specific regions within the GE contribute distinct subtypes of GABAergic interneurons, each occupying a unique niche in the cortical circuit. A previous study (Fertuzinho et al, 2009) showed that in Holoprosencephaly, a disorder with incomplete separation of the right and left hemispheres, specific classes of GABAergic interneurons were reduced. To further characterize interneuron deficit in Holoprosencephaly, we used immunohistochemical markers that label interneurons produced in the medial (Sox 6) and caudal (COUP-TFII) divisions of the GE to test whether these proliferative zones are differentially affected in Holoprosencephaly. Our preliminary results show severe reduction in MGE derived interneurons, but a relative preservation of CGE derived interneurons. These results show that selected neuronal populations with distinct function are altered in human Holoprosencephaly.

B29: Daniel Levitan

Advisor(s):Jenny Libien, Anthony D. Nicastrì, Susan R.S. Gottesman, and Raavi Gupta

Type I Cryoglobulinemia in Chronic Lymphocytic Leukemia: A Rare Association

Most cases of type I cryoglobulinemia arise in the setting of Waldenström macroglobulinemia or multiple myeloma. We present a rare case of type I cryoglobulinemia in a patient with chronic lymphocytic leukemia (CLL). A 59-year-old woman presented with abdominal pain and bilateral, cutaneous, distal leg lesions. Computed tomography showed a retroperitoneal hematoma due to right gonadal artery rupture. Simultaneously, the patient was found to have renal insufficiency with proteinuria and a lymphocytosis of 45,000/ μ L. Flow cytometry showed an sIg κ -restricted B-cell population (54%) with a phenotype consistent with CLL: CD19+, CD20+, CD5+/-, CD10-, CD23+/-, FMC7+, CD38+, CD11c+/-, and HLA-DR+. Fluorescence in situ hybridization revealed deletions of ATM/11q and 13q, and trisomy 12. Renal biopsy was complicated by hemorrhage, resulting in nephrectomy. Microscopically, the kidney showed interstitial and perirenal lymphoid infiltrates consistent with CLL. Also seen was membranoproliferative glomerulonephritis with extensive segmental luminal deposition of hyaline material suggestive of cryoglobulin. Immunofluorescence of the deposits was strongly positive for IgG and weak for IgM with κ more extensive than λ . Serum cryoglobulin testing revealed a cryocrit of 5% with IgG κ specificity by immunofixation. Cryoglobulin was visualized on peripheral blood smear and resulted in aberrant platelet counts by automated analysis. Tests for HIV, HTLV-1 and HTLV-2, hepatitis B, hepatitis C, cytomegalovirus, and ANA were negative, further supporting CLL as the sole cause of the cryoglobulinemia. We reiterate that CLL with type I cryoglobulinemia is a rarely reported association and should be suspected in cases of CLL with renal failure.

B30: Khurram Shafique

Advisor(s):Raavi Gupta, Ahmed Gilani, Twisha H Oza, Chuanyong Lu, and Jose V S Carniello

Teflon coated gauze: Does it affect retrieval of endometrial specimens?

Endometrial biopsy and curettage are commonly performed diagnostic procedures to assess uterine pathology. Adequate endometrial specimen collection is important to formulate an accurate diagnosis. Review of literature shows that 2 to 60% of endometrial samples may be non-diagnostic due to insufficient specimen. Multiple factors may determine the adequacy of the specimen. Teflon coated gauze (TCG) are frequently used for collecting endometrial specimens. The aim of our study is to compare the adequacy of endometrial specimens when retrieved from TCG during grossing endometrial curettage and biopsy specimens. We retrospectively evaluated 200 cases of endometrial specimens, half of which were collected on formalin soaked Teflon coated gauze (TCG group) and later placed in a container. The other half comprised of endometrial specimens which were directly placed in formalin container (Non-TCG group). Non-diagnostic cases are defined as cases which included “scant”, “insufficient” or “inadequate” in their final pathologic diagnosis. The age group ranged from 20 to 80 years. Total number of cases with non-diagnostic results are 60/200 (30%) of which non-diagnostic cases in TCG group were 28% and that in non-TCG group were 32% (Chi sq test C2 (1, N=200) =0.38, p=0.54). Non-diagnostic rate in post-menopausal women, i.e. age >50 years, of TCG group is 39% that in Non-TCG group is 50% (Chi sq test C2 (1, N=97)=1.23, p=0.26). In comparison to this, non-diagnostic rate in pre-menopausal women, i.e. age <40 years is less i.e 21% in TCG group and 7% in Non-TCG group (Chi sq test C2 (1, N=32)=1.04, p=0.30). In conclusion, Teflon coated gauze, even though has a tendency to trap endometrial tissue within its fibers, does not significantly contribute to non-diagnostic rate. We also showed that non-diagnostic rate in post-menopausal women is higher compared to pre-menopausal women irrespective of use of TCG, which is in concordance to previously published data.

B31: Nigar Anjuman Khurram

Advisor(s):Constantine Axiotis

Utilization of *H. pylori* immunostaining in gastric biopsies: A cost-effective diagnostic algorithm

Background: Emphasis on immunohistochemistry (IHC) to confirm the presence of *H. Pylori* (HP) has become routine for evaluation of gastric biopsies. It is unclear if this is a necessary and cost-effective test. We performed a retrospective study of gastric biopsies in order to address diagnostic accuracy and cost-effectiveness. Design: 129 H&E stained gastric biopsies with concomitant HP IHC were independently evaluated by two pathologists and rated for acute & chronic inflammation, erosion/ulceration, edema, lymphoid aggregates, intestinal metaplasia, foveolar hyperplasia, atrophy and presence of HP on H&E. HP status was confirmed by IHC. A binary logistics regression analysis was performed with HP IHC results as the dependent variable. Regression coefficients (β) of the significant variables were assigned as weights and an algorithm for predicting HP results was designed. The cutoff points for the score with the highest specificity and highest sensitivity were decided utilizing ROC curve. Results: Logistic regression identified HP organisms on H&E (p value<0.01, β : 1.32), moderate/severe chronic inflammation (p value<0.01, β : 1.29), acute inflammation (p value<0.05, β : 1.16) and lymphoid aggregates (p value<0.05, β : 1.13) as features to be included in the diagnostic algorithm. The scoring system (AUC: 0.842) assigns scores between 0 to 4.9 with scores below 1.225 ruling out HP in 95.9% of cases (sensitivity) and scores above 3.095 corresponding to a positive HP rate of 96.3% (specificity). Conclusions: Features in our diagnostic algorithm for HP gastritis are HP on H&E, moderate/severe chronic inflammation, acute inflammation and lymphoid aggregates. Scores below 1.225 rule out HP in 95.9% of cases eliminating the need for HP IHC. Scores above 3.095 rule in HP in 96.3% of cases. The cost of a single HP IHC is \$175. Using this algorithm HP IHC can be avoided in 2/3 of cases; this translates to millions of dollars of saving in healthcare cost.

B32: Matthew Troy-Regier

Advisor(s):Ivan Hernandez

The Role of Ribosomal RNA Expression in Learning and Memory

Memory formation requires new protein synthesis translated from new messenger RNA (mRNA). Our lab recently showed that new ribosomal RNA (rRNA) synthesis is also necessary for long term potentiation, a key component of synaptic plasticity, a cellular process involved in memory. rRNA synthesis is performed by RNA Polymerase I (Pol I) and accounts for a majority of all RNA in the cell. Additionally, rRNA synthesis is regulated through the action of enzymes and transcription factors. Based on these observations, we hypothesize that synthesis of new rRNA is necessary for long term memory formation. To investigate this possibility, we pharmacologically manipulated Pol I activation in mice performing the active place avoidance memory task. We found that when rRNA expression is inhibited in the hippocampus, animals exhibit reduced recall of previously learned spatial information. Conversely, up regulation of rRNA during training enhances performance on the active place avoidance task. This provides behavioral evidence for the necessity of rRNA for memory.

B33: Yagnaram Ravichandran

Advisor(s):Sheila Perez-Colon and Aditi Khokhar

Sex Maturity Rating - National Survey on Attitudes, Knowledge and Practices of Pediatric Trainees

Background and Objectives : Sex Maturity Rating (SMR)/Tanner Stages define different levels of sexual maturity based on / development of secondary sexual characteristics. Periodic assessment of pubertal maturation by / physicians is crucial for timely identification of puberty related disorders. With this study, we / aimed to assess the attitudes, knowledge and practices of current US pediatric trainees regarding / pubertal assessment in pediatric patients. Methods: An anonymous online survey questionnaire was sent to pediatric trainees at different levels of / training across United States. Results: Twenty two hundred and thirty one complete responses were received. Our results showed that / 96% trainees understand the importance of assessing SMR in pediatric population, 62% trainees / feel confident in assessing SMR and 55% feel comfortable assessing the need for an / Endocrinology referral based on abnormal SMR for age. Only 33% trainees perform genitalia / examination on each regular clinic visit while 27% trainees never perform genitalia examination / during sick clinic visits and 6% trainees never assess SMR during regular clinic visits. Comfort / levels, practices and knowledge of trainees regarding pubertal assessment improve with higher / level of training and after an Endocrinology elective. Conclusion: This study revealed that the confidence and comfort levels of pediatric trainees in assessing SMR / and recognizing abnormal pubertal maturation are sub-optimal. There are deficiencies in their / practices regarding genitalia examination and pubertal assessment. It emphasizes the importance / of Endocrinology rotation in improving the attitudes, practices and knowledge of pediatric / physicians in training regarding pubertal assessment.

B34: Hussam Alharash

Advisor(s):Henry Schaeffer

Can a customized website for a pediatrics training program improve resident organization and communication?

Background: A common challenge among pediatric residency programs in the United States, is the organization of the administrative and academic components. Prior to 2015, chief residents from our program emailed daily schedules / announcements to a list of 200+ residents, fellows and attendings. Email lists, while useful, are limited to being unidirectional communication with no dialogue, hindered content, and are ineffective due to "alarm fatigue" in many of the recipients. / Objective: Create a chief resident-run website which also functions as a mobile app for housestaff, fellows and faculty. The purpose of the site is to eliminate the need for the mass daily emails and to improve communication, transparency and education in the administrative and academic elements of the residency training program. / Methods: A website (res-aid.org) was created on a Joomla platform with a MySQL database utilizing both PHP and Javascript with open source off the shelf front end styles and CSS. Key features of the site include: direct messaging with the chief residents, access to the academic calendar, the ability to participate in forums for thread based discussions, access to resident manuals with clinical pathways and procedures. A searchable contact list for the entire hospital in addition to links for useful tools and commonly used resources are available. A survey was sent out to all residents two weeks after the initial launch to assess resident's feelings on the utility of the site. / Results: 49 (60%) residents replied to the survey. Of those who replied, 87.5% felt emails from the program had decreased, 61% felt access to materials had improved, and 53% felt they had improved access to the academic calendar. / Conclusions: Implementation of a centralized website to supplement the administrative, academic and educational needs of a large pediatrics training program, has had a positive impact on resident's perception of program communication.

B35: Keyar Mehta

Advisor(s):Henry Schaeffer

Does implementing groups within a large pediatrics training program improve the academic experience of residents?

Background: Among larger programs, a common concern of many incoming residents is getting “lost in the group” and not gaining the opportunity to assume leadership roles and develop cooperative skills. A technique utilized by larger companies and departments, breaking up larger groups into smaller teams helps promote team identity and develops management skills. / Objective: Incorporation of a “groups” system into a residency program to promote more dynamic participation and teamwork in resident education. / Methods: All 83 pediatric residents were divided into 5 groups; each group consisted of PGY 1, 2 and 3 residents, organized based on continuity clinic day. In July, 2015, senior residents were assigned to groups with incoming interns. Groups were assigned a series of academic projects to complete throughout the year (ie; journal clubs, lectures). Residents were surveyed on their experiences with the group system. / Results: 49 (60%) residents replied to the survey. Of those who replied, 45% felt the groups improved the quality of their resident education experience, 44% felt it developed leadership/teamwork skills. Significant differences existed between classes: 70% of interns versus 40% of PGY 3’s felt it positively impacted their education. / Conclusions: Overall, residents did not feel that the group system improved the quality of their education nor assisted in the development of leadership skills, however, this varied based on training year. Senior residents responses negatively skewed overall results, while interns reported positive experiences. This is possibly due to the seniors having to adopt a new system late in their training as opposed to interns ingrained into it on day 1.

B36: Peter Patalano

Advisor(s):Jeffrey Birnbaum

HIV/HCV Counseling and the Medical Interview: A Prospective Study Assessing Medical Student Comfort and Confidence in Sensitive History Taking after Training and Counseling Experience

Abstract: Communication skills are fundamental to establishing a strong patient doctor relationship, especially in the collection of sensitive patient history, including sexual activity. Medical school curricula attempt to address this critical clinical skill, however students may feel unprepared when eliciting social and sexual histories. The RISE program at the Brooklyn Free Clinic trains students to provide patients with comprehensive counseling and HIV/HCV testing. The purpose of this research is to assess the effectiveness of RISE training and HIV/HCV counseling in preparing students to confidently elicit social and sexual histories. RISE participants were matched to controls and surveyed after training and upon the completion of 3 counseling sessions via Likert scale. Data was converted to 5-point nominal data for comparison, the mean survey score of the two groups were compared and an independent sample t-test for testing statistical significance was applied. When comparing overall mean scores, counselors had an increased comfort level across all but one parameter. Overall mean for comfort/confidence score for counselors (3.85) varied from the control group (3.40) by +0.45 ($p = 0.000322$). Compared to their matched controls, counselors were significantly more comfortable and confident in assessing histories over time, whereas no significant difference was observed among controls over time (initial = 3.23, final = 3.36, $p = 0.13$), there was a significant increase in mean score among counselors (initial = 3.51, mean = 4.21, $p = 1.69E-06$). Implementing structured such as this improves comfort and confidence in history taking immediately and over time when compared to not participating. Although medical school curriculums attempt to address and familiarize students with sexual and social history taking, such measures may not be completely effective. Curricular measures may be augmented through the implementation of structured programs outside of the classroom.

B37: Swashti Agarwal

Advisor(s):Sheila Perez-Colon

Williams Syndrome and 15q Duplication Syndrome: Co-incidence vs Association?

Williams syndrome (WS), caused by continuous gene deletion at 7q11.23, is commonly associated with distinctive facial features, supravalvular aortic stenosis (SVAS), short stature, hypercalcemia, developmental delay (DD), joint laxity and friendly personality. The clinical features of 15q11-q13 duplication syndrome include autism, mental retardation, ataxia, seizures, DD and behavioral problems. We report a rare case of genetically confirmed WS with coexisting 15q duplication syndrome. A 17-year-old girl with H/O precocious puberty and short stature presented with primary amenorrhea. She received leuprolide treatment from age 7 to 11 years and growth hormone therapy from age 8 to 11 years. History was significant for global DD, SVAS (s/p surgical repair), failure to thrive requiring G tube placement and juvenile idiopathic scoliosis. On presentation at 17 years, physical exam revealed short stature, dysmorphic facial features including hypertelorism, flat nasal bridge and prominent nasal tip, full lips, poor dentition, joint hyperlaxity, scoliosis, tanner 4 breast and pubic hair. She had low estradiol level for age 18.7 pg/ml (34-170 pg/ml) with inappropriately normal gonadotropin levels: LH 2.48 mIU/ml (0.4-11.7 mIU/ml) and FSH 7.18 mIU/ml (1.0-9.2 mIU/ml). She had normal total testosterone and thyroid function tests. She failed progesterone challenge test. USG and MRI pelvis showed hypoplastic uterus and ovaries for age. MRI brain at age 8 years showed arachnoid cysts and normal pituitary gland. Genetic testing revealed 47,XX,+mar karyotype. FISH analysis for the marker chromosome showed partial trisomy/tetrasomy for proximal chromosome 15q (15p13- >q13). FISH using an ELN-specific probe demonstrated a deletion on the WS critical region at 7q11.23. To our knowledge, co-existence of WS and 15q duplication syndrome has not been reported. Our patient had unusual pubertal development with early puberty followed by central hypogonadism years after leuprolide treatment.

B38: Yitzchok Norowitz

Advisor(s):Stephan Kohlhoff

Relationship of Influenza Virus Infection and Complications from Viral/Bacterial Infections in a Community Based Setting

Rationale: Influenza virus is a major health care burden and is associated with significant morbidity and mortality. Data on morbidity and complications (pneumonia, otitis media) related to influenza virus infection in primary care settings are limited with reports mainly obtained from hospital settings. We assessed the prevalence of complications from viral/bacterial infections in influenza- positive compared with influenza- negative children presenting with influenza-like illness (ILI) in a primary care setting. Methods: This retrospective, practice-based chart review studied complications from viral/bacterial infections in 255 children and adolescents (females/males, 1-21 years) who presented with ILI. We also compared the prevalence of complications by influenza vaccination status between influenza positive and influenza negative cases (2013-2015). Comparisons for categorical variables were made using chi-squared tests. Results: The prevalence of complications (pneumonia, otitis media) was similar in influenza positive and influenza negative patients (P=NS), with the exception of tonsillitis, which was more common in patients who tested positive for Influenza B (P=0.015). Patients presenting with ILI, who were vaccinated, were less likely to test positive for influenza compared with patients who weren't vaccinated (P=0.064). However, prevalence of infections was similar in both groups based on vaccination status. We did not find any effect of type of health insurance on influenza status (P>0.05) Conclusion: In a primary care setting, common respiratory complications of seasonal influenza did not differ in influenza positive compared with influenza negative patients. Vaccination with influenza vaccine may result in decreased duration or severity of symptoms, and remains an important public health intervention. /

B39: Sadaf Saghier

Advisor(s): Steven Schwarz and Simon Rabinovich

Foveolar Morphology in Normal Gastric Tissue and in H. Pylori Gastritis

Introduction: Foveolar hyperplasia (FH) was originally defined by Dixon's Criteria as a semi quantitative increase in the length and tortuosity of the foveolae, combined with expansion of the proliferative compartment. It was further modified by introducing visual analogs. FH in adults has been associated with chemical and H. pylori gastropathy. However, morphologic descriptions of foveolar anatomy in pediatric gastric mucosal biopsies (both normal and diseased) have not been clearly elucidated. **Aim:** The present study sought to determine foveolar morphometric characteristics in pediatric subjects under-going routine upper endoscopy to evaluate possible gastric inflammatory disease. **Methods:** Gastric biopsy specimens were examined from 59 children (ages 2-19 yrs) undergoing endoscopy for dyspeptic symptoms. Included were 37 biopsies read as histologically normal and 22 biopsies demonstrating H. pylori infection. No patients had received treatment with NSAIDs; and 6 subjects (all normal) had received treatment with PPIs for a maximum of 60 days prior to study. Gastric biopsies (H & E stained) were evaluated for total mucosal thickness (MT), foveolar Length (FL) and the FL:MT ratio. From the superficial epithelium border, FL was measured to the lower most part of the gastric pit and MT was measured to the upper border of the muscularis mucosa. **Results:** Statistically significant increases, both in gastric body and in antral mucosal thickness, with parallel increases in foveolar length, were detected in association with H. pylori gastritis. However, no significant, between-group differences were observed in FL: MT ratios. **Conclusion:** 1) This data indicates parallel increase, both in mucosal thickness and foveolar length, may be associated findings in pediatric subjects with H. pylori gastritis. 2) Foveolar lengthening, independent of increased MT, as reported in adult subjects with gastric inflammatory disease, does not characterize H. pylori gastritis in children.

B40: Sibel Guzel

Advisor(s): Sukhvinder Ranu, Tom Mundakel and Ivan Hand

Early Onset Sepsis in Newborns- Five Year Experience at an inner-city hospital in Brooklyn, NY.

Background: The incidence of early onset sepsis (EOS) in the US is estimated to be 0.77 cases per 1,000 live births. Low absolute risk of EOS suggests a need to improve the efficiency of EOS risk assessment and modification of current evaluation algorithms. **Objective:** To determine the local incidence of EOS for term and late preterm newborns and to look at the distribution of risk factors such as clinical symptoms, laboratory and maternal factors in assessing EOS risk. Our hypothesis is that a significant part of the newborn population is being evaluated and is receiving broad spectrum empiric antibiotics even though they are at low risk for EOS. **Design/Methods:** A retrospective electronic medical record review was done for all term and late preterm babies born between Jan 2010 and Dec 2014 and evaluated for EOS and started on antibiotics empirically. Mean & Standard Deviation of birthweight & gestational age at delivery were calculated and a Wilcoxon rank-sum test was used to compare distributions of positive and negative blood culture groups. **Results:** 3659 newborns were admitted to NICU. 771 newborns were evaluated for EOS. 19 newborns were found to have positive blood culture. 14 were considered true positives resulting in an incidence of early onset sepsis 1.14/1000 live births. GBS was the most common organism (50%). There were no significant differences between gestational age, birth weight, mode of delivery and presence of respiratory symptoms between two groups. But other symptoms and positive Chest X-rays findings were significantly higher in the positive blood culture group. Maternal risk factors including GBS status, chorioamnionitis and prolonged rupture of membrane were higher in the negative culture group. **Conclusions:** Our study confirmed that current risk assessment strategies do not accurately identify predictors of EOS, a search for better predictors of EOS is warranted to facilitate a decrease in antibiotic use in infants at low risk for EOS.

B41: Tehila Saadia

Advisor(s): Tamar Smith-Norowitz and Stephan Kohlhoff

IgE Anti-Haemophilus Influenzae Type b (Hib) Antibodies Detected in Serum of Hib Vaccinated Asthmatic and Non-Asthmatic Pediatric Patients

Rationale: Haemophilus influenzae type b (Hib) is a bacterium that causes severe illness in infants and children and has not been linked to atopy and asthma. While the effects of certain vaccinations on atopic disease have been well-studied, little is known about the relationship between Hib vaccination and diseases of altered IgE regulation (asthma and atopy). / Methods: Total serum IgE and IgE- and IgG-anti-Hib antibody responses were studied in Hib vaccinated asthmatic (N=14) and non-asthmatic children (N=26) (VaccZyme™ Human Anti Hib Enzyme Immunoassay Kit). Data are reported as mean optical density (OD) values. / Results: We found that (1) total serum IgE levels were higher in asthmatic compared with non-asthmatic subjects ($P < 0.001$), and (2) IgE- and IgG- anti Hib antibody responses were similar in both asthmatic and non-asthmatic subjects (0.722 ± 0.279 , 0.681 ± 0.28 , respectively, $P = 0.65$; 0.450 ± 0.505 , 0.573 ± 0.779 , respectively, $P = 0.584$). / Conclusions: The universal Hib vaccine antigen does not result in either increased IgE- or IgG- anti-Hib antibody responses in asthmatic or non-asthmatic subjects. Thus, in this cohort, we did not find an association / between Hib vaccination and asthma status.

B42: Tanni Farook

Advisor(s): Vatcharapan Umpaichitra

Differences between Metabolically Healthy vs Unhealthy Obese Children and Adolescents

Obesity is on rise worldwide. A subgroup of obese individuals, referred as Metabolically Healthy Obese (MHO), is resilient to the unfavorable effects of obesity. The predictors of MHO are not well known. Objective: To find predictors of MHO and Metabolically Unhealthy Obese (MUO) subtypes in children and adolescents. / Methods: A retrospective chart review was done for children aged 4 -19 years with BMI ≥ 95 th %tile, seen in pediatric endocrine clinics between 07/ 2014 & 06/2015. Patients were grouped as MHO or MUO, where MUO was defined as meeting ≥ 1 of the following: Fasting glucose ≥ 100 mg/dl, HbA1C $> 5.6\%$, BP ≥ 90 th %tile, TG ≥ 150 mg/dl and HDL < 40 mg/dl. Insulin resistance index (HOMA-IR) was calculated as fasting glucose (mg/dl) x fasting insulin (mU/l) $\div 405$. Chi-square & T-tests were used to compare the 2 groups. / Results: 189 charts were reviewed, of which 71 (37.6%) were MHO. Almost 99% subjects were African-American. Mean ages were: MHO 11.6 ± 3.3 yr (mean \pm SD) and MUO 12.9 ± 3.2 , $p < 0.009$. MUO had higher BMI %tile (98.8 ± 2.1 vs 98.4 ± 1.4 , $p < 0.04$), bigger waist circumference (WC) (100.6 ± 19 cm vs 93.3 ± 16.3 , $p < 0.006$), bigger hip circumference (HC) (113.5 ± 15.4 cm vs 104.2 ± 17.1 , $p < 0.0005$), higher fasting insulin (24.2 ± 14.3 μ U/ml vs 18.5 ± 10.2 , $p < 0.022$), and higher HOMA-IR (5.5 ± 3.6 vs 4.1 ± 2.4 , $p < 0.022$). Acanthosis nigricans (AN) was noted more frequently in MUO than MHO ($p < 0.015$). Higher WC, HC, BMI %tile, insulin levels, HOMA-IR and presence of AN increased the odds of being MUO. In stepwise logistic regression, age (OR 0.84, 95% CI 0.76-0.93, $p < 0.001$) and BMI %tile (OR 0.71, 95%CI 0.54-0.93, $p < 0.012$) were significant predictors of MUO. Wt & ht %tile, liver & thyroid functions, vitamin D, cholesterol and LDL levels were similar between MHO and MUO. / Conclusion: More than 1/3 of obese children are MHO. Patients with MHO phenotype are younger and have lower BMI %tile. Lifestyle interventions initiated at an early age might prevent metabolic abnormalities.

B43: Shipra Bansal

Advisor(s):Vivian Chin

Survey Assessment of Knowledge, Attitudes and Practices of US Pediatric Residents Regarding Newborn Screening

Background: Pediatricians' knowledge about newborn screen (NBS) and their response can impact patient's care. Some pediatricians have reported that they are not well prepared to inform families and follow-up positive NBS. There are no studies of pediatric residents' (RES) knowledge, attitudes and practice (KAP) regarding NBS. / Objective: To assess pediatric residents' KAP towards NBS. / Methods: An IRB-approved anonymous survey of US categorical RES was emailed via the Section on Medical Students, Residents and Fellowship Trainees maintained by American Academy of Pediatrics. The survey assessed knowledge, attitudes and practices. Frequency tables and linear regression analysis were completed. / Results: Out of 821 responses, 655 (260 PGY1, 192 PGY2, 175 PGY3, and 28 PGY4) were analyzed, 96% and 94% had completed nursery and NICU rotations. The mean knowledge score (KS) was 17.7 ± 1.8 (12-21) out of maximum 21. Training level ($p=0.001$) and the completion of NICU rotation ($p<0.001$) significantly improved KS. / Higher level RES frequently followed NBS results in clinic ($p=0.0027$) and knew the agency to contact for results ($p<0.001$). RES were not more likely to discuss the rationale for testing, discuss or follow results with parents in nursery or NICU even with more rotations, higher training level, or being a parent of US born child. / Majority RES felt that NBS is useful for screening (96%) and agreed upon the pediatrician's role in counseling (99%). Only 62% felt comfortable doing so. They (82%) reported a need for more training during residency. Majority (75%) were not familiar with ACTION sheets, clinical algorithms developed by American College of Medical Genetics for NBS follow-up. / Conclusions: RES have excellent knowledge regarding NBS and agreed upon their role but a majority do not explain, counsel or follow-up NBS results in NICU or nursery. This data supports the need for earlier education with emphasis on tools available for NBS in pediatric residency program.

B44: Aditi Khokhar

Advisor(s):Vivian Chin

Comparison of A1c to OGTT for the Diagnosis of Prediabetes in Overweight and Obese Youth

Background: The use of glycosylated hemoglobin (A1c) to diagnose prediabetes (pDM) and diabetes in children has not been validated despite ADA guidelines recommending its use for pDM (A1c 5.7-6.4%) and diabetes (A1c $\geq 6.5\%$). When compared to the gold standard oral glucose tolerance test (OGTT), A1c has lower performance. / Objective: To evaluate A1c as a diagnostic tool for pDM in overweight/obese children against OGTT. / Methods: Retrospective chart review of children with A1c and OGTT in past 10 years, excluding those with anemia, metformin use or diabetes was completed. Impaired fasting glucose (100-125 mg/dl) and impaired glucose tolerance (2 hr glucose 140-199 mg/dl) defined pDM. Area under curve (AUC) for glucose and insulin were calculated by trapezoid rule. HOMA-IR was calculated as $[\text{fasting glucose (mg/dl)} \times \text{fasting insulin (mU/l)}] / 405$. / Results: A total of 230 subjects, aged 6-21 years (mean 13.5 ± 2.9 years, 83% black, 57% females) with mean BMI 34.4 ± 7.7 kg/m² and mean A1c $5.7\% \pm 0.5$ were included. 129 subjects had A1c $\geq 5.7\%$; 60 had pDM. pDM group had higher A1c (5.89% vs 5.64%, $p<0.001$), AUC glucose (130 vs 104, $p<0.001$), HOMA-IR (5.6 vs 4.6, $p=0.01$), and 2 hr insulin (177 vs 107, $p=0.02$) than normal OGTT group. By Fisher's exact test, OGTT and A1c were significantly associated ($p=0.01$) with 70% sensitivity (sn) and 48% specificity (sp). Receiver-operating characteristic (ROC) curve revealed that A1c alone does not provide good discrimination for pDM but higher A1c was associated with pDM (OR 3.1, 95% CI 1.6-6.2, $p=0.001$). In stepwise regression analysis, BMI z-score (OR 0.39, $p=0.04$), A1c (OR 5.89, $p<0.001$) and HOMA-IR (OR 1.13, $p=0.001$) were significant predictors of pDM, adjusted for age. All three predictors together improved the ROC curve for pDM. / Conclusion: A1c alone is not a good discriminator of pDM in children, however when combined with BMI z-score and HOMA-IR, improves performance. A1c $\geq 5.7\%$ has high sn but low sp for predicting pDM.

B45: Julie Parato

Advisor(s):Sheryl Smith

Synaptic pruning in the dentate gyrus during adolescence: A role GABA-A receptor $\alpha 4$ subunit

Synaptic pruning during adolescence is a widely accepted process (Yildirim et al., 2008). This decrease in spine density at puberty is thought to be important for normal cognition because it is abnormal in neurodevelopmental disorders (van Spronsen and Hoogenrad, 2010). It is known that $\alpha 4\beta\delta$ GABAA receptors (GABARs) play a role in pubertal synaptic pruning in the CA1 hippocampus of the female mouse. Additionally, NMDA receptor activation is known to maintain spine stability (Utanir et al., 2007). The presence of $\alpha 4\beta\delta$ GABARs, which increase expression on the dendritic spine of CA1 pyramidal cells at puberty, inhibits NMDA receptor activation by a shunting inhibition (Shen et al., 2010). Consequently, we tested the hypothesis that $\alpha 4\beta\delta$ GABARs also play a role in synaptic pruning on the granule cells of the dentate gyrus (DG). Thus, we examined spine density at the onset of puberty (PND 35) compared to post-puberty (PND 56) in the female mouse. Spine counts obtained using the Golgi method. The data show that spine (sp) density decreases by 41% across adolescence in the dentate gyrus (Pub, 1.7 sp/um, Post, 1.0 sp/um, $P < 0.05$). Spine density was significantly greater in the post-pubertal $\alpha 4^{-/-}$ (1.8 sp/um, $P < 0.05$). IHC staining of granule cells in dentate gyrus for $\alpha 4$ (antibody sc7355) at PND 42 showed an 18% increase in luminosity compared to PND 28 ($P < 0.05$), demonstrating an increase of $\alpha 4\beta\delta$ at puberty. Electrophysiological recordings from DG granule cells also show an increase in $\alpha 4\beta\delta$ receptors at puberty because current generated by 100 nM THIP, a GABA agonist selective for δ , was 3-fold greater at PND 42 compared to PND 28 ($P < 0.05$). These data suggest that $\alpha 4\beta\delta$ GABAR expression plays a role in adolescent synaptic pruning of the DG.

B46: Aditya Tarigoppula

Advisor(s):Joseph Francis

Dynamics of the reward signal in M1 and PMd.

We have recently discovered that the primary motor cortex (M1) in non-human primates (NHPs) modulates with respect to the presence or absence of a juice reward at the end of the trial (Marsh et al. 2015). Such a reward signal has also been observed in various other deep brain and cortical structures (Roesch and Olson 2003, 2004, Schultz 1997, 2002). Here we investigate the dynamics of such a reward signal in M1 and PMd under various reward contingencies and with multiple levels of reward. Contingencies include changing the percentage of the random rewarding trials in a given session from 50% to 75% to 90%. The other contingency provides a structured sequence of rewarding and non-rewarding trials (R-NR-R-NR-R etc). Such experiments will allow us to understand the representation of the perceived reward probability by the NHP in M1 and PMd. Multiple levels of reward include one/two or three levels of juice reward at the end of a successful trial to see if M1 and PMd encodes the value of a trial.

B47: John Hessburg

Advisor(s): Joseph Francis

Decoding reward and punishment in sensory and motor regions of non-human primates

Signals of reward and punishment representation have been recorded in a number of areas in the brain, and this work is continuing that investigation in the sensory, motor, and premotor regions. Two non-human primates (NHP) were trained to complete a gripping task on a virtual robotic arm, where the animal gripped and held a given level of force for a specified period of time. Prior to each trial, visual cues were displayed to inform the NHP if the trial would result in a juice reward if completed successfully, a punishment consisting of a five-second timeout if completed unsuccessfully (e.g. if the applied force was too great or released too early), or no reward or punishment, where the task would move immediately to the next trial. Subsets of trials with no cues and with catch trials, where a cue was presented but no reward or punishment given, were included as well to investigate reward and punishment prediction and error. Neural data were recorded from M1, S1, PMd, and PMv, and spike sorted to isolate individual units. Time intervals around the cue presentation and reward delivery were analyzed through principal component and linear discriminant analysis on the firing rate data. Investigating the intricacies of these reward and punishment signals in the primary sensory and motor regions will allow future brain machine interfaces to capture the breadth of these signals in one or two brain regions, rather than requiring multiple implants in multiple regions. These data will be useful in creating algorithms for more robust and nuanced brain machine interface control, taking greater advantage of the range of information available in these regions for better neural control of robotic prostheses. /

B48: Peng Gao

Advisor(s): Joseph Francis, Jeffrey Goodman and Ivan Hernandez

Layer-specific Dynamics in the Sensorimotor Cortex during Motor Learning

Laminar organization of sensorimotor circuits reflects the input-output relationships crucial for information processing while learning new motor skills. Studies have been conducted to investigate the cortical projection patterns and modification of local synaptic circuits, however, a broader understanding of layer-specific transformations along the temporal dimension is missing. In this study, rats were trained in a skilled reaching task with their preferred forelimb, after which the temporal changes of synaptic strength and structural modification in different regions and layers were examined. PKM ζ , an atypical protein kinase C (aPKC) isoform, which have been suggested to be both necessary and sufficient for the maintenance of the increasing synaptic strength during learning, is selected as the marker for synaptic plasticity in our study. Meanwhile, PSD-95, a major postsynaptic scaffolding protein, is utilized to track the structural modification of neuronal connections. Our preliminary immunohistochemistry data showed a significant increase in PKM ζ expression on layer II/III of somatosensory cortex (S1), layer II/III and layer V of primary motor cortex (M1) when the reaching performance reached a plateau. This increased level was sustained with extended training and is likely to contribute to the long-term storage of motor memory. In addition, there appeared to be a positive correlation between the enhancement of PKM ζ expression and PSD-95 clustering during the acquisition stage of learning. The significantly increased level of PSD-95 was not sustained with extended training after the skill was fully mastered. This PKM ζ -dependent synaptic plasticity may participate in the transformation to maintain well-learned motor skills, whereas the structural modification might only involve in adapting new motor skills. /

B49: Christine Ghobrial

Advisor(s):Mark Stewart

The Role of Cardiac Lineage Protein (CLP)-1 in Stress-Induced Myocardial Infarction

Cardiovascular disease is one of the leading causes of death worldwide. A sufficient loss of cardiomyocytes results in a process of remodeling, which includes inflammatory responses that remove debris, followed by fibroblast transdifferentiation to replace muscle tissue. The Siddiqui laboratory had identified a protein called cardiac lineage protein 1 (CLP1) that is involved in directing cardiac development and made a CLP1 knockdown mouse. We are exploring if CLP1 plays a role in cardiac remodeling following myocardial infarction (MI) in mice. Specifically, we are studying the role of CLP1 in the development of fibrosis in cardiac tissue by investigating Smad3 and NFkB activity, which are known to play a role in MI. Data shows that both CLP1^{+/+} and CLP1^{+/-} hearts exhibit cardiac remodeling, as measured by percent of collagen deposition, both above and below the ligation. CLP1^{+/-} hearts had a lower amount of remodeling below the ligation following ischemic injury, compared to wildtype, 1 week following permanent LAD occlusion. However, at 4 weeks following ischemic damage, there was a greater amount of remodeling in the CLP1^{+/-} mice compared to CLP1^{+/+} mice. / Immunofluorescence staining showed increased pSmad3 and NFkB activation and translocation into the nucleus in the infarcted zone following ischemic damage in both groups. Cardiac function in CLP1^{+/-} mice was worse compared to the CLP1^{+/+}, as measured by echocardiography, 4 weeks following MI. There was not an appreciable difference in LVmass between CLP1^{+/-} and CLP1^{+/+} mice. Increasing the sample size will better elucidate the impact of CLP1 on the function and remodeling of the heart following ischemic injury. Data suggests that CLP1 affects remodeling by possibly delaying the fibrotic phase of myocardial infarction injury. This may result from prolonged inflammatory damage and a delay in collagen deposition in the infarcted area, thus resulting in a poorer functional recovery after ischemic damage.

B50: Hamid Arjomandi

Advisor(s):Mark Stewart and Richard Kollmar

A Rat Model to Study Ictal and Postictal Disordered Breathing and Potential Interventions to Prevent Death

Obstructive apnea due to laryngospasm may contribute to sudden unexpected death in epilepsy (SUDEP). “Pulling” against such a closed airway may result in acute pulmonary edema and impaired gas exchange. Pulmonary edema is, in fact, the most common autopsy finding in patients with SUDEP. Here we report the use of a rat model to study laryngospasm and disordered breathing ictally and postictally, which can be used to develop practical emergency interventions. / Adult male Sprague-Dawley rats were anesthetized with urethane. Head-out plethysmography and quantitative video laryngoscopy were performed to assess baseline respiration and vocal cord motion. Simultaneous ECG and pulse-oximetry recordings were collected throughout each experiment. Each animal underwent surgery to place a tracheotomy tube. In the experimental group, the tracheotomy tube was then completely obstructed until respiratory arrest, followed by chest compression to resuscitate. A subgroup of experimental rats had their lungs inflated with either oxygen or nitrogen at the time of obstruction. / All experimental animals went into respiratory arrest within 2 minutes after the onset of tracheal obstruction. Oxygen saturation dropped as low as 20% during the obstruction, but recovered rapidly during resuscitation. Post-resuscitation, however, there was a second severe drop in oxygen saturation that recovered much more slowly and sometimes incompletely over 15 minutes. If the lungs were inflated during the period of airway obstruction, the desaturation during obstruction was delayed and decreased, and the second drop after the obstruction did not occur. / We used a rat model to explore the respiratory consequences of complete airway obstruction such as that caused by laryngospasm during seizures. The results from the use of lung inflation during obstruction help define the kinetics of desaturation and suggest that this model might be useful for testing interventions that may be developed into emergency tools.

B51: Yekaterina Merkulova

Advisor(s): Nicholas Penington and Keith Williams

Intracellular Calcium Activated An Endogenous Current in HEK293 Cells, But Did Not Activate TRPC4 β – Mediated Currents.

The activation mechanism of TRPC4 β channels was studied using the HEK293 / cell line and 1 μ M or 100 nM intracellular calcium in the patch pipette. In control / cells, 15 WT HEK293 cells were tested, and 11 exhibited a gradually developing, / often outwardly rectifying current at positive membrane potentials that was solely / elicited by exposure to 1 μ M intracellular calcium. A ramp from -80 to +100 mV / revealed a reversal potential around 0 mV. Cell-attached, single channel patches / demonstrated channel activity with 25 pS conductance, sometimes even in / presence of 100 nM calcium. Application of 100 μ M carbachol had no effect on / this current. These findings are consistent with characteristics of TRPM4-mediated / currents, and TRPM4 mRNA has been found in WT HEK293 cells. We have yet to / see this current when 100 nM intracellular calcium is used in our whole cell studies / using the HEK293 cell line. Next, whole-cell patch-clamp experiments using 1 μ M / intracellular calcium were conducted on nine HEK293 cells that were transiently / transfected with TRPC4 β , M1 mAChR and eGFP plasmids. Of these nine / cells, five responded with a characteristic TRPC4-like current, but only after / application of 100 μ M carbachol two minutes after the start of the recording. Three / cells that were transfected with TRPC5, M1 mAChR and eGFP plasmids were / tested under the same conditions. All three responded with a characteristic TRPC5- / like current immediately after exposure to 1 μ M intracellular calcium. Our findings / suggest that a significant number of WT HEK293 cells may exhibit a non-selective / current that is activated by 1 μ M intracellular calcium. Under our experimental / conditions a rise in intracellular calcium alone, without receptor activation, may / not be enough to induce TRPC4 β -mediated currents, but this condition did elicit / TRPC5-mediated currents. These data support a difference in regulation / mechanisms of TRPC4 and TRPC5 channels. /

B52: Kristen Whitney

Advisor(s): Peter Bergold

The Role of ABCA7 and Lipid Transport in Traumatic Brain Injury and Alzheimer's Disease

Traumatic Brain Injury (TBI) is an important environmental risk factor for late-onset Alzheimer's Disease (LOAD). Genetic risk factors for LOAD exacerbate both the prognosis and recovery after TBI, suggesting a shared pathophysiology between TBI and Alzheimer's Disease. GWAS studies have recently identified mutations in the lipid transporter ABCA7 as a risk factor for LOAD in African American populations. We are testing if ABCA7 also contributes to the pathophysiology of TBI. ABCA7 is likely to be a sphingomyelin transporter, we tested whether TBI impairs sphingomyelin transport and/or metabolism. White matter is readily demyelinated after TBI and mice show demyelination two days after closed head injury. Analysis of brain sphingolipids two days post-injury suggests increased levels proximal and decreased levels distal to the injury site. Hippocampal sphingomyelin levels showed the greatest increase, which may reflect the vulnerability of the hippocampus to TBI. Hippocampal LTP is also disrupted two days after closed head injury. Unexpectedly, LTP is partially rescued by exogenous addition of sphingomyelin, but not lipid control phosphatidylcholine. Preliminary behavioral testing on ABCA7 KO mice suggest that they are amnesic on a complex task such as APA, but not on a simpler task such as Barnes maze. These data suggest that CHI induces alterations in sphingomyelin metabolism that may disrupt hippocampal synaptic plasticity. Our results provide insights into why mutations in ABCA7, which is major risk factor for LOAD, may also worsen outcome after TBI. /

B53: Syed Faraz Kazim

Advisor(s):Riccardo Bianchi and Khalid Iqbal

Early-onset epileptic activity is mediated through APP overexpression and mGluR5 activation and not through tau in presymptomatic Alzheimer's disease transgenic mice

Alzheimer's disease (AD) patients are at an increased risk of developing seizures and the hypersynchronous network activity predisposing to seizures may be linked to AD pathology. It remains unclear if epileptiform activity precedes extensive disease pathology in AD and what are the underlying cellular mechanisms. We evaluated seizure susceptibility and hippocampal network hypersynchrony at ~ 3 weeks of age (prior to amyloid plaque deposition, neurofibrillary pathology, and cognitive impairment) in a triple transgenic mouse model of familial AD (3xTg-AD mouse) that harbors mutated human amyloid- β precursor protein (APP), tau, and presenilin 1 genes. Audiogenic seizures were elicited in a higher proportion of 3xTg-AD mice compared with WT controls. Seizure susceptibility in 3xTg-AD mice was attenuated by either mGluR5 blockade with the selective antagonist MPEP or by passive immunization with anti-human APP/A β antibody (6E10). However, passive immunization with anti-human tau antibodies (43D or 77e9) increased seizure susceptibility and severity. In *in vitro* hippocampal slices, suppression of synaptic inhibition with bicuculline induced prolonged epileptiform (>1.5 s in duration) ictal-like discharges in 80% of the 3xTg-AD. In contrast, only short (<1.5 s) interictal-like discharges were observed following bicuculline application in WT slices. MPEP suppressed the ictal-like discharges in 3xTg-AD slices. The ictal-like discharges in hippocampal slices of 3xTg-AD mice that were immunized with 6E10 were reduced compared to those of untreated 3xTg-AD mice. Epileptiform discharge duration positively correlated with intraneuronal APP expression level. Our data suggest that in AD (1) neuronal hyperexcitability underlying seizure susceptibility precedes extensive amyloid β and tau pathologies, (2) APP and mGluR5 play a role in network hypersynchrony, and (3) tau protein prior to abnormal hyperphosphorylation protects against neuronal hyperexcitability.

B54: Matthew Evrard

Advisor(s):Sheryl Smith

Synaptic Pruning in Layer 5 of the Medial Prefrontal Cortex in Female Mice

The onset of certain neurodevelopmental disorders, such as schizophrenia, overlaps with the maturation of the prefrontal cortex (PFC), suggesting that it is implicated their etiology. Unlike other areas of the brain, the PFC is not fully developed until early adulthood. It is well established that before puberty the number of synaptic spines located on the dendrites of cortical pyramidal cells increases dramatically. These synaptic connections that develop before puberty are pruned during adolescence; this process, known as synaptic pruning, is thought to be important for normal cognition because dysregulation of this process appears to result in neurodevelopmental disorders. However, the initial mechanisms which trigger synaptic pruning remain largely unknown. It is known that the spines of cortical pyramidal cells receive GABAergic input. To test the hypothesis that synaptic pruning is GABA_A receptor (GABA_AR) mediated, we first identified layer-specific pruning in the mPFC using the Golgi-Cox staining method in female mice at puberty (PND 35, confirmed by vaginal opening) and post-pubertally (PND 56). Spine counts were obtained using a Nikon Eclipse Ci-L microscope and manually counted. Spine density in Layer 5 of the mPFC decreased by 62% from puberty (5.9 spines/10 μ m) to post-puberty (3.7 spines/10 μ m; $P < 0.0001$) – with the greatest decline occurring in the medial (Puberty, 7.4 spines/10 μ m; Post-puberty, 3.6 spines/10 μ m, $P < 0.0005$) and distal (Puberty, 7.5 spines/10 μ m; Post-puberty, 4.9 spines/10 μ m, $P < 0.0005$) regions. These data suggest that synaptic pruning occurs in layer 5 of the prefrontal cortex in female mice, which prior to this study, has not been shown. Future studies seek to identify if synaptic pruning is GABA mediated through various drug and knockout studies.

B55: Veronica Sebastian

Advisor(s):Todd Sacktor

Localization of PKMzeta in Hippocampal Dendritic Spines following Spatial Training on the Active Place Avoidance Task

Long-term potentiation (LTP) functions as a cellular model of learning and memory and produces synapses that are enhanced structurally and functionally. LTP triggers significant increases in the size of dendritic spines and in α -amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid receptor (AMPA)-mediated currents. Previous work has demonstrated that the constitutively active protein kinase M zeta (PKMzeta) is necessary for the maintenance of late LTP and functions to increase AMPAR currents by preventing the exocytosis of GluA2 subunits from the post-synaptic density (PSD). Additional studies suggest that PKMzeta also plays a role in structural plasticity, as overexpression of PKMzeta increases the number of mature spines in cortical neuronal cultures and the clustering of GluA2 with the scaffolding protein, PSD-95, in hippocampal cultures. Furthermore, the induction of chemical LTP results in an increase in synaptic clustering, which is blocked by inhibition of PKMzeta using ZIP. In this study, we examine the role of PKMzeta in structural plasticity following the establishment of memory on the active place avoidance task in mice with sparse GFP expression (10% neurons), which allows for the visualization of dendritic spines. We show that PKMzeta expression increases in CA1 pyramidal cells after training and localizes in spines. These results suggest that PKMzeta plays a role in plasticity within hippocampal spines, which act as a substrate for spatial memory.

B56: Alexandra Seidenstein

Advisor(s):William Lytton

Parallelizing Large Networks using NEURON-Python

Large multiscale neuronal network simulations will be of increasing value as more big data is gathered about brain wiring / and organization under the auspices of current major research initiative, such as {\em Brain research through advancing / innovative neurotechnologies}. The development of these models requires development of new simulation technologies. We / describe here the current use of the NEURON simulator with MPI (message passing interface) for simulation in the domain of / moderately large networks on commonly available High Performance Computers (HPCs). Some of the issues discussed also / pertain to development of very large networks on the largest current HPCs. We discuss the basic layout of such / simulations, including the methods of simulation setup, the run-time spike passing paradigm and post-simulation data / storage and data management approaches. Using the Neuroscience Gateway, a portal for computational neuroscience that / provides access to large HPCs, we benchmark simulations of neuronal networks of different sizes (from 500 to 100,000 / cells), and using different numbers of nodes (2 to 256). We also compare three types of networks, composed either of Izhikevich point / neurons, single-compartment Hodgkin-Huxley cells, or a hybrid network with half of each. Results show simulation run time / increases linearly with the network size and decreases sublinearly with the number of nodes. Networks / with point neurons were faster than the hybrid and purely Hodgkin-Huxley cell networks, although difference was small since / all cells had a single compartment. The source code for the parallel simulation methods described and that used for the / benchmark simulations is available online.

B57: Mohamed Sherif

Advisor(s): William Lytton

Localization of CB1 receptor agonism in a multiscale model of hippocampal CA3

Brain oscillations, which play roles in memory and attention, have been reported to be abnormal in schizophrenia (SCZ). Cannabinoid receptor type 1 (CB1R) agonists used in human laboratory studies are able to produce impairments in working memory and reduction of theta and gamma power which are similar to those reported in schizophrenia. CB1Rs are present on different cell terminals, making it difficult to determine the mechanism of the altered neuronal dynamics observed in vivo. We therefore developed a computer model of CA3 to investigate which locations result in the reported oscillatory changes. Our network model consisted of pyramidal neurons and 4 populations of interneurons. The interneuron populations received inhibitory input from medial septum (MS). CB1Rs were situated on 5 locations within the model. CB1R agonism was tested at all possible combinations of locations. We found the greatest (>70%) reduction of both theta and gamma power when CB1R agonism was applied at three locations simultaneously: MS, soma of PV basket cells, and axon terminals of CCK basket cells. CB1R agonism on MS results in reduction of influence of MS onto interneurons, reducing the theta-pacing effect. CB1R agonism on PV basket cells results in reduction of excitatory drive from pyramidal cells onto PV basket cells. CB1R agonism on CCK basket cell axon terminals reduces the inhibitory influence onto pyramidal cells. Both effects result in pyramidal cells firing less synchronously, thus reducing gamma power. The multiscale modeling of the CA3 region and of the 5 different CB1R locations made it possible to identify the combinations of locations which maximally influenced network oscillations. We make use of information obtained using immunolabeling, cellular tracing and electrophysiological techniques that cannot be connected without using multiscale modeling and then do rapid hypothesis testing and prediction. We present novel predictions that can now be tested experimentally.

B58: Roza George

Advisor(s): Jeremy Coplan

The Epigenetics of PKM ζ in the Development of Affective Disorders

Affective disorders encompass prevalent and common mental health issues which affect approximately 20.9 million American adults, which is approximately 9.5% of the population annually (Kessler et al., 2005). Clinical observations have shown that affective disorders, such as depression, have symptoms related to memory and memory formation (Wolfe et al., 1987). However, the precise neurological changes that take place in order to produce these well documented and common symptoms are yet to be elucidated fully. When considering changes that affect the mechanism of memory, PKM ζ is a likely target to examine because of its well documented role in the formation and maintenance of LTP (Migues et al. 2010). Epigenetics, which is the molecular modification of DNA base pairs and histones, is a source of interaction between genetic and environmental factors (Fagiolini et al., 2009). The direct epigenetic base pair modification of the PKM ζ gene and its resulting molecular effects in affective disorders or in healthy brains has yet to be studied. Disrupted social bonds which result in feelings of loss is the basis for classical models of depression in humans (Mourning, 2004). Bonnet macaques (*Macaca radiata*) were exposed to a separation stress paradigm, which included a group of animals that were exposed to social isolation on a cyclic basis for 15 weeks and a second group that was consistently kept in a social environment (Perara et al., 2011). The goal of this study is to compare the hippocampi of the animals with the three different isolation stress treatments by using fluorescent immunohistochemistry staining and epigenetic testing with the anticipation of more effectively elucidating the role of PKM zeta in affective disorders. Significant data and analysis has yet to be obtained in this study.

B59: William Sterling

Advisor(s):Ramaswamy Viswanathan, Zachary Wolner, and Ramotse Saunders

Recurrent Foreign Body Ingestions Following Rapid Methadone Taper: Case Report, and Pharmacologic, Ethical, System and Management Issues

Mr. A, a homeless 39-year-old Caucasian man, presented after swallowing a six-inch knife. He was hospitalized for endoscopic removal of the object. He had a history of Schizophrenia and Opioid Use Disorder, previously treated at another medical center with quetiapine 300 mg and methadone maintenance 210 mg orally daily, with a three-year period of stability. Systems-of-care issues resulted in abrupt discharge from that program and a 6 week taper and discontinuation of methadone in another medical center. This was followed by the patient engaging in recurrent self-injurious foreign body ingestions (FBIs). Before presenting to our hospital he had been discharged from another hospital where he had engaged in repeated FBIs while under close observation, including in a psychiatric unit. While under our care, the patient displayed affective volatility and engaged in repeated FBIs despite close nursing observation. Items swallowed included screws, pens and a shattered lightbulb, resulting in lower GI perforation requiring multiple surgical interventions for repair. Our hypothesis was that the FBI was a pathologic manipulative response to obtain the methadone which he did need, but was denied to him by the system, and the response generalized to other situations where he felt frustrated and angry. We started him on methadone and gradually increased it to 100 mg daily which led to improvement in his mood and cessation of the maladaptive behaviors. He was discharged on this and referred to a methadone maintenance program. This case highlights the risks of abrupt methadone taper, and several systemic challenges to obtaining adequate care for Opioid Use Disorder. We also discuss possible neurobiological factors contributing to his behavior, and psychological, ethical and pharmacologic issues in his management.

B60: Maninder Bhutani

Advisor(s):Ramotse Saunders, Srinath Gopinath, and Arashinder Dhaliwal

Clozapine Usage During Pregnancy And Its Effects On Fetal Well-Being And Heart Rate Variability: A Case Report.

Heart rate variability (HRV) has been an important area of research connecting the brain and the body. The heart is dually innervated by the sympathetic and parasympathetic autonomic nervous systems. The role of HRV is being increasingly recognized in psychiatric disorders especially mood and anxiety disorders. Decreased HRV can be attributed to multiple reasons, one of them being the use of psychotropic medications, especially antipsychotics, which are known to have anticholinergic side effects. Clozapine is one of the two Class B drugs that can be used in pregnant women with schizophrenia. It has been studied & observed that clozapine responders have an increase in their HRV corresponding to their improvement in psychiatric symptoms. It has also been noted that clozapine crosses the placental barrier and show decreased fetal HRV. / We present the case of a 37-year-old pregnant lady with treatment refractory schizophrenia, who was seen by the CL psychiatry team for a decision on continuation of clozapine due to reduced fetal HRV. She was diagnosed at the age of 30 years, currently being treated with Clozapine 250mg PO at bedtime and obstetric history of Gravida 4 Para 3 Living 2 & Abortion 0. She was admitted to Obstetrics service at 35 weeks of pregnancy for glucose controlAs the patient was responding well and clozapine is considered Class B in pregnancy, she was continued on the same medication and dose. She was stable during the entire pregnancy, maintaining her baseline functioning and not having any psychiatric symptoms relapse. Fetal heart rate tracing was performed as a routine test and was found to have decreased HRV. Her pregnancy was uneventful and she delivered a healthy baby with APGAR scores of 7 and 9. The systemic review for neonatal disorders was negative as was the pediatric examination. / The above case illustrates the vitality in decision of risk & benefits of continued clozapine in pregnant females and that would benefit from further research.

B61: Leah Steinberg

Advisor(s):Subramoniam Madhusoodanan

Chronic Lithium Neurotoxicity: A Case Report

Introduction: Chronic neurotoxicity caused by lithium became evident in the 80's, but its mechanisms remain unclear. Syndrome of irreversible lithium effectuated neurotoxicity (SILENT) is not a common occurrence among patients on lithium chronic therapy. Possibly lithium causes demyelination at multiple sites in the central nervous system. It is important for clinicians to be aware of this clinical entity to facilitate early diagnosis. **Methods:** A 61-year-old Jewish female with extensive psychiatric history was admitted after sustaining three falls, worsening ataxia in the previous month, dysarthria, and progressive altered mental status. Patient was on olanzapine 10mg po daily, lithium po 300mg am and 600mg hs, benztropine 1mg po bid, and diphenhydramine 50mg po bid prior to admission. Lithium level was found to be 1.9. All the above medications were discontinued and she received intravenous fluids. Head cat scan was unremarkable. Rapid Plasma Reagin was negative, vitamin B12 and TSH were within normal limits. Neurologist recommended screening for Huntington's disease because of choreiform movements, but the test was negative. She was started on aripiprazole 10mg po daily and valproate 500mg po bid. Her ADL functioning and ambulation prior to admission were normal. **Results:** Lithium level decreased from 1.9 on admission to 1.6 on day two, and 0.6 on day six. Patient was hospitalized for 21 days, and showed mild improvement of ataxia, dysarthria, and altered mental status. She no longer was able to independently care for self and required assistance to ambulate. She was discharged to a skilled nursing facility. **Conclusion:** Neurocognitive symptoms and chronic lithium therapy in this patient suggest possible lithium neurotoxicity. We recommend assessing patients on chronic lithium therapy frequently for decline in cognition, altered mental status, new abnormal movements, and change in ambulation, even if lithium levels have been therapeutic for a long period of time

B62: Joseph Weiner

Advisor(s):David Schreiber

Patterns of Care and Survival Outcomes in the Treatment of Esophageal Melanoma

Purpose: / Due to the rarity of esophageal melanoma, the optimal management of this disease is limited. The pooled dataset in the National Cancer Database (NCDB) was used to identify the prognostic factors and treatment outcomes. **Materials and Methods:** / Patients who were diagnosed with esophageal melanoma between 2004 and 2011 were identified. Patients were stratified as either localized (T1-4N0M0), regional (T1-4N+M0) or metastatic (M1). The primary endpoint of this study was overall survival (OS) which was analyzed using the Kaplan-Meier method and multivariate Cox regression, which was performed to identify potential factors influencing survival. **Results:** / A total of 56 patients were identified with median follow up of 10.2 months. Twenty-seven (48.2%) patients had localized disease, 10 patients (17.9%) had regional disease and 19 patients (33.9%) were metastatic at diagnosis. For those with localized disease, the 3 year OS was 50.5% for the 14 patients treated with esophagectomy and 0.0% for the 7 treated with definitive radiation therapy. For regional disease, the 3 year OS was 11.1% for the 9 patients treated with esophagectomy. The 3 year OS for those with metastatic disease at diagnosis was 0.0%. On multivariate analysis, treatment with esophagectomy was not associated with a reduced risk of death (HR 0.84, 95% CI 0.31-2.25, p=0.73), while regional disease (HR 3.78, 95% CI 1.40-10.19, p=0.009) and metastatic disease (HR 7.54, 95% CI 2.89-19.62, p<0.001) were associated with decreased survival. **Conclusion:** / Esophageal melanoma is an extremely rare and aggressive disease with very poor outcomes. Esophagectomy may result in reasonable survival for localized disease.

B63: Anna Lee

Advisor(s):David Schreiber and David Schwartz

Is there a benefit to prolonging the interval between neoadjuvant chemoradiation and esophagectomy in esophageal cancer?

Rationale: Evidence suggests that delaying surgery may increase the rate of pathologic complete response (pCR) and that pCR is associated with improved overall survival (OS). In this study, the National Cancer Data Base was analyzed to evaluate this relationship in a large, hospital-based registry. / Methods: We identified patients diagnosed with esophageal adenocarcinoma or squamous cell carcinoma who received neoadjuvant chemoradiation followed by esophagectomy from 2003-2012. Patients were stratified into quartiles based on the interval between the completion of chemoradiation to surgery (≤ 40 days, 41-50 days, 51-63 days, ≥ 64 days) and those with pT0N0M0 were classified as having pCR. Multivariate logistic regression was used to assess the impact of covariates on pCR and multivariate Cox regression was used to assess their impact on OS. / Results: The study population included 5,393 patients. The median preoperative radiation dose was 5040cGy. Increasing time interval to surgery was associated with increased pCR rate (12.3% for ≤ 40 days to 18.3% for ≥ 64 days, $p < 0.001$). On multivariate analysis, time interval ≥ 51 days was associated with an increased likelihood of pCR ($p = 0.009$ for 51-63 days, $p < 0.001$ for ≥ 64 days), as well as increasing radiation dose ≥ 50 Gy ($p = 0.046$ for 50-50.4Gy, $p = 0.02$ for > 50.4 Gy). However, increasing time interval was not associated with an improvement in OS for any quartile on multivariate analysis. In addition, OS was worse for those who underwent surgery ≥ 64 days after completion of radiation (HR 1.16, 95% CI 1.01-1.33, $p = 0.03$). / Discussion: This is, to our knowledge, the largest study in the literature analyzing the impact of prolonging the time interval between neoadjuvant chemoradiation to surgery. We found that while an increasing time interval was associated with a higher pCR rate, there was no impact on survival. These data do not support routinely increasing the time interval between neoadjuvant chemoradiation and surgery.

B64: Virginia Osborn

Advisor(s):David Schreiber and David Schwartz

Patterns of Care of IMRT Usage in Postoperative Management of Uterine Cancer

Purpose: To analyze the patterns of care regarding intensity modulated radiation therapy (IMRT) usage in the postoperative management of uterine cancer. Methods: The National Cancer Database was queried to identify women with endometrial adenocarcinoma who underwent total abdominal hysterectomy and bilateral salpingo-oophorectomy followed by postoperative external beam radiation between 2004-2012. In order to be included, women had to have received either 1.8 Gy or 2 Gy per day to a dose of 4400-5600 cGy. Descriptive statistics were used to analyze IMRT usage by year and facility type, and were compared via the Chi Square test. Multivariate logistic regression was used to identify covariables associated with IMRT usage while controlling for age, race, year of diagnosis, facility type and insurance status. Results: There were 7,839 women included in this study. The overall IMRT utilization was 18.7% and increased from 1.9% in 2004 to 32.4% in 2012 ($p < 0.001$). Usage varied by facility type, with academic facilities delivering IMRT 20.3% of the time, compared to 19.0% of treatments at comprehensive cancer centers, and 15.5% at community cancer centers ($p = 0.045$). On multivariate logistic regression, more recent year of diagnosis was strongly associated with increased IMRT usage. Compared to the year 2004, the year 2005 had an adjusted odds ratio for IMRT usage of 2.73, 95% CI 1.57-4.72, $p < 0.001$. This increased each year through 2012, where the adjusted odds ratio for IMRT was 24.90, 95% CI 15.24-40.67, $p < 0.001$. Those with private insurance (OR 1.61, 95% CI 1.15-2.26, $p = 0.01$) were more likely to receive IMRT, as well as those treated at an academic cancer center (OR 1.28, 95% CI 1.03-1.59, $p = 0.03$). Conclusions: In this hospital-based registry, IMRT usage for postoperative radiation in uterine cancer has rapidly increased in utilization between 2004-2012. Academic cancer centers appear to have adapted IMRT faster than non-academic centers.

B65: Simona Treidler

Advisor(s): Susan Law and Adrian Marchidann

Postpartum Thrombosis of Developmental Venous Anomaly Complicated by Venous Infarction and Subarachnoid Hemorrhage

Developmental venous anomaly (DVA), the most common cerebral vascular malformation, occurs after occlusion of the normal venous structures with preservation of the embryologic medullary veins. If associated with a cavernous angioma or arteriovenous shunt, it may harbor a hemorrhagic risk. A 32-year-old, previously healthy, African-American woman returned 8 days postpartum with severe, refractory headache and generalized tonic-clonic seizures. She had no toxic habits and was taking vitamins, iron and ibuprofen. Blood pressure was 170/94 mmHg, pulse 80 beats/minute, respirations 19/minute, and temperature 98.4°F. The general and neurological examinations were normal. The blood tests were remarkable for HCO₃ 14 mEq/L, anion gap 30.6 mEq/L, ALT 41 IU/L, AST 113 IU/L, LDH 432 U/L, uric acid 6.6 mg/dL. CBC, PT, and PTT were normal. Urine had trace protein; toxicology screen was negative. Factor V Leiden and prothrombin gene mutations were absent; protein C and S activity were normal. Anticardiolipin, anti-β₂-glycoprotein antibodies and lupus anticoagulant were negative. Homocysteine level was normal. Magnesium and diazepam were given for seizures, nifedipine for blood pressure control, and levetiracetam for seizures prevention. MRI and CT angiography of the brain showed a thrombus within a DVA, surrounded by venous infarction, cerebral edema and subarachnoid hemorrhage (SAH). Heparin was started and followed by warfarin for 3 months to limit thrombus growth. HTN was controlled, the thrombosed DVA recanalized, and the venous infarct and SAH resolved. Only 20 cases of thrombosed DVAs were described in the English literature; 9 had venous infarction and 11 had parenchymal hemorrhage. Only one case occurred during pregnancy and another one postpartum. None of these patients had SAH. Postpartum, even in absence of a hypercoagulable state, DVA may be complicated by thrombosis, venous infarction and SAH. Anticoagulation, in spite of SAH, was safe in this patient.

B66: Kaylene Barrera

Advisor(s): Chongmin Huan

Site-1-Protease Mediated Unfolded Protein Response Protects against Pancreatic Injury in Acute Pancreatitis

Introduction: / Acute pancreatitis (AP) mainly involves acinar cell injury that is initiated when cellular self-protection is overwhelmed by pathogenic dysregulation. Although premature intracellular activation of trypsinogen was widely thought to induce AP, recent studies show that endoplasmic reticulum (ER) stress triggered by multiple AP predisposing factors leads to acinar injury if not salvaged by the unfolded protein response (UPR). Site-1-protease (S1P) is a Golgi membrane-bound UPR mediator that enables activating transcription factor 6 (ATF6) to activate transcription of UPR-target genes via cleavage activation of ATF6. But the self-protective role of S1P-mediated UPR in AP is unknown. Here we study cerulein AP and ethanol-induced acinar abnormalities in S1P deficient mice. **Methods:** / Paired S1P(flox/+) and S1P(flox/flox) littermates that express normal level and 70% less pancreatic S1P respectively were studied. Cerulein AP was induced via 7 hourly cerulein (50μg/kg) intraperitoneal injections. Ethanol was administered by following a binge-like alcohol intake protocol. Pancreatic injury was analyzed by histological and biochemical studies. Isolated S1P(flox/+) and S1P(flox/flox) acinar cells were cultured with ethanol or cerulein for measurement of ER stress-induced S1P mRNA and nuclear ATF6 levels by RT-PCR and Western blot respectively. **Results:** / Cerulein and ethanol treatment increased S1P expression and nuclear ATF6 in acinar cells. Compared to S1P(flox/+) mice, S1P(flox/flox) mice had significantly increased serum amylase and lipase, pancreatic acinar injury and inflammatory infiltration in cerulein AP. Consistently, ethanol intake caused higher serum amylase levels and more abnormal pancreatic acinar cells in S1P(flox/flox) mice compared to S1P(flox/+) mice. **Conclusion:** / Induced S1P activity in AP protects against acinar cell injury. /

B67: Peiqi Ou

Advisor(s):Chongmin Huan

Sphingomyelin Synthase 2 deficiency impairs B cell apoptosis in the periphery and results in lupus-like disease

Systemic lupus erythematosus is an autoimmune disease characterized by the presence of autoantibodies against self-DNA. Lupus remains a clinical challenge due to a lack of specific and effective treatments. Recent studies indicate that failed clearance of self-reactive B cells by a checkpoint in germinal centers is the major cause of disease. However, the desired knowledge of this checkpoint that helps design the novel therapeutic strategies is still elusive. Sphingomyelin synthase 2 (SMS2) is an enzyme that catalyzes the synthesis of sphingomyelin and diacylglycerol (DAG) on plasma membrane. We found that SMS2 deficiency caused anti-DNA antibody production and a lupus like phenotype in mice. SMS2 prevented the violation of germinal center checkpoint via induction of B cell apoptosis. SMS2-derived DAG activated PKC delta, a key B cell apoptosis mediator whose mutation causes lupus in both human and mice. Our finding provides insight into a self-protective mechanism that blocks anti-DNA antibody production, and may help develop new approaches to lupus therapy.

B68: Michael Smith

Advisor(s):Gainosuke Sugiyama and Antonio Alfonso

Appendectomy in Patients with HIV: Not as Bad as We Once Thought

Background: Today, with the efficacy of antiretroviral therapy, the prevalence of HIV is increasing. As a result, patients are presenting with common surgical conditions such as appendicitis. Previous small studies have demonstrated increased complications in this population. We sought to investigate the effect of HIV and AIDS on outcomes in patients undergoing appendectomy. / Methods: We queried the Nationwide Inpatient Sample between 2005 and 2012 for patients who underwent appendectomy for acute appendicitis. Patient demographics, length of stay (LOS), hospital charges, and mortality during admission were extracted. Using multivariate logistic regression, we created statistical models that controlled for age, gender, race, insurance type, socioeconomic status, number of Elixhauser comorbidities, and presence of perforation. / Results: There were 821 patients with HIV, 422 with AIDS and 338,425 serving as control. Comparing HIV to non-HIV patients, mean LOS was higher (3.8 vs 3.0 days, $p < 0.001$) and mean total charges was higher (\$33K vs \$30K, $p < 0.0001$). AIDS patients had higher mean LOS (5.0 vs 3.0 days, $p < 0.001$), total charges (\$44K vs \$30K $p < 0.0001$), more mechanical complications (2.4 vs 0.6%, $p < 0.0001$), and postoperative complications (6.6 vs 3.1%, $p < 0.0001$). HIV status was not an independent risk factor for mortality or perioperative complications, but was associated with increased LOS. AIDS was an independent risk factor for postoperative infections (OR 2.10, 95% $p = 0.0007$), digestive complications (OR 1.57 $p = 0.046$), and increased LOS (OR 1.23 $p < 0.0001$). / Conclusion: In this large retrospective analysis we found that in patients who undergo appendectomy, HIV and AIDS were not independent risk factors for mortality. Though AIDS is a risk factor for postoperative infection and digestive complications, appendectomy is a safe procedure in this patient population. Further studies to investigate how to mitigate these risks in the population with AIDS are warranted. /

B69: Nicholas Ullman

Advisor(s):Gainosuke Sugiyama and Antonio Alfonso

Colon Cancer Presentation In Afro-Caribbean Patients: Experience at an Urban Safety Net Hospital

Background: / Colorectal cancer is the second leading cause of cancer – related death in the United States. However, it does not affect all racial groups equally; African Americans have a greater incidence, higher mortality rate and are more likely to present at an advanced stage compared to their white counterparts. In an effort to better understand this disparity, this study evaluates the presentation of colorectal cancer in a unique cohort of Afro-Caribbean patients in an urban safety net hospital in New York City. Methods: / All patients who underwent colectomy for invasive colorectal cancer from 2007-2015 were identified via retrospective chart review (n=132). Patients were then stratified by race and stage at presentation and compared to previously published SEER data. Results: / We identified 110 Afro-Caribbean patients who underwent colectomy for invasive colorectal cancer. When compared to their African American counterparts, they were more likely to present with Stage III disease (37% vs 25%) and were less likely to present with Stage IV disease (10% vs 24%). Conclusion: / Afro-Caribbean patients are more likely to present with locally advanced tumors than their African-American counterparts. Patients who undergo surgery for Stage III are more likely to experience surgical complications and have higher rates of early post-operative mortality. Further study is needed to better understand this disparity and its implications for Afro-Caribbean colorectal cancer patients. /

B70: Sarah Ullrich

Advisor(s):Gainosuke Sugiyama and Antonio Alfonso

Tumor Biology and Racial Disparities in Reconstruction After Mastectomy: A SEER Database Analysis

Introduction: Significant disparities in immediate breast reconstruction after mastectomy have persisted despite large-scale efforts to minimize them. Immediate breast reconstruction has been shown to lead to higher rates of surgical satisfaction, minimize delay in post-operative cancer treatment, and improve the quality of life and overall well-being of mastectomy patients. However only 25-40% of eligible women in the United States receive reconstruction. The rate of reconstruction is even lower in African American and Hispanic women compared to White women. In an effort to better understand this disparity, this study uses national population-based data to examine how demographic factors, socioeconomic factors, and disease characteristics interact and affect the rate of immediate breast reconstruction (IBR) after mastectomy. Methods: Women with AJCC7 Stage 0-III breast cancer who underwent mastectomy from 2010 to 2012 were identified in the Surveillance, Epidemiology and End Results Program (SEER) database. socioeconomic and biological factors were compared between women undergoing mastectomy with IBR and mastectomy alone using univariate and multivariate analysis. Results: We identified 51,115 women who underwent mastectomy for Stage 0-III breast cancer from 2010-2012, of whom 15,389 (30.1%) received IBR. Patients more likely to receive IBR were younger and presented at a less advanced stage. Factors independently associated with not receiving IBR were race/ethnicity insurance status, Tumor grade 3, advanced stage, and triple negative disease. Conclusion: The decision to undergo reconstruction after mastectomy is influenced by many factors. Our results show that even after adjusting for tumor characteristics, socioeconomic factors are independently associated with receiving IBR after mastectomy. Further research is needed to elucidate the factors that influence the decision to undergo IBR in order to eliminate these persistent disparities.

B71: Yohannes Constable

Advisor(s): Gainosuke Sugiyama and Antonio Alfonso

Is Robotic Repair Superior to Laparoscopic Ventral Hernia Repair In Postoperative Pain Reduction

Background: Laparoscopic ventral hernia repair offers improved patient outcomes and cost benefits. With this modality, transfascial sutures and tacking for mesh fixation has been linked to increased postoperative pain. In contrast, robotic-assisted laparoscopy allows for fixation by continuous suture, which has anecdotally been associated with decreased pain. We sought to identify a difference in postoperative pain between tack and suture fixed mesh. Methods and Procedures: We conducted a retrospective review of patients who underwent minimally invasive ventral hernia repair over 22 months. Repairs using hybrid or preperitoneal techniques were excluded. Demographics, operative time, method of fixation, and post-operative pain were analyzed. Opiate requirements were converted to morphine equivalents and normalized by body surface area. Results: 73 patients underwent minimally invasive ventral hernia repair. Of those, 39 were repaired using IPOM technique. Twenty-three (59%) of patients were repaired with tacks and 16 (41%) with sutures under robotic assistance. There were no statistical differences between BMI, age, or sex. The suture group mean OR was 165 min compared to 88 min in the tack group ($p < 0.001$). Median pain score (0-10) was 2.0 versus 2.5 for tacking and suturing methods respectively ($p = NS$). Patients that underwent tacking required a mean of 3.36 mg/m² versus 3.92 mg/m² in suture group ($p = NS$). Conclusions: Minimally invasive ventral repair can be achieved with both tacking and continuous suture fixation of mesh with low post-operative pain scores and opiate requirements. Further studies may identify factors leading to patient discomfort, or demonstrate cost superiority. /

B72: Brendan Chen

Advisor(s): Gainosuke Sugiyama and David Radvinsky

Robotic Trans Abdominal Pre Peritoneal Ventral Hernia Repair: Lessons Learned

Background: Laparoscopic ventral hernia repair with mesh has gained popularity since the early 2000s. Despite improvements in technique, intraperitoneal placement of the mesh is not without complications. We explored the feasibility of robotic assisted transabdominal preperitoneal (TAPP) with mesh to reduce complications such as mesh erosion, migration, and fistula formation. Methods: 45 robotic assisted ventral hernia repairs were completed over 2 years. Of those, 20 patients underwent TAPP repair. Initially, we started by employing double dock method, then eventually adopting a single dock method. A peritoneal flap was created by starting at the near lateral edge of the abdomen and moving medially, beyond the hernia defect to the far lateral edge. The defect was then closed primarily with a running suture and followed by mesh placement which was tacked in a double crown fashion. The created flap was used to cover the mesh and then closed with a running suture. Results: 20 patients underwent robotic assisted TAPP ventral hernia repair. The first 5 were performed with a double dock method. A single docking method was adopted for the remainder of the patients. There were no open conversions and the peritoneal flap was successfully closed over the mesh in all cases. The mean age was 49 yrs, mean BMI was 31.5 kg/m², mean operative time was 173 min, mean defect size 17.6 cm² and mean mesh size was 125.2 cm². Conclusions: We present our early experience in performing the Robotic Assisted Transabdominal Preperitoneal Ventral hernia repair technique. The ergonomics and instrumentation afforded by the robotic platform allow for easy creation of a peritoneal flap to completely cover the mesh. This approach may restore the normal physiology of the anterior abdominal wall, improve mesh adherence, and reduce complications associated with intraabdominal mesh. Further studies are needed to demonstrate improved outcomes and cost-effectiveness of the procedure. /

B73: Gina Milone

Advisor(s):Gainosuke Sugiyama and Sara Kim

Is It Cultural or Biological? Management of DCIS in an Afro-Caribbean Population

Introduction: In the United States (US), 97% of patients with ductal carcinoma in situ (DCIS) receive surgical excision of their lesion, with only 1/3 undergoing mastectomies nationwide. Little is known about mastectomy rates among inner-city patients, or the reason for mastectomies among this population. We sought to evaluate the rates of breast conservation therapy (BCT) to mastectomy for DCIS in an Afro-Caribbean inner-city population, and to assess if there are disparities of care between this population and the general US. **Methods:** Our center serves primarily an Afro-Caribbean inner-city population. We identified all patients treated for DCIS from 2007-2014. Treatments were separated into two groups: BCT and mastectomy. BCT and mastectomy rates were compared to reported literature rates. Factors leading to more aggressive surgical management, including tumor grade, multifocal disease, receptor status, and age at diagnosis were also reviewed. **Results:** 354 patients underwent breast surgery from 2007-2014, 79(22.3%) of whom had DCIS. Among DCIS patients, 38 had BCT(48%) compared to 41 who underwent mastectomy(52%). Average ages were 61 and 57 in the BCT and mastectomy groups, respectively. In the mastectomy group, 28/41(68.3%) of patients had mastectomy for positive margins(n=13), high-grade tumor(n=12), or concern for invasive ductal carcinoma(n=3). 13/41(31.7%) had mastectomy for unknown reasons. **Discussion:** Our Afro-Caribbean population had a much higher rate of mastectomy than the national average. It is unclear if this is due to patient preference, tumor biology, accessibility of care, or other factors. Further study is needed to determine what other factors influence patients' and surgeons' treatment decisions /

B74: Katrina Brakoniec

Advisor(s):Gainosuke Sugiyama

Racial Disparities In Colorectal Cancer: Difference is Not With The Operation – An Analysis Using ACS NSQIP

Introduction: / Over 100,000 new cases of colorectal cancer (CRC) are diagnosed each year. In the currently literature, compared to other ethnicities, Blacks have a higher incidence of CRC and rate of mortality, and undergo surgical treatment for CRC less often than their white counterparts. Additional data on the outcomes of surgery for CRC in this population is not available. We hypothesized that race is an independent factor associated with worse outcomes following colectomy for CRC. **Methods:** / The American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) database was queried from 2005-2010 for patients that underwent colectomy for cancer. The patients were divided into two groups, Caucasian and Black. These groups were case matched using a propensity score matching analysis based on preoperative variables. Primary outcomes included 30-day mortality and morbidity. **Results:** / 9,808 total patients were identified. After case matching, there were 859 patients in the Black and White patient groups. There were no statistical differences in baseline characteristics. White patients had a significantly higher rate of blood transfusion (3.14% vs 1.16% p=0.008), and rate of return to operating room (4.77% vs 2.32% p=0.009). There were no statistical differences in 30 day mortality or major morbidity. **Conclusions:** / After the decision to undergo surgical intervention is made, there is no significant difference in morbidity or mortality between Black and White patients. Further research into the factors contributing to early surgical intervention for CRC is warranted. /

B75: Koby Herman

Advisor(s):Gainosuke Sugiyama

Novel Robotic Assisted Laparoscopic Repair of Hand-Assist Site Incisional Hernia following Hand-Assisted Laparoscopic Nephrectomy

Background: The incidence of incisional hernias following hand-assisted laparoscopic surgery (HALS) has been reported to be 3-10%. Laparoscopic repair can be challenging due to the nearly pelvic location of these hernias. Here we report the first case of a robotic-assisted repair for an incisional hernia following a hand-assisted laparoscopic nephrectomy (HALN). / Methods: / Elective robotic-assisted laparoscopic ventral hernia repair was performed on a patient with a history of HALN who developed an incisional hernia. Using the robotic platform, extensive adhesiolysis, with dissection and reduction of the hernia contents, was performed. The edges of the internal oblique muscles were dissected on either side of the hernia and closed primarily with a running suture. A plane anterior to the transversalis fascia was dissected and an 11x11 cm polypropylene mesh was placed into the plane centered over the defect closure. The mesh was secured with a running suture. / Results: / The patient was a 50 year old man with a history of HALN due to recurrent nephrolithiasis. He underwent an elective robotic-assisted laparoscopic ventral hernia repair using polypropylene mesh. We were able to perform extensive adhesiolysis, reduce the hernia contents, and ensure 2 cm of coverage circumferentially from the edge of the mesh. There were no complications and the postoperative clinical course was uneventful. / Conclusions: / We present the first case report of a successful robotic-assisted laparoscopic repair of an incisional hernia following hand-assisted laparoscopic surgery (HALN). The robotic assisted laparoscopic approach offered a distinct advantage over more traditional approaches. Robotic-assisted laparoscopic repair of HALN is feasible and is a valuable addition to the minimally invasive surgeon's armamentarium. However prospective studies comparing the robotic-assisted approach to established techniques are warranted. /

B76: Michael Lee

Advisor(s):Gainosuke Sugiyama and Paul Chung

A Calculated Risk: Performing Laparoscopic Cholecystectomy on Patients with End Stage Renal Disease

Introduction: End stage renal disease (ESRD) is a multifactorial disease linked to race and socioeconomic status and associated with worse surgical outcomes. We assess intraoperative and postoperative outcomes in patients with cholecystitis undergoing laparoscopic cholecystectomy (LC) comparing patients with and without ESRD. Methods: We identified adult patients undergoing LC for cholecystitis, while excluding gallbladder disease without cholecystitis and acute renal failure, from the Nationwide Inpatient Sample (2005-2012). We examined mortality, length of stay (LOS), intraoperative and postoperative complications. We performed multivariate analysis adjusting for age, gender, race, insurance status, income levels, year of admission, elective status, number of Elixhauser comorbidities, and presence of ESRD. Results: 512,073 patients underwent LC and 5,020 had ESRD. On univariate analysis, ESRD patients had higher mortality (3.8 vs 0.37%, $p < 0.0001$), higher median LOS (7.0 vs 3.0 days, $p < 0.0001$), and more complications: intraoperative (3.0 vs 1.4%, $p < 0.0001$), mechanical wound (1.7 vs 0.4%, $p < 0.0001$), respiratory (3.8 vs 1.8%, $p < 0.0001$), cardiovascular (1.6 vs 0.7%, $p < 0.0001$), nervous system (0.1 vs 0.04%, $p = 0.04$), and postoperative infections (8.4 vs 5.3%, $p < 0.0001$). On multivariate analysis ESRD was an independent predictor of mortality (OR 3.94, 3.30-4.69 95% CI, $p < 0.0001$), mechanical wound complications (OR 1.90, 1.48-2.45 95% CI, $p < 0.0001$), and intraoperative complications (OR 1.46, 1.21-1.76 95% CI, $p < 0.0001$). ESRD was associated with less postoperative infections (OR 0.84, 0.75-0.94 95% CI, $p = 0.002$). Conclusion: After adjusting for clinical, socioeconomic, and demographic variables, ESRD is an independent risk factor for increased mortality, intraoperative and mechanical wound complications, and increased LOS in patients undergoing LC. Studies exploring risk optimization strategies for patients with ESRD undergoing LC are warranted. /

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