

Sairaman Nagarajan

Advisor(s): Maria-Anna Vastardi

The Role Of Gender In The Association Between Obesity And Atopic Disease In Urban Children

Rationale: The role of gender remains understudied in the relationship between obesity and atopy, particularly in urban children. The aim of this study was to examine if gender modified the association between obesity and multiple atopic diseases.

Methods: A retrospective cohort study was conducted on 113 children (aged 0-21) in an urban university hospital. Patients were evaluated for a history of allergic rhinitis, eczema, asthma, food allergies and IgE, eosinophil% and counts. An atopic score variable was created to summate the total number of atopic diseases per patient. Chi-square tests, t-tests and linear regression assessed the relationship between obesity and individual atopic disease variables as well as cumulative atopic score. Interaction effects were tested by gender.

Results: In our population, 23% was obese, 45% were female and 55% male. The most common atopic diseases were allergic rhinitis (67% vs. 23, $p < 0.001$) and food allergies (54% vs. 36%, $p = 0.02$). We found no differences in laboratory biomarkers and individual/cumulative atopic disease prevalence in obese children compared to controls, but stratification by gender proved that obese females had a higher mean atopic disease score (4.00 vs. 2.62, $p < 0.001$) compared to controls. Interestingly, obese males had a lower atopic disease score (3.00 vs. 3.42, $p < 0.001$) compared to controls. Finally, regression models showed obese females showed a significantly higher mean atopic disease score ($\hat{\beta} = +1.37$, $p = 0.005$) compared to controls, whereas obese males were protected ($\hat{\beta} = -0.42$, $p = 0.006$).

Conclusions: This study shows that obesity and atopy were modified strongly by the interaction effects of gender, using an urban, representative dataset of US children. These results suggest the need for continued surveillance of the atopy-obesity relationship, particularly in urban females, in whom weight reduction therapies may be more beneficial than males in controlling symptoms of atopy.

Roshni Naik

Advisor(s): Maria-Anna Vastardi

Body Mass Index Correlates With Total Serum IgE Levels In Healthy Adults And Those With Allergy/Asthma

Rationale: Obesity is associated with increased Th1 responses in adipose tissue and Th2 responses in peripheral blood. We determined the relationship of body mass index (BMI) to total serum IgE levels.

Methods: Blood levels of total serum IgE levels were measured (IU/ml, fluoroenzymeimmunoassay) and BMI (kg/m^2) determined for 31 adults (16 female, 13 with allergy/asthma and 18 healthy control subjects, mean age $38.8 \text{ yrs} \pm 14.0$). Spearman correlations were determined.

Results: There is a significant association of BMI with total serum IgE level ($R = 0.47$, $p = 0.007$) for the entire group.

Conclusions: The immune responses of obesity are associated with IgE production and may contribute to allergy/asthma in adults.

Yifeng Chen

Advisor(s): Rauno Joks

Effect Of Sleep Duration On Levels Of Exhaled Nitric Oxide From Adults With Asthma

Rationale: The daily pattern of allergic asthma disease severity involves exacerbation in the overnight period. As increased nocturnal asthma activity may affect sleep, we determined the association of sleep duration with morning and afternoon exhaled nitric oxide levels.

Methods: Exhaled nitric oxide (eNO) levels (Niox Vero, Aerocrine) were measured for adult asthmatics (n=6) and healthy controls (n=8) at 10 AM and 4 PM. Sleep duration for the previous night was recorded. Spearman correlation coefficients were generated.

Results: Median duration of sleep was 6.6 hrs (min 4.0, max 8.3). Median eNO level in AM was 23.0 ppb (min 8.0, max 81.0); median eNO in PM was 21.0 ppb (min 7.0, max 82.0). There was a significant inverse relationship between sleep duration and AM eNO ($R = -0.65$, $p = 0.02$) and near significance for PM eNO ($R = -0.57$, $p = 0.06$).

Conclusions: Increased duration of sleep is associated with lower airway levels of nitric oxide, both in the morning and afternoon, in both adults with asthma as well as healthy controls. This suggests sleep may suppress airway inflammation.

Max Friedman

Advisor(s): Helen Lauro

Case Report: Anesthetic Management Of A Patient With Robinow Syndrome

Case Report: Anesthetic management of a pediatric patient with Robinow syndrome

Abstract: A nine year old boy presented for elective surgery for bilateral myringotomy tube placement and lingual frenulectomy. Medical history was significant for suspected Robinow syndrome, a syndrome of skeletal dysplasia which generally consists of disproportionate dwarfism, characteristic limb abnormalities and craniofacial abnormalities, and may include cardiac, renal, and spinal abnormalities as well. We discuss our care of this patient and the various preoperative, intraoperative, and postoperative considerations for anesthesia in patients with Robinow syndrome.

Andrew Carfield

Advisor(s): Mohammad Salam

A Case Report Of Posterior Reversible Encephalopathy Syndrome In A Postpartum Patient

Posterior Reversible Encephalopathy Syndrome (PRES), otherwise known as reversible posterior leukoencephalopathy syndrome (RPLS) or reversible posterior cerebral edema syndrome is a syndrome with variable presentation but is generally characterized by headache, altered mental status, seizures, and visual disturbances. Its occurrence is rare in both the postpartum period and in normotensive patients. Although the exact mechanism is not known, it is believed to be due to impaired cerebral auto-regulation leading to vasogenic edema. There are a number of conditions associated with developing PRES including hypertension, eclampsia/pre-eclampsia, immunosuppression, sepsis, and renal insufficiency. We will present a rare case report of a patient diagnosed with PRES in the immediate postpartum period. The patient presented with tonic-clonic seizures two hours postpartum, and had both clinical and neuroimaging consistent of PRES. Most authorities agree that PRES is caused by a disrupted cerebral autoregulation, which leads to cerebral vasogenic edema due to abnormal blood flow. Our patient was treated with Dilantin for a short time and made a complete recovery. The management of PRES involves seizure control, hypertension control, and control of the control of the underlying etiology. PRES should be suspected in any post-partum patient who develops cognitive decline and seizures.

Annette Lukose

Advisor(s): Kathleen Friel

Looking At The Effect Of Bimanual Intensive Therapy And Constraint-Induced Movement Therapy On The Improvement Of Hand Function And Cortical Motor Pathways In Children With Cerebral Palsy

Introduction: Unilateral Spastic Cerebral Palsy (USCP) is caused by damage to the developing brain within the first 2 years of life and results in weakness and motor deficits on one side of the body. This is an observational study that is an add-on to an Intensive Upper Extremity Summer Program at Blythedale Children's Hospital in Valhalla, NY. At Blythedale Children's Hospital children with USCP receive hand training therapy for 6h/day for 5 days a week for six weeks. Intensive Bimanual Therapy and Constraint-Induced Movement Therapy (CIMT) are two forms of upper extremity rehabilitation that have been shown to improve hand function in children with USCP. The purpose of this study is to determine the effect of bimanual training and CIMT on the motor cortex excitability and the improvement in hand function in children with USCP.

Methods: Case study examines a 6-year-old boy with congenital USCP enrolled in the Blythedale Children's Hospital Intensive Upper Extremity Summer Program. TMS (Transcranial Magnetic Stimulation) Motor Mapping. TMS Motor Maps were made with single-pulse TMS given to a region of the motor cortex to evoke movements of selected digit and wrist muscles of the hemiplegic hand. Motor responses were measured with surface electromyography. Improvements in hand function were measured using: Jebsen-Taylor Test of Hand Function (JTTHF), Fugl-Meyer Assessment, and Canadian Occupational Performance Measure.

Results/Conclusion: The patient showed improvements in hand function and changes in motor cortex mapping over the course of the summer program. The JTTHF reveals improvement in speed in accomplishing timed tasks over the course of camp. The Fugl Meyer Assessment of affected hand reveals some motor recovery between pre-camp and post-camp performance. The Canadian Occupational Performance Measure reveals that the individual's performance and satisfaction in functional goals have increased, clinically significant in 4 of 5 functional goals.

Clive Goulbourne

Advisor(s): Jason Lazar

Comparison Of Physician Preference Of Novel Oral Anticoagulant Vs. Warfarin To Actual Prescription Choice

Although novel oral anticoagulants (NOACs) serve as an effective alternative to warfarin for oral anticoagulation (AC), AC management strategies remain highly variable. The purpose of this study is to assess physician preference towards NOACs vs. warfarin and identify factors related to selection of therapy.

Attending and housestaff physicians across multiple subspecialties at SUNY Downstate were surveyed online using 5 clinical scenarios: bleeding history, increased fall risk, CKD, and polypharmacy. For each scenario physicians rated their preference of AC on a Likert scale of 1-5 (1=strong preference for warfarin, 3=neutral, 5=strong preference for NOAC). For each physician, scores were averaged to derive an overall preference score (PS). PS ≥ 3 indicated preference for NOACs and ≤ 3 for warfarin preference. Chart review was done on patients discharged on AC examining (1) the class of oral AC used and (2) the presence of the clinical conditions above. Results were analyzed to determine concordance between survey responses and actual AC prescribed.

Among 70 survey responses, the mean PS was 3.6, $p < 0.05$ indicating favorability for NOACS. Mean attending PS was higher than housestaff (3.9 \pm 0.6 vs. 3.5 \pm 0.6, $p = 0.006$). There was a trend towards higher PS in EM than in IM and Neurology physicians (3.6 vs. 3.5 vs. 3.5, $p = 0.065$). Mean PS was significantly lower in the setting of increased fall risk (2.7, $p < 0.001$) and CKD (2.9, $p < 0.002$) and significantly higher in the setting of bleeding history (3.7, $p = 0.03$) than in other clinical conditions. Actual patient chart review revealed lower rates of NOAC prescribed in patients with CKD and increased fall risk compared to others (38% vs. 40% vs. 61%).

Overall, NOACs are preferred over warfarin for AC. Attendings show stronger preference towards NOACs than housestaff. A preference for NOACs may be specialty related. Increased fall risk and CKD are each associated with lower PS and lower actual NOAC prescribing.

Chanel Jonas

Advisor(s): Jason Lazar

Fractal Analysis Of Coronary Angiograms In Patients With Eccentric And Concentric Left Ventricular Hypertrophy

Fractal dimensions are a measure of the self similarity possessed by a fractal and part of the larger branch of geometry called fractal analysis. Fractals are defined as structures that demonstrate repeated patterns of self similarity over progressively smaller scales. There have been studies done recently which look at the relationship between fractal dimensions and retinal vessels. Abnormally high and low fractal dimensions were correlated with increased 14 year CHD mortality. In this study, the fractal dimensions from coronary angiograms of 36 patients with eccentric or concentric left ventricular hypertrophy were computed and analyzed. The coronary angiogram images were enhanced for better clarity using Image J and GIMP programs prior to calculating the fractal dimension. It was found that the mean left coronary artery fractal dimensions were 1.5142 ± 0.0296 and mean right coronary artery dimensions were 1.4765 ± 0.0495 . Fractal dimensions for the 2 arteries were not significantly correlated. Fractal dimension was indirectly correlated with pulse wave velocity, a direct measure of arterial stiffness for both the RCA and LCA. The significance of these findings as well as longitudinal changes in fractal dimensions merit further study.

Jesse Kane

Advisor(s): Jason Lazar

Mean Platelet Volume In Congestive Heart Failure At Baseline And During Acute Decompensated Heart Failure

Mean platelet volume (MPV) is routinely reported along with platelet counts. Younger platelets are larger and more thrombogenic. Earlier studies have suggested higher MPV is predictive of cardiovascular events. Limited studies show that during acute decompensated heart failure (ADHF), higher MPV levels are associated with higher BNP levels and greater 6 month mortality. Less is known about stable outpatients and MPV changes in ADHF. The objective of this study was to compare outpatient to inpatient MPV levels in CHF patients. We retrospectively studied 46 patients admitted for ADHF with MPV determined either before or after admission while stable in the outpatient setting (baseline). Clinical, and laboratory data were obtained from electronic medical record. Same hospital 180-day readmission rates were determined. Mean age was 70+13years. Mean ejection fraction was 36+18%. Mean platelet count was 204+85 103/uL at baseline vs. 223+100103/ uL upon admission (p=.16). Mean MPV was 8.5+1.0 fL at baseline vs 8.4+.90fL on admission (p=.75). At baseline, 15% of patients had abnormally low MPV values (<7.5fL), 85% had normal and none had high values (>11.5fL). MPV significantly increased in patients with low MPV at baseline by 0.7+.8 (p=.034). Absolute changes in MPV were inversely correlated to baseline MPV values (r=-.49, p<.01). Patients with low MPV at baseline had fewer days to same hospital readmission (55+46 vs 10+23days, p=0.01). In conclusion, 15% of stable ambulatory CHF patients have abnormally low MPV values suggesting impaired production rather than increased destruction. These patients are more likely to exhibit an increase in MPV during ADHF suggesting increased release as an acute response. Therefore differing mechanisms may govern platelet production/release may in the stable outpatient and acute inpatient settings. While prior studies have found high MPV values during ADHF, our findings suggest lower values in chronic stable patients.

Venu Pasricha

Advisor(s): Jason Lazar

Nailfold Capillaroscopy For The Identification Of Microvascular Disease In African-Americans

Background: Nailfold video capillaroscopy (NFC) is a non-invasive imaging technique that is used clinically in the rheumatology arena in order to directly visualize capillaries for the identification of microvascular abnormalities related to systemic sclerosis. More recently, this technique has been performed to assess microvascular involvement in non-rheumatic conditions such as arterial hypertension, diabetes mellitus, acromegaly, hyperthyroidism, Syndrome X.

Although African Americans (AA) are particularly susceptible to hypertensive related microvascular target organ damage, NFC has not been studied in this setting. Accordingly, the objective of this study was to characterize or characterize subclinical microvascular structural abnormalities in AA with hypertension (HTN).

Methods: We studied 40 AA controls and 38 AA HTN subjects, of which 14 also had diabetes (DM). NFC was performed 3-4x on each of 8 digits using a capillaroscope and recorded digitally for off-line analysis. Images were reviewed by a blinded observer according to previously published criteria and mean capillary number and final capillary score (indirectly related to capillary number) were calculated and averaged for each subject.

Results: The HTN groups was significantly older, had higher body mass index (BMI) and higher systolic and diastolic blood pressures (all p<.002). On NFC, the mean capillary number was lower (7.1 $\hat{\pm}$ 1.4 vs 7.6 $\hat{\pm}$ 2.4 vs 8.8 $\hat{\pm}$ 1.4, p=.003) and the final capillary score was higher in the HTN-DM and the HTN groups (.35 $\hat{\pm}$.48 vs 1.13 $\hat{\pm}$.95 vs 1.21 $\hat{\pm}$.70, p= <.001) as compared to controls. On multivariate linear analyses, both mean capillary number and final capillary score were independently related to HTN after adjusting for age, BMI, and mean arterial pressure (both p<.02).

Conclusions: HTN is associated with lower capillary density in AA with HTN. The relation between capillary density and other markers of target organ disease merits further study.

Shera Ramesar

Advisor(s): Jason Lazar

Relation Between Nail-Fold Capillary Density And Microvascular Reserve In African Americans

Objectives: African Americans (AA) are prone to develop diabetic (DM) and hypertensive microvasculopathy. Measures of microvascular abnormalities are lacking. Nailfold videocapillaroscopy (NFC) is used to visualize capillaries when systemic sclerosis is suspected, and recently in studies to assess microvascular involvement in hypertension (HTN) and DM. The relation between capillary density and functional microvascular derangements is unknown. Our objective was to determine the relation between nailfold capillary density and microvascular flow reserve using Laser Doppler Flowmetry (LDF).

Methods: We studied 123 AA subjects (21% with HTN, 18% with DM, 25% with both HTN and DM). NFC was recorded for 8 fingers. Mean capillary number and final capillary score (degree of capillary drop out) were calculated. LDF was performed on the hand to record flux, a measure of microvascular flow (Periflux 5000), both pre and post reactive hyperemia induced by inflation of a Hokenson's cuff around the upper arm above systolic blood pressure with subsequent release. The percent increase in flux was calculated.

Results: NFC was interpretable in 118/123 subjects and LDF was feasible in 116. The HTN and DM groups were older, with higher body mass index and higher blood pressure (all $p < .05$). Mean capillary number was significantly lower and the final capillary score was higher in the HTN, DM and HTN-DM groups as compared to control. Percent change in flux correlated with mean capillary number ($r = .26$, $p = .005$) and inversely with final capillary score ($r = -.29$, $p = .002$). These relations persisted after adjusting for confounding variables on multivariate linear analyses.

Conclusion: HTN and DM are associated with subclinical abnormalities of microvascular structure and function in AA. Reduced nailfold capillary density is associated with lower microvascular flow reserve in AA. The relation between capillary density, microvascular flow reserve and target organ disease merits further study.

Helen Lyo

Advisor(s): Jason Lazar

Relation Between Aging And Cardiovascular Risk Factors With Spinal Cord Size: A Pilot Study

Aging and the presence of cardiovascular (CV) risk factors have been found associated with decreased brain volume and cognitive dysfunction. However, less is known about their relationships to the other central nervous system component, the spinal cord (SC). This pilot study tests the hypothesis that age and CV risk factors are associated with lower SC volume and higher frailty. We recruited and prospectively studied 18 subjects, age 30-69 years. CV risk factors were: hypertension in 8, diabetes in 10, 10 with hyperlipidemia and 10 were former or current smokers. Two participants had CAD. Each subject underwent assessment of CV risk factors, standardized frailty testing, and cervical spine magnetic resonance imaging (MRI) to determine SC area from multiple axial images from C2 to C7. 13 participants were not frail (0 indicators), 5 were pre-frail (1-2 indicators) and 1 was frail (≥ 3 indicators). Mean SC area was $67.5 \pm 12.7 \text{ mm}^2$ and the range was $35.0 \text{--} 85.4 \text{ mm}^2$. For the group, mean SC area was significantly correlated with age ($r = -0.52$, $p = 0.027$) and there was a trend with pooled cohort risk score (10-year CV event risk) ($r = -0.38$, $p = 0.12$). There were no significant correlations between mean SC area and height, weight or body mass index. There was a trend towards lower mean SC area in subjects with 3-4 risk factors than in those with 0-2 risk factors 63.0 ± 4.0 vs $73.2 \pm 4.2 \text{ mm}^2$, ($p = 0.10$) and in the pre-frail/frail group as compared to the non-frail group 60.1 ± 5.4 vs $70.9 \pm 3.2 \text{ mm}^2$ ($p = .09$). This pilot study suggests that advancing age and higher CV risk may be associated with lower SC volume, which in turn may predispose to the frailty syndrome. It supports the rationale for additional larger studies to evaluate these associations.

Steven Song

Advisor(s): Jason Lazar

First Report Of Hemopericardium Resulting In Multi-Organ Failure As A Consequence Of Dabigatran Use Reversed By New Antidote Idarucizumab

Dabigatran, the first novel oral anticoagulant (NOAC) with a reversal agent, heralded a paradigm shift in the treatment of non-valvular atrial fibrillation. The potential for life-threatening hemorrhagic events with the use of NOACs has been highly debated since the effectiveness of reversal agents such as Idarucizumab are based primarily on pharmacologic data. It is known that cancer patients are at an increased risk of bleeding with anticoagulation, though specific studies demonstrating the risks or efficacy of NOACs in this population are lacking. We provide the first report of hemopericardium resulting in multi-organ failure secondary to Dabigatran that was successfully reversed by Idarucizumab.

An 84-year-old man with prostate cancer and atrial fibrillation was admitted for neutropenic fever and kidney failure. He received fluid resuscitation and broad-spectrum antibiotics without improvement. Within 24 hours, his condition progressed to cardiogenic shock and multi-organ failure. Echocardiography revealed a large pericardial effusion with evidence of cardiac tamponade. Idarucizumab was administered facilitating pericardiocentesis of hemorrhagic fluid. He returned to baseline functional status within 1 week.

This patient's presentation was compounded by his malignancy and chemotherapeutic regimen, docetaxel and enzalutamide, both P-glycoprotein modulators that increase the plasma level of Dabigatran. This case underscores the importance of critical appraisal of a patient's comorbidities and drug interactions if prescribing a NOAC. Given the lower threshold for catastrophic bleeding in cancer patients on treatment with chemotherapy and additionally requiring anticoagulation, physicians should carefully select those for NOAC prescription until evidenced based practice guidelines have been established. In the meantime, the real-world effectiveness of Idarucizumab for neutralizing Dabigatran in life-threatening hemopericardium has been reported for the first time.

Abhishek Sharma

Advisor(s): Jonathan Marmor

Relationship Of Body Mass Index With Outcomes After Transcatheter Aortic Valve Replacement: Results From The National Cardiovascular Data- Sts/Acc Tvt Registry

Objective: To investigate the relationship of body mass index (BMI) with short and long term outcomes after Transcatheter Aortic Valve Replacement (TAVR).

Methods: Patients who underwent TAVR between November 2011 and March 2015

from STS/ACC TVT Registry were included in the analysis. Registry data on 20,429

patients were linked to the Centers for Medicare and Medicaid Services to assess the association of BMI with 30-day and 1-year mortality using multivariable Cox proportional hazards modeling.

Results: Among 31,929 patients, 2.5% (n=806) were underweight; 33.7% (n=10755) normal weight; 33.5% (n=10691) overweight; 17.5%(n=5582) class I obese; 7.4% (n=2363) class II obese; and 5.4% (n=1732) class III obese. On multivariable analysis, compared to normal weight patients, underweight patients had an increased risk of mortality at 30 days and 1 year after TAVR [1.35 (1.02-1.78) and 1.41 (1.17-1.69), respectively] whereas overweight, obese class I and II patients had a decreased risk of mortality at 1 year [0.88 (0.81-0.95), 0.80 (0.72-0.89), and 0.84 (0.72-0.98), respectively]. Patients with BMI \geq 30 kg/m², each 1 kg/m² increase was associated with 2% and 4% decreases in the risk of 30-day and 1-year mortality, respectively. Further, for patients with BMI \geq 30 kg/m², each 1 kg/m² increase was associated with a 3% increased risk of 30-day mortality, and a statistically non-significant trend for an increase in the risk of 1-year mortality.

Conclusion: Results of this largest study support existence of an "obesity paradox" among patients with severe aortic stenosis undergoing TAVR

Sonam Verma

Advisor(s): Alexandra Reznikov

A Rare Phenotypic Presentation Of Epileptic Encephalopathy And Pontine/Cerebellar Hypoplasia In A Male Due To Cask Gene Mutation

Introduction

X-linked CASK gene mutations are found in female patients with a severe neurodevelopmental disorders and distinct brain anomalies which comprises of progressive microcephaly, ponto-cerebellar hypoplasia and severe developmental delay, (MICPCH). Females with MICPCH carry heterozygous loss-of-function mutations in CASK gene. It has been hypothesized that CASK loss-of-function mutations are associated with reduced male viability or in utero lethality while hypomorphic mutations are associated with a different phenotypic spectrum.

Case report

We here report a case of a 6 month old Chinese boy, born full term to nonconsanguineous parents who presents with intractable epilepsy since two weeks of age, microcephaly, hypotonia, severe global developmental delay, dysmorphic features and optic nerve dysplasia. He feeds through PEG tube. His vEEG is diagnostic of Ohtahara syndrome. MRI brain showed lissencephaly, in addition to pontine/cerebellar hypoplasia. Whole exome sequencing showed likely pathogenic hemizygous splice variant in CASK(c.1669-2T>C) between exons 17 and 18, which has not been previously reported in the literature.

Discussion

Including our patient, there are eleven sporadic male individuals with MICPCH and severe epileptic encephalopathy who have been reported in the literature up to 2017. CASK alterations in these patients likely represent germline mutations (missense mutation, nonsense mutation, splice site mutation). In this group, the affected males have the most severe clinical presentation with profound developmental delay and intractable epilepsies such as Ohtahara syndrome or Early Myoclonic Epilepsy of Infancy. MRI shows significant pontocerebellar hypoplasia. Other brain malformations can include rarefaction of gyri, cortical atrophy and hypomyelination but no further supratentorial involvement is usually observed. Thus, the brain imaging findings are the major diagnostic clue and should prompt testing of the CASK gene.

Hoang Tang

Advisor(s): Tonya Taylor

The Changing Sexual Health Risk Behaviors In Men With And Without HIV As They Age

Objective: To identify predictors of unsafe sex practices within the urban-Black community and to identify differences in risk factors between older and younger men with and without HIV.

Methods: Patients were recruited for this study from University Hospital of Brooklyn and King's County Hospital Center. Audio Computer-Assisted Self-Interview was used to collect data on patient health status, HIV knowledge and risk perceptions, sexual behaviors, social networks, stigma, and psychological resources. Additional information was collected using focus groups and in-depth interviews for select patients.

Results: 193 subjects were recruited for this study. The mean age was 46.8 years (range 20-80). 113 (58.6%) identified as heterosexual, 19 (9.8%) as bisexual, 58 (30.1%) as homosexual, and 3 (1.5%) as other. 169 (87.6%) identified as Black, African American, or Caribbean, 38 (19.7%) identified as Latino(a), 17 (8.9%) identified as other, and 7 (3.6%) identified as White or Caucasian. 138 (71.5%) were HIV+, 53 (27.5%) HIV-, and 2 (1.0%) didn't know their status/NA. Participants were separated into 4 groups based on HIV status and age. The rates for condomless sex were: 29.0% for those < 50 and HIV+, 44.8% for those < 50 and HIV-, 57.9% in those < 50 and HIV+, and 66.7% in those < 50 and HIV-. Condomless sex was associated with having multiple sexual partners, diagnosis of an STI within the last 6 months, and sex while using drugs or alcohol.

Discussion: In order to plan effective interventions for at risk populations we must first identify the main determinants that lead individuals to engage in high-risk sexual behaviors which include psychological processes, socioeconomic factors, and the dynamics of sexual interactions. On the basis of the results of this study we plan to propose evidence based behavioral intervention strategies to reduce sexual risk behaviors in priority populations.

Tong Wooi Ch'ng

Advisor(s): Sheila Perez-Colon

Challenging Diagnosis: Anti-Nmda-Receptor Encephalitis With Subsequent Discovery Of An Ovarian Teratoma

Background: Anti-N-Methyl-d-aspartate receptor (NMDAR) encephalitis is an under-recognized condition in the pediatric population. It carries a high mortality rate if not treated promptly. Clinicians need a high index of suspicion to prevent poor outcomes.

Case: A 14-year-old presented with 1-day history of confusion, agitation, memory loss, auditory and visual hallucinations. It was preceded by 10 days of tactile fever, vomiting, diarrhea and severe headache with photophobia and phonophobia. Urine toxicology screening, CBC, CMP, LP and head CT were normal. She worsened the next day with altered sensorium and subsequently intubated due to bradycardia and desaturations. She also developed autonomic instability (hyperthermia and hypertension) and dyskinesia. With the constellation of signs and symptoms, NMDAR encephalitis was highly suspected. Repeat LP on day 5 of admission revealed elevated lymphocytes and WBC. Pelvic US and CT were normal (no ovarian mass). She was started on solumedrol and IVIG treatment empirically. CSF NMDAR Ab was reported on day 14 of hospitalization as positive and diagnosis of Anti-NDMAR encephalitis was made. Since she did not respond as expected to the therapy, she received plasmapheresis, rituximab and cyclophosphamide. Her condition continued to deteriorate even after the second line therapy for which a pelvic US was repeated (4 weeks after the initial one) and showed a 1 cm mass in the left ovary. Two benign teratomas were found on exploratory laparotomy which required cystectomies. Her condition improved after surgery. She recovered few years later.

Conclusion: This unique case demonstrates the importance of clinicians to be aware of this condition as it deteriorates rapidly and with early therapy, it has proven to have better cognitive outcome. It also highlights the need to closely follow up the radiological images on those patients with positive anti-NDMA antibodies-encephalitis in which the initial radiologic work up was negative.

Marjon Vatanchi

Advisor(s): Neil Brody

New Energy Devices For Neck Rejuvenation: Review Of Modalities And Efficacy

Rationale: During aging, the neck develops skin dyspigmentation, rhytides, loss of mandibular contour and prominence of platysmal bands. We review the latest data on efficacy of assorted energy devices.

Methods: Novel publications from 2014-2016 on neck rejuvenation technologies were reviewed. This revealed a surge of new technologies which include ablative and non-ablative lasers, radiofrequency devices, photodynamic therapy (PDT), and combination therapies.

Results: One prospective study of non-ablative fractionated laser resurfacing in 18 women found immediate improvement in skin dyschromia, laxity, and wrinkles; however, re-evaluation at 3-months only showed sustained improvement in dyschromia and wrinkles. Another study evaluated long-term efficacy of fractional CO2 laser utilizing blinded reviewers. Participants had significant improvement in skin laxity, jowls, fat deposition, and horizontal neck lines both one-month and one-year post-treatment. In regards to PDT, a comparison study evaluated intense pulse light (IPL) and red light energy with and without PDT. The neck was divided into four equal sections and treated with a different combination therapy. The IPL-PDT and red light-PDT groups had better efficacy than IPL or red light alone.

Discussion: The studies display improvement in skin laxity, dyschromia, and rhytides for neck rejuvenation. For photodamage and dyschromia, it is the author's opinion that non-ablative fractionated lasers prove more efficacious clinically when compared to photodynamic therapies. With skin laxity and submental fullness, current laser studies support superior outcome for CO2 laser but with more downtime and need for expert clinicians. The best cosmetic outcomes are lasers used in combination with a secondary treatment modality (neuromodulators, cryolipolysis, liposuction). This is an exciting new era for neck rejuvenation. As physicians continue to mix and match treatment modalities, more research can be expected.

Maliheh Mohamadpour

Advisor(s): Sharon Glick

A Rare Cause Of Collodian Membrane And Neurological Deficits In A Newborn

Rationale: Lipid storage diseases are a group of uncommon metabolic disorders that cause significant debilitation with a high risk of death in infancy. Commonly, these disorders have been associated with the Ashkenazi Jewish population. We present a rare form of lipid storage disease that causes significant dermatological and neurological deficits in a differing sub-population.

Description: A Middle Eastern baby boy whose parents are first cousins was delivered at 37 weeks gestation with a thick collodian membrane encasing his body. Dermatology was consulted for concern that the membrane was causing compression to the left hand. Examination and ultrasound Doppler of the extremities deemed him clear of any vascular compromise. At three days of life, the collodian membrane began to fissure eventually exfoliating off. Concerned for a congenital ichthyotic disorder, genetic testing was offered.

At 8 months, the genetics result was available. At which time, significant neurological deficits were noted on examination. The infant was unable to roll over nor could he sit in the seated position. He had severe nystagmus bilaterally. The skin was erythematous with fine white scale throughout the body and large ichthyotic plaques on the lower legs.

Results: Genetic analysis revealed a mutation in the Abhydrolase Domain Containing-5 (ABHD-5) gene. This mutation leads to a rare lipid storage disease: Chanarin-Dorfman Syndrome.

Discussion: The ABHD-5 gene provides instruction for breaking down triglycerides. When mutated, triglycerides accumulate throughout the body leading to lipid storage disease. Chanarin-Dorfman Syndrome is a rare autosomal recessive condition seen in the consanguineous Middle Eastern population. Patients develop generalized ichthyosis, myopathy, cataracts, sensorineural deafness, developmental delay, hepatomegaly and a collodian membrane. Diagnosis can be made with peripheral blood smear which displays vacuolated leukocytes and confirmed with genetic testing.

Roshanak Benabbas

Advisor(s): Richard Sinert

Diagnostic Accuracy Of History, Physical Exam, Laboratory Tests And Point-Of-Care-Ultrasound For Pediatric Acute Appendicitis In The Emergency Department: A Systematic Review And Meta-Analysis

We performed a systematic review/meta-analysis to determine the utility of history, physical exam, lab tests, Pediatric Appendicitis Score (PAS) and Emergency Department-Point-of-Care Ultrasound (ED-POCUS) in the diagnosis of Acute Appendicitis (AA) in ED pediatric patients.

PUBMED, EMBASE, and SCOPUS were searched up to October 2016. Quality Assessment Tool for Diagnostic Accuracy Studies (QUADAS-2) for Quality assessment. Positive and negative Likelihood Ratios (LR+ and LR-) were calculated and when appropriate data was pooled. Using the test characteristics of different imaging modalities and applying Pauker-Kassirer method we developed a test-treatment threshold model to identify diagnostic findings that could rule in/out AA and obviate the need for CT scan, MRI and Radiology-Department Ultrasound (RUS).

Twenty-one studies were included encompassing 8,605 patients with AA prevalence of 39.2%. We divided studies based on their inclusion criteria into 2 groups of "undifferentiated abdominal pain" and abdominal pain "suspected of AA". In patients with "undifferentiated abdominal pain" history of "pain migration to RLQ" (LR+ 4.81) and the presence of "cough/hop pain" in the physical exam (LR+ 7.64) were most strongly associated with AA. None of the history, physical exam, lab tests findings or PAS alone could rule in/out AA in neither group. ED-POCUS had LR+ 9.24 and LR- 0.17. Using our test-treatment threshold model, positive ED-POCUS could rule in AA without the use of CT and MRI, but negative ED-POCUS could not rule out AA.

Presence of AA is more likely in patients with undifferentiated abdominal pain migrating to the RLQ or when pain is reproducible with cough/hop. Once AA is suspected, no single history, physical exam, lab finding or PAS score can eliminate the need for imaging studies. In ED patients suspected of AA, a positive ED-POCUS is diagnostic and obviates the need for CT or MRI while negative ED-POCUS is not enough to rule out AA.

Alyssa Conigliaro

Advisor(s): Richard Sinert

Protocolized Laboratory Screening For The Medical Clearance Of Psychiatric Patients In The Emergency Department: A Systematic Review

Emergency department (ED) patients with psychiatric chief complaints undergo medical screening to rule out underlying or comorbid medical illnesses prior to transfer to a psychiatric facility. This systematic review attempts to determine the clinical utility of protocolized laboratory screening for the streamlined medical clearance of ED psychiatric patients by determining the clinical significance of individual laboratory results. We defined clinical significance as abnormal laboratory results that altered patient treatment or disposition. We searched PUBMED, EMBASE and SCOPUS using the search terms “Emergency department, Psychiatry, Diagnostic tests, Laboratories, Studies, Testing, Screening, and Clearance” from January 1966-February 2017 for studies on adult psychiatric patients. This systematic review follows the recommendations of Meta-analysis of Observational Studies in Epidemiology (MOOSE) statement. The quality of each study was rated according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement. Four independent reviewers identified 2,847 publications. We extracted data from 3 studies (n=629 patients). Study quality ranged from low to moderate (33%-57% of satisfied items) using the STROBE checklist. Complete blood count had the highest weighted prevalence of clinically significant test results (0.4% (95%CI 0.25-0.55%)). To date, there is a paucity of published research on the utility of protocolized laboratory screening for ED psychiatric patients and the available literature is of low quality with a high risk of selection and abstraction bias. We cannot confirm whether or not laboratory screening is warranted for all ED psychiatric patients.

Andrew Nguyen

Advisor(s): Shahriar Zehtabchi

Clinical Value Of Initial Serum Lactate In Risk Stratifying Trauma Patients

Background: Emergency physicians face the challenge of rapidly identifying high-risk trauma patients, often with minimal data to guide them. Lactate (LAC) is widely used as a surrogate of tissue hypoperfusion. However, clinically important values for LAC as a predictor of mortality are not well defined. Objectives: 1. To assess the value of triage LAC in predicting mortality after trauma. 2. To compute interval likelihood ratios (LR) for LAC.

Methods: Retrospective, electronic chart review of trauma pts treated at a large, urban trauma center. Inclusion: All trauma pts with a significant mechanism of injury (MOI) that warranted triage labs. Outcome: In-hospital mortality. Data are presented as median and quartiles or percentages with 95% confidence intervals. Groups (lived vs. died) were compared with Man-Whitney-U or Fisher’s exact tests. Multivariate analysis was used to measure the association of the independent variables (age, gender, MOI, intracranial hemorrhage, blood pressure, heart rate, venous LAC, base deficit) and mortality. The interval LRs were calculated for all LAC observed values.

Results: 10,575 pts; median age: 38 [25-57], 69% male; 76% blunt; 1.1% (n=119) mortality. LAC was statistically different between the groups (2.3 [1.6 – 3] vs 2.8 [1.6 – 4.8], p=0.008) and was associated with higher risk of mortality (OR: 1.14 [1.08-1.21], p=0.0001). LR revealed a range of 0.6-1.0 for LR-. Increasing LAC increased LR+. However, LR+ for LAC reached 5 (moderate increase in disease probability) with LAC > 9mmol/L and LR+ passed 10 (conclusive increase in disease probability) with LAC >18mmol/L.

Conclusions: In a cohort of trauma pts with a wide spectrum of characteristics (age, disease severity, MOI): 1. Triage LAC was statistically able to identify high-risk pts. However, meaningful contribution to decision-making (moderate increase in pre-test probability) occurred only at LAC >9. 2. LAC was not useful at excluding those with a low risk of mortality.

Yakira David

Advisor(s): Laura Martello-Rooney

A Retrospective Study Evaluating Cigarette Smoking And Right- Vs Left- Polyps And Colorectal Cancer In An Afro Caribbean Population

Background: Up to 20% of cases of colorectal cancer may be linked to smoking in the United States. Carcinogens from tobacco can cause damage to or alter the expression of cancer-related genes in the colorectal mucosa. Right- and left-sided colon cancers and adenomas differ clinically, epidemiologically and histologically, and thus the effect of cigarette smoking may also differ. We predict that right-sided adenocarcinomas are more common in this population and that smoking is associated with the presence of advanced adenomas.

Methods: A retrospective chart analysis of patients undergoing screening colonoscopy at our inner city hospital serving mainly an Afro-Caribbean population from January 2010 to December 2011 was performed. Data was collected on demographics, personal and family history, polyp characteristics and bowel prep. Only patients with good bowel prep were included and those with a family history of malignancies were excluded. Data was analyzed using chi-square analysis.

Results: 2,510 patients were reviewed. 40% had polyps or cancer. 53% were lifetime non-smokers, 6.4% were active smokers and 8.6% of were former smokers. 31% had no smoking status documented. 26.9% of smokers had a right-sided colon polyp compared with 20.9% of non-smokers. There was a statistically significant association between smoking and right colon polyps but not between right-sided polyps and advanced histology. 36.2% of patients with left-sided polyps were active smokers. 1.3% of smokers had a left-sided adenocarcinoma compared to 0.7% of non-smokers and 2.8% of former smokers. 73% of the adenocarcinomas were located within the right colon.

Conclusion: Smoking is correlated with the increased prevalence of both right-sided and left-sided polyps. It is also associated with the presence of advanced adenomas and adenocarcinoma within the left-colon. Based on this data we recommend that active or former smokers undergo screening at an earlier age.

Sarrina Shraga

Advisor(s): Sugiyama

Longitudinal Pilot Study Of Continuous Feedback To Improve Student Patient Note Writing Skills

Changes in medical practice have greatly affected interactions between students, residents and faculty and has led to variability in teaching within clerkships. As a result the AAMC released the Entrustable Professional Activities (EPAs) to evaluate medical students. Progress note writing is one of the main EPA's; we created a program to improve this student skill. This project quantitatively assessed improvement in students'™ daily progress notes following three weeks of continuous feedback.

Students rotating on the General Surgery service at were given an introductory lecture on basics of patient note writing. They were then asked to write electronic daily progress notes for patients they assessed during pre-rounds and rounds. During the course of three weeks, students received anonymous, ungraded feedback on their notes provided by two trained residents on a continuous basis, approximately twice per week. To assess the progress notes we used the Patient Note Scoring rubric developed by UICCOM. The rubric consists for three categories 1 Documentation 2 Differential Diagnosis and 3 Workup. A score of 1-4 was given for each category and weighted to total score of 100 (Documentation 30%, Differential Diagnosis 60% and Work-up 10%). The rubric was used to grade the first note as a baseline. The same scoring system was used to grade the last note to assess effects of the intervention. The scoring was done in a by two independent blinded graders to assess all student notes.

39 students participated in the project. We found an avg improvement of 4,6, and 1 points (p 0.00008, 0.0003, and 0.006) for documentation, differential diagnosis and workup respectively. The total grade improvement avg 10 points (p < 0.0001). We had mixture of third and fourth year students with no significant difference in improvement between school year.

Our pilot program of continuous feedback proved successful in improving patient note writing skills for both third and fourth year students.

Orjola Prela

Advisor(s): Gainosuke Sugiyama

Emergent Presentation Of Colorectal Cancer In At Risk Populations: A Safety Net Hospital Experience

Introduction: Colorectal cancer is the second leading cause of cancer related deaths in the US. African Americans have a greater incidence, higher mortality rate and are more likely to present at an advanced stage when compared to their white counterparts. We explored the difference in African American and Caribbean born (Afro-Caribbean) patients that underwent surgery for colorectal cancer at two urban safety-net hospitals.

Methods: We conducted a retrospective chart review of patients that underwent resection for colorectal cancer from 2007-2015. Patients were stratified by race and country of birth; 119 African American and 203 Afro-Caribbean patients were identified. We then compared rates of disease presentation requiring urgent or emergent surgical intervention and rates of presentation allowing for elective procedures. Emergent/urgent presentation was defined as surgical intervention to treat a tumor complication on the same hospital admission in which the diagnosis of colorectal cancer was made. Tumor complication rates between each group were also compared. Complications included obstruction, anemia requiring transfusion, colonic perforation and hemorrhage. Comparisons were performed using the Chi Square Test for emergent/urgent vs elective case presentations and the Fisher's Exact Test for tumor complication rates.

Results: There was no significant difference in the rate of urgent/emergent cases of colorectal cancer when compared to elective procedures. We identified 30 (25.2%) African American patients compared to 55 (27.1%) Afro-Caribbean patients that required an urgent/emergent procedure ($p = 0.7912$). African American compared to Afro-Caribbean patients had no statistically significant differences in the rate of obstruction (9.24% vs 9.85%, $p = 1.0$) hemorrhage (7.56% vs 5.42% $p = 0.4778$), and perforation (3.36% vs 2.96% $p = 1.0$). However Afro-Caribbean patients were more likely to present with anemia requiring transfusion (7.88% vs 1.68%, $p = 0.022$)

Erin Chang

Advisor(s): Gainosuke Sugiyama

Can The Laparoscopic Approach Be Employed In Octogenarians? A Retrospective Review Using Acs Nsqip

Introduction: Laparoscopic surgery (LAP) is associated with decreased length of stay (LOS) and pain; however open exploration is often employed for small bowel obstruction (SBO). We compare differences in outcomes between LAP and open approach in octogenarian patients presenting with SBO from adhesions.

Methods: Using ACS NSQIP 2006-2014, we identified patients ≥ 80 years of age, undergoing emergency surgery ≤ 1 day of admission with postoperative diagnosis of adhesive SBO (ICD9 560.81). Risk variables included age, sex, race, BMI, preoperative sepsis, ASA classification, LOS, postoperative mortality and pneumonia. Univariable analysis and multivariable analysis were performed.

Results: There were 103 LAP and 692 open cases with no significant differences in age ($p=0.1518$), sex ($p=0.7994$), BMI ($p=0.1151$), or race ($p=0.3722$). The open group had higher ASA class ($p=0.0225$) and incidence of preoperative sepsis ($p=0.01597$). Unadjusted outcomes showed longer LOS (median 4.0 vs 8.0 days, $p<0.0001$), higher incidence of postoperative mortality ($p=0.0071$) and postoperative pneumonia ($p=0.0032$) in open vs LAP. On multivariable analysis age (OR:1.11, 95%CI:1.01-1.22, $p=0.0311$) and preoperative sepsis (OR:3.77, 95%CI:1.06-12.02, $p=0.0287$) were associated with increased risk of mortality. Male sex (OR:2.68, 95%CI:1.58-4.60, $p=0.0003$) and open procedure (OR:5.03, 95%CI:1.50-31.34, $p=0.0282$) were associated with developing pneumonia.

Conclusion: Age and presence of preoperative sepsis, but not procedure type, was associated with mortality while male sex and open approach was associated with increased risk of postoperative pneumonia. Therefore octogenarians who present with SBO from adhesive disease may benefit from an initial laparoscopic exploration. Further prospective studies are warranted.

Sajni Parikh

Advisor(s): Gainosuke Sugiyama

Breast Reconstruction Rates In An Afro-Caribbean Population, Is Race Really A Factor?

Introduction: Breast reconstructive surgery has become an integral component in the management of breast cancer and can be performed either at the time of mastectomy or delayed until completion of adjuvant therapy. Analysis from two national databases, SEER and NSQIP, found breast reconstruction rates to be 30.1% and 38.3% respectively, with predominance in Caucasians and patients <40yrs. Given our predominant Afro-Caribbean patient population, we aimed to compare the rates of breast reconstruction at our institution to those in the general population.

Methods: We performed a retrospective analysis of all the patients that received a mastectomy from 2007-2014 at a single institution. We analyzed the rates and types of reconstructions in the population and sought to find factors leading to reconstructive surgery.

Results: A total of 177 patients (82% Afro-Caribbean) received mastectomy; 141 were diagnosed with IDC and 36 were diagnosed with DCIS. Patients that received reconstruction were found to be younger than patients who did not (DCIS: 54 y/o vs. 67 y/o; IDC: 51 y/o vs. 60 y/o). Patients with noninvasive breast cancer had reconstruction more often than patients with invasive cancer (DCIS: 64% vs. IDC: 39.7%). Of those with DCIS, implant reconstruction was more common than autologous flap reconstruction (65% vs. 18%). For patients with IDC, 62% were implants and 34% were flaps. 73% of patients receiving reconstruction had early stage breast cancer (stages 0-2) while only 58% of patients without reconstruction had stage 0-2 breast cancer.

Discussion: Comparison of our data to the national trend shows that in our patient population, which is predominantly Afro-Caribbean, significantly higher rates of breast reconstruction were performed. Secondary analysis suggests that age and aggressiveness of disease may influence the decision to pursue reconstruction. Further prospective, multi-institutional studies are needed to elucidate factors that lead to our findings.

Achuta Guddati

Advisor(s): Iuliana Shapira

Analysis Of Nationwide Trends And Outcomes Of Percutaneous Endoscopic Gastrostomy (Peg) Tube Placement In Hospitalized Cancer Patients Over A 13 Year Period.

Background: The decision to provide enteral feeding in cancer patients is complex and is based on the patient's preference, prognosis of the disease and the risks associated with surgery. Outcomes PEG tube placement in cancer patients have not been studied. We analyzed a nationwide database over a 13 year period.

Methods: Data was extracted from the Nationwide Inpatient Sample (NIS) from 2000 to 2012 using ICD-9-CM codes. NIS variables were used to identify in-hospital mortality, discharge dispositions. We also examined the admissions related to complications from PEG tube placement. Chi square test and Wilcoxon rank test were used.

Results: 2,325,603 hospitalized patients underwent PEG tube placement from 2000 to 2012. Of these, 465,049 (20%) were cancer patients. Of all cancer related admissions, 0.86% received PEG tube placement. The rate of PEG tube placement in cancer patients has gradually increased from 2000 to 2012 (p=0.007). The number of hospital admissions with PEG tube-related complications have increased from 6696 in 2000 to 9640 in 2012. The in-hospital mortality in non-cancer patients who received PEG tube was higher than in those who did not get PEG tube (9.85% vs. 8.05%, p=0.0000). Cancer patients who underwent PEG tube placement were discharged to nursing homes less often than non-cancer patients (47% vs. 80%, p<0.001).

Conclusions: The rates of PEG tube placement in cancer patients and related complications have increased in the last decade. The in-hospital mortality of non-cancer patients who received PEG tube placement was higher and these patients were discharged to nursing homes more often than cancer patients who received PEG tube placement. The decision to place PEG tube in cancer patients should be individualized taking into consideration the effect of possible PEG tube-related complications, availability of support systems, prognosis of the underlying malignancy and the desired quality of life.

Karan Josan

Advisor(s): Iuliana Shapira

Disparities In Outcomes In Metastatic Cancer Patients Who Develop Spinal Cord Compression.

Background: The outcomes of metastatic spinal cord compression (MSCC) are often dependent on the provision of appropriate interventions in a timely manner. A database with nationwide representation was utilized to examine the outcomes of hospitalization in these patients over a 12-year period.

Methods: Nationwide Inpatient Sample (NIS) from 2000 to 2011 was utilized to extract data for all in-hospital stays of patients with MSCC using ICD-9-CM codes. Outcomes in terms of mortality and morbidity with respect to gender, age and race were examined. These interventions were defined as “early intervention”™ if they were provided within the first 48 hours of hospitalization.

Results: 13,457 patients were admitted with MSCC from 2000 to 2011 who received one or more modalities of treatment. Of these, 5035 (37%) received early intervention. The percent of patients receiving early intervention has not changed significantly from 2000 to 2011 ($p=0.15$). Female gender, private for-profit hospitals and higher co-morbidity index were associated with lower use of early intervention. Female patients with MSCC had 0.77 times lower odds (95% CI 0.66 to 0.91) for receiving early intervention. Race, payer status, hospital teaching status and hospital size did not appear to be associated with provision of early intervention. In-hospital mortality was lower in the early intervention group (5.0% vs. 6.9%, $p=0.04$). The LOS was significantly shorter and hospital charges lower in those who received early intervention (LOS: median 6 days vs. 11 days, $p<0.001$) (charges: \$34,354 vs \$50,062; $p<0.001$).

Conclusions: Female gender was noted to be a risk factor for suboptimal care delivery by early intervention in MSCC. The etiology of this disparity is unclear and warrants further investigation. This is particularly relevant since most cases MSCC are seen in prostate cancer in men and healthcare providers may be sensitized to its prevalence in men.

Tyion Torres

Advisor(s): Iuliana Shapira

Persistent Disparity In Mortality In Geriatric Female Patients With Lung Cancer In Us.

Background: Lung cancer is the leading cause of death due to cancer and accounts for more than 1 in 4 cancer deaths. Improvements in healthcare delivery and therapeutic advances have resulted in a significant increase in geriatric patients in the US population. However, it is unclear if these advances have reduced the mortality of lung cancer patients across different races, age groups and gender to the same extent. We have analyzed the SEER database which has a nationwide representation for race-specific and gender-specific mortality in lung cancer patients over a 14 year period (2000 to 2013).

Methods: Mortality data regarding patients who were diagnosed with lung cancer (any stage) was extracted from the Surveillance, Epidemiology and End Results (SEER) database from 2000 to 2013. The statistical query was limited to ages groups ≤ 65 and > 65 years, included both the genders and races (classified as White and Black with Hispanic). Statistical difference was considered significant when p value ≤ 0.05 .

Results: Mortality rates have significantly declined in male patients with lung cancer across both races and age groups. However, a statistically significant difference between white and black patients continues to persist. In both white and black females aged ≤ 65 years, the mortality rate has also decreased and the trend has converged to a similar rate. Notably, there is persistent difference in mortality between white and black elderly females. The linearized trend lines are depicted in Fig 1(not able to submit here).

Conclusions: Significant disparity in mortality between white and black male patients with lung cancer exists but has been diminishing over time in both younger and elderly patients. However, a different trend is noted between white and black female patients. The etiology of this disparity is unclear and may reflect past smoking habits, genetics, socioeconomic factors, systematic errors and reporting bias.

Andrew Lee

Advisor(s): David Stevens

What's Your Number? Engagement Opportunities For Patients With Uncontrolled Diabetes

Background: 29 million people in the United States suffer with Type 2 Diabetes Mellitus (DM). This disease is the leading cause of blindness, nontraumatic lower limb amputation, and chronic kidney disease, placing a burden on our patients and the healthcare system [1]. Contributing factors include but are not limited to patient education, socioeconomic factors, and medication adherence. The aim of this study is to identify barriers to ideal glycemic control in our patient population.

Methods: Our study was designed to be a retrospective cross-sectional analysis. The patients were predominantly of Afro-Caribbean descent at a safety-net hospital in Central Brooklyn. 44 patients were polled from the Kings County DM Registry, which included resident clinic patients with a Hemoglobin A1C (a1c) above 8% seen between 2016-17. Patients were surveyed with a standardized questionnaire.

Results: 50% of patients felt that their diabetes was well controlled, despite all patients having uncontrolled DM (a1c >8), with the average a1c being 9.8%. 80% of patients were not able to state their own a1c or its significance. 45% of patients did not know the names or doses of their medications. 45% of patients graduated high school, and of that subgroup, only 16% had an understanding of their a1c. Patients identified difficulties with medication adherence such as polypharmacy, access to medications, and lack of insight about the disease.

Discussion: Patient engagement is essential to the management of chronic disease. A1c is the standard tool for assessing DM control, yet most of our patients with uncontrolled diabetes were unaware of their own values or its significance. Therefore, it is essential to ensure education on the tools to support patient self-efficacy through a1c teaching and medication reconciliation. Focusing interventions on these aspects can enhance medication adherence, lifestyle changes, and overall DM control.

Jason Green

Advisor(s): Steven Weiss

Acquired Perforating Dermatitis In A Patient With Underlying Diabetes Mellitus And Liver Disease

Acquired perforating Dermatitis (APD) presents as pruritic, umbilicated lesions commonly located on the extremities in patients with underlying chronic systemic diseases or renal, endocrine or hepatic in origin. APD may be misdiagnosed as being viral in etiology, due to an appearance similar to that of molluscum contagiosum. Diagnosis can be made clinically in the proper patient context, and confirmed with skin biopsy.

64 YOF PMHx hypertension, type 2 diabetes mellitus (DM), hyperlipidemia and coronary artery disease was sent to the ED by her PCP after acute elevation in bilirubin. She reported 3 months of fatigue and decreased exercise tolerance, generalized pruritus and jaundice. Vital signs were all within normal range. Examination revealed scleral icterus, skin with hyperpigmented, umbilicated papules with a central white core and larger plaques with central crusting on upper and lower extremities and back. Lesions were clean based without surrounding erythema or purulent discharge. Labs revealed total bilirubin 17 mg/dL, direct bilirubin of 9.2 mg/dL, alkaline phosphatase 1244 U/L, and slight AST elevation, all other labs within normal limits. She was admitted for further evaluation. Skin biopsy revealed altered collagen with keratin plug, findings congruent with perforating collagenosis. Pt started on corticosteroids for symptomatic relief. CT and MRCP imaging showed no evidence of biliary duct dilation or pathology. Trans-thoracic echocardiogram revealed diffuse hypokinesis with ejection fraction of 20%. Liver biopsy was consistent with hepatic congestion and the patient was diagnosed with congestive hepatopathy from severe systolic heart failure. After initiation of heart failure medications and diabetic control, labs trended down and skin lesions improved.

APD is frequently seen in chronic systemic diseases, usually DM and CKD. Treatment consists of topical retinoids, symptomatic control with topical steroids and emollients, and underlying disease control.

Pramod Theetha Kariyanna

Advisor(s): Jason Lazar

Clinical Profile Of Patients With Myocardial Infarction Associated With Marijuana Use.

Introduction: Marijuana is the most commonly abused substance in the US. It has been reported that the risk of myocardial infarction (MI) is increased 4.8 fold following marijuana use. Less is known about the clinical profile of patients presenting with MI following marijuana use.

Methods: A detailed search for case reports was conducted in Google Scholar and PubMed using the keywords "marijuana, cannabis, MI, STEMI, NSTEMI". Fifty-nine cases were read and clinically profiled.

Results: 92% of cases were reported on or after 2000. The median age upon presentation was 29 years; 88% of the patients were male. The prevalence of hypertension was 17%, none had diabetes, 3% had hyperlipidemia, 5% were obese, and 46% were active cigarette smokers. 31% of the cases presented with MI within 6 hours of use and 41% within 24 hours of marijuana use. 42 patients had documented EKG findings, 39% of which were ST segment elevation MI. Troponin levels were documented in 19 patients, 90% had elevated troponins and 10% had normal troponin levels. Transthoracic echocardiography (TTE) was performed in 15 patients of whom 33% had normal TTE, 60% had reduced ejection fraction. Coronary angiography was conducted in 43 patients, 53% had coronary stenosis and 35% did not. Slow coronary flow was noted in 7% and stents were placed in 35%. Death due to MI was reported in 17%.

Discussion: The pathophysiological basis of MI associated with marijuana is unclear. Elevated carboxyhemoglobin, tachycardia, decrease in time for angina onset following use, slow coronary flow, coronary vasospasm, increased sympathetic tone and increased platelet aggregation have been proposed.

Conclusion: Marijuana use is associated with unique clinical profile of myocardial infarction. Most reported cases involve young males, nearly half of whom are active smokers and present late after symptoms. Demand ischemia may play an important role as the majority of MI's are non-STEMI; more than one third do not have coronary stenosis

Akeem Lewis

Advisor(s): David Stevens

A Red Pill, Tall Pill, Blue Pill, Small Pill: Standardizing Medication Reconciliation In A Resident Primary Care Practice.

Introduction: Medication Reconciliation (MR) is the process of creating an accurate list of drug names, dosing, and frequency. As stated by the Joint Commission, an accurate list aims to avoid medication errors such as omissions, duplications, dosing errors, and drug interactions.¹

Lack of standardized MR documentation at Kings County Resident Primary Care clinic (KC) leads to discrepancies in the medical record posing challenges in transitions of care.

Our intervention sought to improve the completion rate of MR by standardizing the Home Medication Editor (HME) and requiring its use.

Methods: A randomized cross-sectional study was conducted at KC over a 3 month period. MR completion was defined as accurate documentation in the HME of dosing and frequency of intended medications. The MR completion was assessed pre- and post-intervention for accuracy. Eligible patients had at least 1 prior primary care visit and were on at least 1 medication. Providers were then educated to document medications in the HME, which were reviewed for accuracy 3 months later. Patients were also surveyed post-intervention to see if the medication list they received was accurate and useful.

Results: Of the 73 randomly selected patients, 42% of pre-intervention MR lists were complete, compared to 76% of post-intervention lists (P-value <0.01). The post-intervention patient survey showed that 100% of patients received a list, 71% kept the list and 66% showed it to other providers.

Discussion: At KC, standardization of MR was done to improve transitions of care. Adherence to the standard was increased by educating providers about the HME, however further steps will require direct feedback to sustain performance in the intervention. With this, we hope patients will benefit by being able to share lists with other caregivers, while empowering them to manage their chronic diseases.

Odeth Barrett-Campbell

Advisor(s): Andrew Chang

Sickly Sweet- Challenges In Diagnosing Dysglycemia In Patients With Sickle Cell Trait

49 y/o woman with sickle cell trait (SCT) presented for routine care in clinic. ROS was unremarkable. Mother has DM. She had normal vital signs, BMI of 25kg/m² and examination normal. Labs were normal save for HbA1c: variant hemoglobin, A1C=25.5%. Oral glucose tolerance test (OGTT): Impaired Glucose Tolerance (IGT). Diet and lifestyle changes were advised. Three months later, remained asymptomatic, her weight was unchanged. Glycated Fructosamine was 290 umol/l (205 -285). Addition of low-dose Metformin, were discussed but she refused.

In reviewing the case one may consider ruling out a hemoglobinopathy in dysglycemic patients when wide variations are seen in A1C values. The A1C trend can be used to identify patients at risk of DM but there are limitations in patients with hemoglobin variants due to increase in red cell turnover. Serum fructosamine in this case would be inappropriate for screening.

Dysglycemia refers to a disorder in the metabolism and regulation of blood glucose and may be applied to pre-diabetic and diabetic individuals. Patients with IGT may be identified as pre-diabetics which may confer risk of dyslipidemia, HTN and obesity. Individuals with hemoglobin variants may have falsely low or high levels of A1C. Fasting glucose and OGTT are the most appropriate alternatives for screening in such cases. Glycated fructosamine and albumin would be useful for monitoring in DM patients with hemoglobinopathies as values are not affected by disorders of hemoglobin metabolism or RBC survival. Both reflect short term control (2-3 weeks) and are affected by disorders of albumin metabolism. 1, 5-Anhydroglucitol is a newer test used as a measure of short term glycemic control but based on literature review is not extensively studied in hemoglobinopathies. Despite ongoing efforts to improve and standardize the measurements of A1C that would best apply to patients with hemoglobin variants it is still advisable not to use A1C in diabetics or prediabetics with SCD.

Samantha Yarmis

Advisor(s): Ismaila Adiatu

Relationships Between Patients' Perceptions Of Healthy Lifestyles And Control Of Hypertension, Diabetes, And Obesity

Diabetes mellitus, hypertension, and obesity are among the most commonly encountered health problems in the primary care setting. In addition, they are each important risk factors for all-cause mortality and multiple medical comorbidities. We conducted a cohort study of 41 patients seen over the course of 1 month at a primary care clinic at Kings County. Patients were interviewed to determine the nature of their diet and exercise habits, and were asked if they perceived their lifestyle as healthy. In addition, their charts were reviewed to determine body mass index (BMI), hemoglobin A1c (HbA1c), blood pressure (BP), and the trends of these variables over time. 85% (35/41) of these patients had an elevated BMI, of which 34% (14) were obese. Of those patients with an elevated BMI, the majority had a stable or worsening BMI, indicating poor control of weight. 59% (24/41) of patients had diabetes, of which 61% had uncontrolled diabetes as determined by an HbA1c \geq 7.0. 85% (35/41) of patients had hypertension, with no clear overall trend of blood pressure control over time evident. Most patients reported an active lifestyle (61%, 25/41) and a healthy diet (76%, 31/41). However, patients' self-reports of diet and exercise were rarely in accordance with established medical guidelines for healthy lifestyles. Patients' self-reported activity levels did not correlate with BMI, HbA1c, or systolic blood pressure. Similarly, patients' self-reported healthiness of diet did not correlate with HbA1c or systolic blood pressure. However, healthiness of diet did show a significant correlation with BMI ($p < 0.05$). These results indicate that patient perception of health frequently does not correlate with objective measures of health. This gap between perception and outcomes can be addressed in part with greater patient education regarding healthy lifestyles and interventions to encourage adherence with lifestyle changes.

Eric Kupferstein

Advisor(s): David Stevens

Clearing The Air: Improving Tobacco Use Screening In Resident Clinic

Background: Smoking is the leading cause of preventable death and morbidity in the United States, with a national prevalence of 15.1% and 14.9% in Brooklyn. Furthermore it costs our healthcare system over \$170 billion. Despite this, many New Yorkers continue to smoke. We at NYC Health + Hospitals/Kings County Primary Care clinic (KC) set out to evaluate our effectiveness in identifying tobacco use by administering a simple screening questionnaire.

Methods: The study population included patients seen at KC. The intervention group (A) established smoking status by use of a questionnaire. The non-intervention group (B) established smoking status via retrospective chart review, without the use of a questionnaire. Statistical analysis was performed to compare the effectiveness of the questionnaire as a screening tool in the A versus B group.

Results: In the intervention group (n=208), 9% were identified as smokers, 90% as non smokers and 1% were not documented. In the non intervention group (n=240), 6% were identified as smokers, 53% as non-smokers, and 41% were not documented. The p value for identifying smoking status between the A and B group was 0.274. The p value for smoking status documentation between the A and B group was <0.001 .

Discussion: Although the p-value for identifying smoking status between the A and B group was not statistically significant, our results show the absolute percentage of smokers documented was significantly higher in the A group compared to the B group ($p < 0.001$). This demonstrates that implementing a smoking screening questionnaire at KC would drastically increase smoking status documentation, which should lead to a significantly higher number of smokers identified. With more smokers identified, we should be able to treat their tobacco addiction and reduce overall preventable morbidity and mortality associated with tobacco use.

Laronda Hollimon

Advisor(s): Yalini Senathirajah

Virtualizing Promis Measures In A Clinical Setting

Collecting and presenting data digitally in the waiting room - a way to better patient experience and increased access?

Real time information is essential for clinicians to make the right decision for their patients. Modern computing has enabled us to do just that, from using geo-location to being able to talk anywhere you are, or sending text messages instantly. By digitizing patient questionnaires using PROMIS measures in conjunction with tablet devices, clinicians would have instant access to the results.

PROMIS measures ("Patient-Reported Outcomes Measurement Information System") is a set of person-centered measures that evaluates and monitors physical, mental, and social health in adults and children. It can be used with the general population and with individuals living with chronic conditions (1). In our study, while in the waiting room the patient uses a tablet to complete a questionnaire based on these measures and the tablet computer calculates a score immediately. Based on the scores generated different types of graphs would be created, to present to the doctor.

Five clinicians were tested on four different typical data interpretation tasks using four different types of visualization, and their eye movements and screen actions recorded. The data is analyzed for accuracy and speed of users' data interpretation and users' overall perceptions of the system.

The study will test whether getting real time data from patients is beneficial to the overall wellbeing of the patients. In times of increased stress on the health system, methods of speeding workflow, addressing the needs of multicultural patients, and easing physician tasks are all ways to potentially facilitate greater access.

Joselle Cook

Advisor(s): Latif Salam

Mollaret'S Meningitis: A Rare Manifestation Of Genital Herpes

Mollaret's meningitis is a form of cyclical self-limiting aseptic meningitis that is often associated with previous HSV-2 genital herpes infection. The benign and recurrent nature of the disease should prompt clinicians to consider this diagnosis in the appropriate setting, thereby avoiding such patients to lengthy hospitalizations, unnecessary testing, and medications. This case highlights the often overlooked sequelae of genital herpetic infections, and urges clinicians to cast a broad differential for meningitis.

A 53-year-old African American male with known history of HSV-2 genital herpes and viral meningitis presented with severe headaches, vomiting, and subjective fevers for 1 week. He was treated 4 years prior for presumed viral meningitis. The patient was febrile to 101.4F on admission with nuchal rigidity. The rest of his physical exam was unremarkable. His admission labs were inconspicuous. Head CT demonstrated no acute intracranial pathology. Lumbar puncture (LP) demonstrated normal opening pressure, normal glucose, modest elevation in protein (61mg/dl), mild lymphocytic pleocytosis (WBC 12/mm³), and negative CSF gram stain. CSF viral cultures were also negative. IV acyclovir was started with improved symptoms, however ongoing fluctuating pyrexia (max 103.1 F) prompted extensive imaging, infectious, and rheumatologic work up, which were all unremarkable. HSV viral PCR was not performed due to insufficient CSF and patient refusal of repeat LP. He self-discharged after 10 days of IV acyclovir treatment.

Although the CSF profile of Mollaret's Meningitis is similar to other aseptic meningitides, the hallmark is its recurrent nature. CSF PCR for HSV-1, HSV-2, or VZV aid in diagnosis and should be part of the initial workup in suspected cases. Antivirals result in faster symptom resolution and may suppress recurrences. This index case aims to foster awareness on the expansive differential for meningitis and a rare complication of genital herpes.

Jenny Paredes

Advisor(s): Laura Martello-Rooney

Inflammatory Patterns Exhibited By African American Colon Tumor-Derived Cell Lines

Despite progress in closing the gap, disparities still persist among African American (AA) colon cancer patients both in incidence and death rates. Our previous studies reported that colon tumors from AAs displayed hypermethylation of DNA regions in inflammatory genes when compared to Caucasian Americans (CA). To assess differences in the inflammatory response, we utilized three AA colon cancer cell lines (CHTN-06, SB-501 and SB-521) generated in our laboratory and compared them with the commercially available colon cancer cell lines, HT-29, SW-480 and CRL-1807. We evaluated the anti-inflammatory effect of Aspirin and the anti-inflammatory cytokine IL-10 by determining MAPK activation in response to the pro-inflammatory cytokine TNF- α . Additionally, we studied the secretion of the pro-inflammatory cytokine IL-8 in response to TNF- α in the AA cell lines and compared them to the CA cell line HT-29. Interestingly, IL-10 treatment was more effective in the AA CHTN-06 and SB-501 when compared to the CA cell lines in the inhibition of activation of MAPK and as hypothesized, the CA cell lines demonstrated lower MAPKs activation levels in response to TNF- α after pretreatment with Aspirin (ASA). The AA cell line SB-521 on the contrary, showed a stable inflammatory state and unresponsiveness to ASA and IL-10 treatment; suggesting that AA tumors may require tailored treatments for controlling inflammation. Additionally, our results show significant differences in the inflammatory cytokine production of IL-8 in the CA cell lines in response to TNF- α induction when compared to the AA cell lines. Altogether, our results portray the diversity of inflammatory patterns across the AA cell lines. Lastly, as it has been documented that AA colon cancer patients are less responsive to the chemotherapeutic Fluorouracil; therefore, in future studies we will evaluate the effect of this and other therapeutic agents on AA and CA cell lines in terms of inflammation and apoptosis.

Maria Munoz-Sagastibelza

Advisor(s): Laura Martello-Rooney

Paclitaxel-Loaded Microparticles In Combination With Gemcitabine-Loaded Microparticles Decreases Gemcitabine Resistance And Promotes Cell Death In Pancreatic Cancer Cell Lines

Pancreatic cancer is the fourth leading cause of cancer death in the United States with only 7% of diagnosed patients surviving 5 years. Current systemic chemotherapies have not been very effective at decreasing tumor burden, but nonetheless expose patients to the adverse side effects of treatment. Poly(lactic-co-glycolic acid)-based microparticles (MPs) are a promising tool for localized drug delivery due to their high biocompatibility, flexibility in encapsulation and extended drug release. The present study investigated whether paclitaxel-loaded microparticles (PMPs), alone or in combination with GMPs, decreased gemcitabine resistance, colony formation and promoted cell death in two human pancreatic cancer cell lines, PANC-1 and MIAPaCa-2.

In vitro studies with PANC-1 cells treated with PMPs or GMPs showed enhanced cell killing and a significant decrease in colony formation. Moreover, the sequential treatment of PMPs followed by GMPs, showed a greater decrease in colony formation in comparison with the others. Subsequently, we tested the effect of the treatments on two well-known resistance markers for gemcitabine, ribonucleotide reductase catalytic subunit M1 (RRM1) and cytidine deaminase (CDA), as well as activation of apoptosis measuring cleaved caspase-3 (CC3). The sequential treatment and PMPs alone showed a significant decrease in RRM1 and CDA proteins and an increase in CC3 expression for both cell lines. However, when both cell lines were treated with GMPs alone, both markers went up suggesting an increase in resistance against gemcitabine.

In conclusion, the sequential treatment showed a reduction in drug resistance, an increase in cell death and impairment in colony formation. Further studies are in progress to investigate this treatment in a mouse model of pancreatic cancer to confirm in vivo efficacy. The described drug delivery method has the potential to be a more efficient local treatment modality than systemic drug against pancreatic cancer.

Tehila Saadia

Advisor(s): Rauno Jok

Relation Of Hepatitis B Virus Infection In Brooklyn Immigrants To Allergic Responses And Asthma

Rationale: Hepatitis B virus (HBV) is an immunomodulatory virus and has been linked to IgE production. We determined the association of HBV serologies to IgE responses in Brooklyn immigrants from HBV-endemic countries.

Methods: Serology testing (ELISA, Abnova) was performed on immigrants with (n=167) and without (n=175) asthma, allergic rhinitis, and food allergies. Patients who tested positive for HBV surface antibody (anti-HBs) were tested for HBV core antibody (anti-HBc) to identify natural infection versus vaccination. Anti-HBs negative subjects were further tested for HBV surface antigen (HBsAg) to identify infection prior to seroconversion. Serum IgE levels and exhaled nitric oxide (eNO) (Niox, Aerocrine) measurements were obtained on all patients. Chi-square tests were performed for associations between HBV groups [(1)non-vaccinated, non-infected; (2)vaccinated only; (3)past/current infection] and allergic diseases. Kruskal-Wallis tests were performed to compare distribution of serum IgE and eNO between HBV groups.

Results: 66% (n=226/342) of the sampled Brooklyn immigrant patient population was found to have past or current HBV infection. The prevalence of allergic diseases in HBV infected patients was 50.4% (n=114). We did not find significant association between natural HBV infection and development of seasonal allergies (p=0.39), asthma (p=0.25), food allergies (p=0.15), IgE (p=0.59), or eNO (p=0.24). Furthermore, there was no association of these factors with vaccination or non-infected/non-vaccinated status (p=NS).

Conclusions: There is no significant association between HBV infection and the development of IgE responses in this Brooklyn immigrant patient cohort.

Tracian James-Goulbourne

Advisor(s): Gary Briefel

A Rare Presentation Of Lactic Acidosis

Type B lactic acidosis (Type B LA) due to underlying malignancy is a rare paraneoplastic phenomenon and a life-threatening oncologic emergency. Though most commonly associated with hematological malignancies, it may be seen in solid tumors. The pathogenesis is likely multifactorial and may be due to enhanced aerobic glycolytic activity in malignant cells.

A 59 year-old man presented with several weeks of epigastric pain, vomiting and a 35-pound weight loss. A cachectic patient was seen with epigastric tenderness and hepatomegaly. Initial labs: anemia, transaminitis and normal lactate. Abdominal CT scan: multiple liver masses with retroperitoneal lymphadenopathy. U/S guided liver biopsy: poorly differentiated adenocarcinoma. Alpha-fetoprotein, CA19-9 and CEA were markedly elevated. He improved with conservative management and discharged for oncology follow-up. He presented 8 days later with dyspnea and RUQ abdominal pain; was tachypneic, tachycardic, icteric with RUQ tenderness. Labs: worsening anemia, transaminitis and a high anion gap metabolic acidosis, for which bicarbonate infusion was given. CTPA ruled out PE but showed right sided pleural effusion. Thoracentesis: atypical cells suspicious for malignancy. He deteriorated with multi-organ failure. Lactic acid level increased to 23 mm/l and was determined to have Type B LA after Renal consult. RRT was deferred due to significant coagulopathy. He died in ICU by day 6.

Type B LA due to underlying malignancy is a rare entity which should be considered early in patients who present without evidence of tissue hypoperfusion. Liver metastases with impairment has been reported as an attributable factor to decreased utilization of lactate. However, there are several reported cases of Type B LA without liver involvement. Bicarbonate infusions and RRT are supportive measures for managing metabolic derangements. Morbidity and mortality benefits are less likely to be seen without successful treatment of the underlying cancer

Shifra Mincer

Advisor(s): Mariana Markell

Food Choices And Dietary Intake In A Population Of Inner City Kidney Transplant Recipients - Impact Of Food Cost

Factors that influence food choice in our ethnic minority kidney transplant (KTR) population are not known. Demographics and factors influencing food choice and preparation were obtained from face to face interview in 23 randomly selected clinic patients. Patient concern regarding food cost and its influence on choice was assessed using a 5 point Likert scale. Dietary intake was estimated from 3-day diet diary and 1 day diet recall. Nutrient values were extrapolated using the USDA Supertracker. 17 (80%) reported income <\$20,000 and Medicaid as primary Insurance. 15 (72%) reported receiving disability payments and 7/10 (70%) reported using EBT coupons to buy food. Mean age was 44.7±10.1, BMI 27.9±5.6, creatinine 0.88±0.1 mg/dl, 6 (29%) patients reported that cost of food was very important for their food choices (FDCOST). By Mann-Whitney U-test, FDCOST patients ate fewer calories per day (1127±84.8 vs 1786±150.5, p <0.05), less PO₄ (887.3±174 vs 1257±127.5, p=NS) and less protein (48.5±17.5 vs 85.8±8.2, p+NS) but had similar serum PO₄, BMI and albumin values. In a 30-second sit-to-stand test, 2 (30%) FDCOST patients were unable to complete the test. All of the patients who did not report concern with food cost completed the test successfully. In our population of indigent inner-City KTRs:

1) Despite the availability of EBT coupons, 30% of patients felt that food cost was an important factor in their dietary choices. 2) Patients who reported concern with food cost ate fewer calories, and less protein and PO₄ than those who made choices based on other factors.

3) Although laboratory tests and BMI were similar between the two groups, the relative weakness in 30% of the patients who reported food cost concerns should be explored further, as frailty has important prognostic significance in the post-transplant patient.

Eric Ruff

Advisor(s): Mariana Markell

Attitudes And Beliefs Of Patients Who Increase Exercise Following Transplantation And Association With Increased Vitamin D Levels

Despite improvements in anemia and uremia following successful kidney transplantation, not all patients report increased exercise habits. Demographics and beliefs about transplant were compared in patients who reported increased exercise (EXMORE) and those who decreased or stayed the same. Of 24 randomly selected clinic patients, 17 (80%) reported income <\$20,000 and Medicaid as primary insurance. Mean age was 44.7±10.1, BMI 27.9±5.6, creatinine 0.88±0.1 mg/dl, 7/17 (41%) of respondents reported increased frequency of exercise following transplant. By Spearman correlation, EXMORE was associated with beliefs that doctors kept them healthy ($r=0.5$, $p<0.05$), less likely to believe that transplant cures disease ($r=-0.59$, $p<0.05$), had strong belief that medications kept their kidney healthy ($r=0.58$, $p<0.05$), and gratitude for their donor ($r=0.6$, $p<0.05$). Vit D levels were higher in the EXMORE group (31.9±3.2 vs 19.3±2.3, $p<0.005$), but there was no difference in hgb, creat, BMI, BP or other parameters. In our population of indigent inner-city kidney recipients 1) Almost half reported increasing exercise following successful transplant. 2) Increased exercise was associated with strong evidence of external locus of control (belief in doctors and transplant medications), less belief that they were "accused", and increased report of gratitude for the donor 3) Because increase in exercise has many potential benefits, the association with higher Vitamin D levels which has been associated with improved muscle strength, as well as the appropriate approach to patients with an internal locus of control, who may require different motivation to exercise should be explored.

Russell Dowling

Advisor(s): Jack Caravanos

Meta-Analysis Of Blood Lead Levels In India And Associated Burden Of Disease

Lead (Pb) has long been identified as a pollutant of concern due to widespread contamination and its potential to impact human health. Chronic lead exposure and associated health effects have been widely documented in the scientific literature, and lead toxicity has been linked to cognitive impairment, intelligent quotient (IQ) deficits, cardiovascular effects, and low birth weight. Measuring the scope of lead contamination in India based on the available literature can provide valuable insights into the associated burden of disease. An extensive literature review was conducted of studies monitoring potential IQ deficits in Indian children.

A PubMed search was conducted in May 2016 using the terms "Blood Lead India". This search yielded a total of 593 articles. An inclusion criteria was established prior to the review in order to select relevant articles. The analysis of blood lead data in this study was performed using the statistical software STATA 14.1. In order to assess the disease burden of lead in India, the geometric means (GM) of blood lead measurements, in the context of various subgroups, were compiled for analysis. IQ deficit was determined using the identified lead levels of the "children" subgroup.

The final dataset included 22 studies with participants throughout India and resulted in 53 observations. The observations ranged from years 2011 to 2016. The overall GM was 19.03 ug/dL (10.42-34.75). For the subgroup age, adults had a blood lead level of 16.29 ug/dL (11.59-22.91) while children have a blood lead level of 19.89 ug/dL (9.76-40.54). Populations with occupational exposures had a blood lead level of 27.27 ug/dL (CI: 19.00-39.14) while those with non-occupational exposure had a blood lead level of 14.92 ug/dL (9.62-23.15). Within the study population, children were identified to have a GM BLL of 19.89 ug/dL (9.76-40.54). Using dual models, the mean IQ decrement for children in our study population is estimated to be greater than 5 points.

Stacey Subbie

Advisor(s): Jacquelyn Meyers and Bernice Porjesz

Influence Of Family History Of Alcohol Use Disorder On The Development Of Post-Traumatic Stress Disorder And Cognitive Performance In Trauma-Exposed Adolescents

Family history of alcohol use disorder (AUD) has been previously associated with adult post-traumatic stress disorder (PTSD). However, few studies have examined this using longitudinal, prospective reports in trauma-exposed adolescents and young adults, and no study has examined the role of neurocognitive performance in this context. Using data from the Collaborative Study of the Genetics of Alcoholism (COGA) prospective cohort, this study aims to determine whether trauma-exposed adolescents and young adults who report a family history of alcohol use disorder (AUD) are more likely to develop PTSD and/or display neurocognitive deficits, than those without a family history of AUD. COGA's prospective cohort is comprised of offspring from AUD high-risk and comparison families who were aged 12-22 at enrollment and were interviewed every 2 years since 2004 (females=1246, males=1167). Traumatic exposures were collected using the Semi Structured Assessment for the Genetics of Alcoholism, which assesses 14 potentially traumatic events. In this study, we investigated the interactive effects of family history of AUD and trauma exposure (assaultive, nonassaultive, and sexually assaultive exposures) on DSM-IV PTSD and Tower of London task (TOLT) performance, after controlling for age, sex and socio-economic indicators. A significant interaction of family AUD density and trauma exposure was observed ($r^2=0.164$, $p<0.05$) such that adolescents who were exposed to traumatic events and had a family history of AUD had greater risk for PTSD as compared with those without a family history of AUD. In addition, early differences in TOLT performance that are no longer present later in development were observed for those with a family history of AUD and exposure to assaultive trauma. Understanding the influence of family history of AUD on the development of PTSD in trauma-exposed subjects could help guide future research concerning mediating factors involved in the development of PTSD.

Roza George

Advisor(s): Jeremy Coplan

Disruption Of The Serotonergic System In The Suicidal Brain; Small Molecule Profile Of The Effects Of Early Life Stress Obtained By Lc-Ms/Ms

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). It is estimated that >30% of depressed patients suffer from treatment resistant depression (Sourey et al. 2006) which puts these individuals at a higher risk of suicide (Gilbert, 2013). Early life stress (ELS), has been shown to be a risk factor in the development of TRD (Kaplan et al., 2000). Furthermore, evidence of TRD being more than just a simple neurochemical deficit has been found. In fact, increased serotonergic neurons have been found in the dorsal raphe of suicide victims (Underwood et al. 1999). When considering the role of serotonin in TRD a more definitive neurological model is needed to treat these high-risk patients more effectively. 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). Serotonin along with other small molecules were then chemically extracted from perfused brain slices and analyzed using LC/MS/MS Sciex 6500+. It is hypothesized that ELS causes disruption and not a deficit in the serotonergic system, and therefore TRD is a block in serotonin that cannot be treated by increasing serotonin in the brain with the use of SSRIs.

Tina (Thu-Ha) Nguyen

Advisor(s): Michele Pato

Sensory Modulation In First-Break Psychosis - A Pilot Study

Objective: To examine impact of introducing a sensory modulation room on acute first-break psychosis inpatient psychiatric unit as adjunctive treatment to psychopharmacology and therapy. We predict sensory mod will help reduce pt self-reported distress level, and reduce rates of acute events, manual holds, and STAT meds for agitation.

Methods: Pts rated distress before and after use of room, initiated by pt or staff, collected Feb-Dec 2016. Rates of STAT IMs, PO PRNs +/- Benadryl, manual holds (MH), and acute event (Tier) notes (TN) were reviewed for Mar-Sept 2015 (before) and compared with corresponding months in 2016 (after intro of room). Time period chosen to minimize differences due to change in attending physician after Sept 2016.

Results: Pt self-report from 56 uses of room. Data showed avg change of 4.28 out of 10-pt scale after use of room, 87.5% of pts reporting (+) change in subjective mood (more tense to more relaxed). 4 pts had (-) change and 3 pts had no change. All outcome variables showed reduction from 2015 to 2016, but avg monthly rates were not statistically significant. 6 paired t-tests conducted. STAT IMs 2015(19.0+/-15.3) vs 2016(14.7+/-5.6), p=0.50. PO PRNs +Ben 2015(40.9+/-10.2) vs 2016(33.9+/-8.9), p=0.20. PO PRNs-Ben 2015(33.3+/-7.6) vs 2016(25.0+/-7.0), p=0.06. MH 2015(3.7+/-3.0) vs 2016(3.4+/-1.1), p=0.82. TN 2015(17.6+/-11.8) vs 2016(15+/-4.6), p=0.60.

Discussion: Use of sensory room showed (+) change in subjective anxiety. Downward trend of STAT IMs, PO PRNs +/- Ben, MH, and TN with intro of room, suggest sensory approaches may promote least restrictive means to manage aggression, but results not statistically significant. This may be due to already low rates of STAT meds and MH on unit even before intro of room, thus only very large reductions would be significant. Pts more agitated and likely to get PRNs/MHs also more likely to use acute or intense to use sensory room. Decline in PRNs/MHs show potential for sensory mod as adjunctive tx.

Tia Mansouri

Advisor(s): Ramaswamy Viswanathan

Lamotrigine-Induced Stevens Johnson Syndrome/Toxic Epidermal Necrolysis In A Young Adult: A Case Report

Borderline Personality Disorder (BPD) is a constellation of symptoms including impulsivity, aggression, affective instability, transient psychotic symptoms, and interpersonal dysfunction. Lamotrigine (LTG) is an anticonvulsant medication used for seizure disorders and for maintenance treatment of depression in bipolar disorder. Evidence suggests that mood stabilizers/anticonvulsants are effective in treating affective dysregulation and impulsive aggression in BPD. The use of LTG is associated with skin rash, not well characterized among patients with psychiatric disorders. Most rashes are benign, yet they may herald a life-threatening eruption. Stevens-Johnson Syndrome (SJS) and Toxic Epidermal Necrolysis (TEN) are rare, severe mucocutaneous skin reactions affecting 10% and 30% of body surface area respectively, with more than 90% mucosal involvement. We present a 19-year-old with a history of major depressive disorder, bulimia nervosa, and BPD who was prescribed lamotrigine 25 mg daily. Two weeks after initiation, she presented with flu-like symptoms and fever, attributed to a positive Influenza A swab. Four days later, she developed an erythematous itchy rash on her chest, arms, and face, associated with up-titration of LTG from 25 mg to 50 mg daily. LTG was discontinued, but three days later, it progressed to a diffuse, erythematous maculopapular rash of the face, anterior chest, abdomen, bilateral upper/lower extremities and back. She was admitted for SJS/TEN overlap secondary to LTG, receiving symptomatic treatment along with IVIG per standard protocol. She responded appropriately, and LTG was not restarted. While literature on the use of LTG in BPD is limited, prescribing rates are high. Data support use of LTG to treat mood dysregulation in BPD, but it is essential that clinicians recognize signs of potentially fatal adverse outcomes, and further studies are needed to evaluate the prevalence of life-threatening side effects in specific psychiatric disorders.

Rishab Gupta

Advisor(s): Romain Branch

Is This Avoidant/Restrictive Food Intake Disorder? Questions And Considerations For Icd-11 Classification For Eating Orders

The nosology of eating disorders is undergoing a vast change. As a part of the revision process, the new diagnostic category of "Avoidant/Restrictive Food Intake Disorder" (ARFID) replaces the "Feeding Disorder of Infancy or Early Childhood" of DSM-IV to include those patients who have restrictive patterns of diet, but do not endorse weight or body shape concerns as the primary reasons for these restrictions. DSM-5 broadened the scope of ARFID to also include adults with restrictive eating patterns, which cannot be explained otherwise. We intend to highlight the nosological issues with ARFID as a diagnosis among adults. We are presenting a case series describing four patients presenting with disordered eating causing significant dysfunction that occurred for the first time in adulthood. In each patient, anxieties regarding the consequences of eating multiple types of food led to significant restrictions of the quantity or kinds of diet which was associated with distress and dysfunction, and, significant weight loss. However, in all the cases, the restriction was secondary to the fear of physical symptoms which could be explained by underlying ICD-10 somatoform disorder. The cases do not match the classic western description of ARFID. This series highlights some of the issues relating to the eating disorder, particularly its clinical and nosological status. Problems relating to classification in a non-western setting are also reflected by the difficulty in labeling eating-related problems amidst the interplay of somatization, culture and eating.

Paulo Sales

Advisor(s): Romain Branch

Levodopa Enhances Immobility Induced By Spinal Cord Electromagnetic Stimulation In Rats: A Novel Treatment For Catatonia?

Background: Catatonia is a clinical syndrome composed of complex motor signs, disturbances of volition, and autonomic instability that can be life threatening. Empirical data from an animal study suggest that spinal repetitive ElectroMagnetic Stimulation (rEMS) can lead to complex locomotor responses that resemble catatonia. However, no studies explored the possibility of applying spinal rEMS to treat psychiatric disorders.

Methods: A literature review was conducted on the NCBI database (PubMed) to identify original studies and review articles about the pathophysiology and treatment modalities of catatonia.

Results: There is a paucity of data regarding the pathophysiological mechanisms of catatonia. In an animal model, spinal rEMS promoted locomotor reduction and increased stereotypical responses in rats previously treated with Levodopa + Benserazide, what resembles the clinical manifestations of catatonia in humans.

Conclusions: Cervicothoracic rEMS induced a complex immobility response that resembled catatonia and was, in part, modulated by dopaminergic pathways in rats. The rEMS is a non-invasive method applied to modulate neurocircuits in real-time to treat neuropsychiatric conditions. Thus, spinal rEMS could potentially be part of an innovative treatment for catatonia. Further studies are necessary to explore this possibility.

Nishant Gupta

Advisor(s): Jeremy Coplan

Interaction Of Early Life Stress (Els) And Short Allele Of Serotonin Transporter Gene (Stg) And Hippocampal Volume And Neurogenesis Rates

ELS coupled with the short allele STG is a vulnerability group associated with depression. We examined the effect of this interaction on bilateral hippocampal volumes and rates of neurogenesis in bonnet macaques. In addition, the relationship between brain volumes and neurogenesis rates was studied. 25 adult male macaques [mean (SD) weight = 9.86 (2.67) kg; age = 8.48 (1.45) years] were studied. 9 were reared under randomly assigned variable foraging demand (VFD) conditions, a form of ELS. 6 of 9 VFD were heterozygous δ and 0 of 16 of non-VFD had the short allele ($p = 0.005$). Doublecortin counts were quantified and logarithmically converted. A subgroup of 15 macaques [weight = 10.01 (2.48) kg; age = 8.68 (1.05) years] was used to examine the relationship between brain volume and neurogenesis rates. Adult male macaques with one short allele and ELS exposure were found to have significantly reduced neurogenesis [$N=6$, log Doublecortin mean (SE) = 2.54 (0.49)] versus remainder [$N=19$, mean (SE) = 4.63 (0.28); $F(1, 23) = 6.87$, $p = 0.015$, $n = 25$]. There were no weight or age differences. ($p < .15$). An effect of this vulnerability group was also noted on hippocampal volume [$F(1, 17) = 6.47$; $p = 0.021$]. Fisher LSD post hoc testing revealed that VFD-reared macaques with δ allele of STG exhibited an asymmetrical increase in hippocampal volume, with right greater than left [$p = 0.030$]. GLM analysis also revealed a correlation between brain volumes and rates of neurogenesis [$F(1, 13) = 10.76$; $p = 0.006$; $n = 15$]. Macaques with low brain volume exhibited higher Doublecortin counts. ELS and short allele of STG was associated with increased volume of right hippocampus and reduced rates of neurogenesis in adult male macaques in a grouping where there were no age and weight differences. Low brain volume was associated with higher rates of hippocampal neurogenesis consistent with previous work showing macaques with lower BMI have higher rates of neurogenesis.

Pratik Bahekar

Advisor(s): Romain Branch

Use Of Hematopoietic Growth Factors In The Management Of Clozapine Induced Blood Dyscrasias.

Intro: Clozapine use for treatment resistant Schizophrenia is limited by agranulocytosis. Presented is an updated review on using G-CSF for clozapine-induced granulocytopenia in clozapine re-challenge, comorbid immune suppression, & treatment augmentation. Method: MEDLINE review for articles published August 2016, MeSH terms: Hematopoietic Cell Growth Factors, Bipolar % Related Disorders, Schizophrenia Spectrum & Other Psychotic Disorders, G-CSF, Antipsychotic Agents, Myelopoiesis & Neutropenia. Results: 50% patients show a mean prodromal WBC drop at 29.3 +/- 12.6 days before agranulocytosis. In rechallenge, onset is quicker & severe. Neutrophils exposed to serum of those who developed agranulocytosis underwent complement activation & cell lysis, suggesting an immunological mechanism. Clozapine metabolite N-desmethylclozapine is toxic to myeloid precursor cell. Clozapine bioactivated to nitrenium ion lead to neutrophil apoptosis. Filgrastim raises peripheral ANC within 4 to 24 hours through actions of cytokines such as IL-1B, LPS, TNF- α . CD4, Th17 & IL-23 downregulates G-CSF. Endogenous G-CSF levels rise during transient increase in ANC at clozapine initiation. G-CSF levels in agranulocytosis has inconsistent relation to ANC levels. Discuss: Monitoring endogenous G-CSF levels with WBC counts during clozapine-induced neutropenia helps distinguish between benign & malignant neutropenia leading to agranulocytosis. Measured endogenous levels of G-CSF & other cytokines have varied with progression of granulocytopenia. The duration of onset, progression & recovery after discontinuation of Clozapine are mixed. This indicates that multiple mechanisms may exist in clozapine-related blood dyscrasias & may explain the inconsistent efficacy of G-CSF on clozapine-induced agranulocytosis. Distinguishing between benign and malignant neutropenia is needed to identify cases that would benefit from Filgrastim. Its use in clozapine rechallenge reduce the risk from agranulocytosis in treatment resistant schizophrenia.

Tetiana Gritsik

Advisor(s): Mohammad Faysel

Effect Of Demographics, Location, And Admission Status On Length Of Stay For Pediatric Appendectomy Patients In New York City

Objective: Standard treatment for acute appendicitis almost always involves removing the appendix (appendectomy). In the United States, more than 64,000 appendectomies are performed on children yearly, ranking it to be the most common pediatric surgical emergency.

The length of stay (LOS) is a metric commonly used in statistical analysis for health planning purposes, evaluation of quality of care and patient outcomes prediction.

After reviewing existing research, this study aims to determine a correlation between demographics, location and admission status on length of stay for pediatric appendectomy patients in NYC.

Methods: De-Identified data for this study was obtained from Statewide Planning and Research Cooperative System (SPARKS) 2014 Hospital Inpatient Discharges. Primary outcome measures are length of stay (LOS), APR Severity of Illness, County where the procedure was performed, patient Race and Gender, and Emergency Department Indicator. We have selected pediatric patients (0-17), who were admitted in 5 counties of NYC with primary diagnosis of appendicitis (CCS Code 142) and procedure of appendectomy (CCS Code 80). Total number of records: 1 855. Statistical analysis included descriptive statistics, analysis of variance and correlation between five factors and LOS and was performed using SAS 9.3 (SAS Institute Inc, Cary, NC).

Results: More than 80% of all pediatric cases in NYC were marked as ED cases and showed longer LOS. Males had higher hospitalization frequencies at 61.5% as opposed to females at 38.5%. Race analysis showed that 58.8% of all cases are Other/Multi Racial. The study did not reveal a statistically significant linear relationship between County, Race, Gender, ED indicator and LOS. To conclude, only Severity of Illness correlates with LOS ($p > .05$) in pediatric appendectomy patients in NYC: more complicated cases have longer hospitalization (1.59 days for minor, 4.44 for moderate, 8.76 for major and 18.25 for days for Extreme Severity).

Amir Momeni-Boroujeni

Advisor(s): Raavi Gupta

Mutational Clustering Of Endometrial Carcinomas And Their Prognostic Significance: Morphologic Classification Is A Better Predictor Of Survival Than Mutational Clustering In Endometrial Carcinoma

Introduction: Endometrial carcinomas have two main subtypes: serous and endometrioid. It has been known that serous adenocarcinomas have a worse prognosis than endometrioid carcinomas. In this study, we aim to cluster the endometrial carcinomas based on their mutational profile and compare the survival statistics of the mutational versus morphologic clustering.

Methods: 548 cases of Endometrial cancers (Serous and Endometrioid) from The Cancer Genome Atlas were studied. Their survival and mutational data for the most common mutations in endometrial carcinomas was extracted. A network analysis method was used to cluster the cases based on their mutational profiles. The survival of mutational clusters and morphologic clusters were compared using survival statistical tools.

Results: After adjusting for clinical stage, morphologic clustering of endometrial carcinomas was found to have a better correlation with survival compared to mutational clustering (p value: 0.007) with endometrioid carcinoma having the best prognosis (average survival: 110.55 months) followed by mixed endometrioid and serous carcinomas (average survival: 36.1 months) and serous adenocarcinoma (average survival: 30.09 months). Of note, a subcluster of endometrioid endometrial carcinoma cases with a unique mutational profile (with mutations in PTEN/FGFR2/NRAS/CCND1/CYLC1 and no mutation in PIK3CA and none of type I endometrial carcinoma mutations) have a significantly better prognosis (p value: 0.022) compared to the other endometrioid carcinomas irrespective of clinical stage.

Conclusion: Our results show that while mutational clustering of endometrial carcinomas is possible, these clusters do not conform with histologic grouping of endometrial carcinomas because of shared mutations between endometrioid and serous adenocarcinomas. Morphologic grouping is a better predictor of outcome compared to genetic clustering.

Rong Xia

Advisor(s): Raavi Gupta

Computational Image-Analysis To Distinguish Well-Differentiated Hepatocellular Carcinoma From Normal Liver Tissue

Background: Distinguishing well-differentiated hepatocellular carcinoma (WD-HCC) from other hepatic lesions is challenging because of morphologic similarities between them. Computational image-analysis offers new opportunities for objective diagnosis through quantitative assessment of histological features. Here, we have used automatic image processing and statistical analysis to differentiate between the WD-HCC and normal liver tissue (NLT).

Design: Twenty core liver biopsy specimens (11 WD-HCC; 9 NLT) were retrieved and re-evaluated. Images (98 WD-HCC; 97 NLT) were obtained at 400x from non-overlapping areas in H&E stained slides, excluding areas with inflammation, steatosis, cholestasis, artifacts, and portal triads. The computer was trained on 47 WD-HCC and 47 NLT images by classification algorithm for computational image analysis. The remaining images (51 WD-HCC; 50 NLT) were used to test the algorithm. Images were deconvoluted to subtract background colors. After noise reduction and Otsu thresholding, morphologic opening and connected component analysis were applied to enumerate the number of nuclei.

Results: There were greater number of nuclei in WD-HCC as compared to NLT (463.4 ± 84.0 vs. 278.5 ± 32.5 ; $p < 0.001$). Applying these data from test cases an ROC was developed using binary classification. The remaining images (51 WD-HCC; 50 NLT) were tested by the binary classification algorithm. This computational image analysis differentiated WD-HCC and NLT with a sensitivity of 98% and specificity of 96% with a Kappa coefficient of 0.94.

Conclusions: Computational image analysis of nuclear density differentiated WD-HCC from NLT. The nuclear density was significantly higher in WD-HCC than in NLT. Computerized image analysis can be used to assist in the diagnosis of hepatocellular carcinoma especially in suboptimal specimens.

Emiliya Storman

Advisor(s): Alan Gintzler

Hypothalamic Aromatase Activity Varies Over The Rat Estrous Cycle: Contribution Of Circulating Estrogens

Estrogens are known to play an important role in regulation of a myriad of central nervous system (CNS) functions, including mood, memory, cognition, neuroprotection, and pain. Aromatase (Aro), which synthesizes estrogens from androgens, is present not only in reproductive organs, but also throughout the CNS. It is particularly concentrated in hypothalamus, a neuroendocrine organ regulating many bodily functions. However, factors that regulate hypothalamic Aro activity (and thus the availability of locally produced estrogens) are largely unexplored.

I assessed the influence of changes in circulating estrogen levels on hypothalamic Aro activity using the tritiated water release assay. For these experiments, I used hypothalami from male, proestrous, diestrous, and ovariectomized rats, as well as from rats supplemented with subcutaneous estradiol (the most potent estrogen) following ovariectomy or during diestrus. I also examined if the differences in Aro activity can be attributed to changes in Aro protein levels.

My data showed that hypothalamic Aro activity: (a) is higher when circulating estrogen levels are higher, (b) is restored by estradiol replacement, but only in intact rats, suggesting that factors in addition to estradiol alter Aro activity, and (c) is not proportional to the corresponding Aro protein levels, suggesting the importance of acute (presumably chemical) modification of Aro to regulating its activity. Understanding factors that alter production of hypothalamic estrogens could yield insight into the regulation of CNS Aro activity, providing better comprehension of and potentially guiding development of pharmacotherapies for CNS disorders of estrogen-dependent functionalities.

Avi Hameroff

Advisor(s): Ozgul Muneyyirci-Delale

Prostaglandin Levels In Pregnant Women With And Without Hyperemesis Gravidarum

Severe nausea and vomiting of pregnancy is known as hyperemesis gravidarum (HG) and affects 0.5-2% of pregnancies. It was proposed by Muneyyirci and Cunningham that a casual association existed between HG and primary dysmenorrhea (PD), thought to result from elevated levels of prostaglandins. They observed some patients with HG reported PD, and it was found that patients with severe HG were 10x likely to have PD.

Many hormones, hormone releasing factors, cytokines and prostaglandins have been found to stimulate the synthesis and release of hCG, and it is prostaglandin E2 (PGE2) which is known to cause nausea and vomiting of pregnancy. Prostaglandin dehydrogenase (PGDH) converts PGE2 to its inactive metabolite 5-ketoprostaglandin E2. The activities of PGDH are regulated by progesterone. The natural reduction of progesterone between 5-9 weeks of pregnancy results in low activities of PGDH which increases maternal level of PGE2.

We predict that pregnant women in the first trimester with hyperemesis gravidarum will have elevated levels of PGE2 in their plasma.

IRB-approved consent was obtained from subjects. A questionnaire was administered, and the specimen was collected and stored at -80F. Plasma prostaglandin levels were assessed using Cayman Chemical Prostaglandin E Metabolite ELISA Kit and compared between the groups. Data were analyzed using two-tailed Student's t-test, Fisher exact test and odds ratio.

We enrolled 18 women: 12 with HG and 6 controls without. Pregnant women with HG during a prior pregnancy were 10 times more likely to develop HG in subsequent pregnancies. HG women reported the start of nausea and/or vomiting at approximately 5.8 ± 1.5 weeks of gestation that continued until 22.3 ± 9.5 weeks of gestation. Plasma prostaglandin levels were significantly higher in HG women than in controls. HG: 93.4 ± 19.9 pg/mL, Control: 62.9 ± 34.9 pg/mL, $p=0.015$. PGE2 may be involved in the etiology of HG. Further studies are needed to confirm.

Robert Alexander

Advisor(s): Susana Martinez-Conde

Gaze Behavior During The Averted Detection Of A Simulated Faint Star

Vision in daytime conditions relies on pointing one's fovea to successive targets of interest. Looking directly at visual targets may not be the best strategy to acquire information in nighttime conditions, however, because rods (which mediate night vision) are absent from the fovea. Here we explored the relationship between eye movements and perception in scotopic conditions, with a technique first proposed around 325 BC and still used today, known as "averted vision" Looking away from faint celestial objects, instead of directly at them, can improve their detection. The reason is thought to be that light falls on more rods as the objects approach $\sim 20^\circ$ of visual angle away from the center of gaze. No studies have determined the pattern of averted vision that best facilitates perception, however. We assessed averted vision while recording eye positions of dark-adapted human participants, for the first time. We used a CRT monitor and a series of three neutral density filters to create a centrally-placed dim artificial star, of apparent magnitude 4.2 (dimmer than Tau Ceti). After dark-adapting, participants ($n=12$) made eye movements to a series of fixation targets, viewed binocularly. Participants made a yes/no judgment about whether the star was visible at each fixation location. This provided a map of detection performance in all directions surrounding the star. If rod-cone distribution was the sole predictor of performance, we should have found peak performance 20° away from the star and a linear improvement as gaze approaches 20° . Contrary to this prediction, our participants' accuracy peaked around 10° , and decreased at greater distances. This work may provide a better understanding of rod function, and in turn lead to improved screening and assistive technologies for eye movement and night vision disorders.

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 and induced 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 and Foxp3 expression is abnormal in this autoimmune disease. Through my work I hope to provide greater insight in to the cause of autoreactive disorders.

Hui Jiang

Advisor(s): Xian-Cheng Jiang

Plasma Phospholipid Transfer Protein Promotes Platelet Aggregation

It remains unclear whether plasma phospholipid transfer protein (PLTP) is involved in hypercoagulation or hypocoagulation. We addressed direct effect of PLTP on platelet aggregation and the underlying mechanism. We found that PLTP overexpressed mice decrease bleeding time, while PLTP deficient mice increase it. We also found that human platelets secrete PLTP under stimulation. Platelet aggregation increased upon PLTP overexpression whereas it decreased with PLTP deficiency in a gene dose-dependent manner. Human recombinant PLTP increased mouse or human platelet aggregation in a dose-dependent manner. Phosphatidylserine externalization provides a water/lipid surface for the interaction of coagulation factors, which accelerates thrombosis. Compared with wild type controls, platelets from PLTP transgenic mice had significantly greater amounts of phosphatidylserine on the exterior surface of the plasma membrane, whereas platelets from PLTP-deficient mice had significantly less on the surface, thus influencing fibrinogen binding. Moreover, recombinant PLTP together with ADP significantly increased phosphatidylserine exposure on the plasma membrane of PLTP-deficient platelets, thereby increasing fibrinogen binding. Importantly, PLTP overexpression significantly accelerated the incidence of photothrombosis-induced infarction, whereas PLTP deficiency significantly reduced the incidence. We concluded that PLTP promotes phosphatidylserine externalization at the plasma membrane of platelets and accelerates ADP- or collagen-induced platelet aggregation. Thus, PLTP is involved in hypercoagulation. Therefore, PLTP inhibition could be a novel approach for countering thrombosis.

Matthew Evrard

Advisor(s): Sheryl Smith

Synaptic Pruning in Layer 3 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. In order to begin investigations to test the role of the GABAA receptor in this process, I initially sought to establish whether synaptic pruning occurs in layer 3 of mPFC of female mice, which has not yet been shown. To this end, I examined 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 3 of the mPFC decreased by 31% ($P < 0.05$) from puberty to post-puberty. This suggests that synaptic pruning occurs in layer 3 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.

Yongwoo Kim

Advisor(s): Adrian Marchidann

Vertigo With Typical Peripheral Characteristics In Cerebellar Stroke

Background: Vertigo is a common yet challenging complaint in the emergency department (ED). Direction-fixed horizontal nystagmus that follows Alexander’s law with abnormal head impulse test, spontaneously resolved vertigo, and vertigo that worsens with head movement are considered typical for “peripheral” vertigo. We present a case with above characteristics that was caused by an acute ischemic stroke (AIS).

Case Presentation: 89-years-old man complained of acute vertigo that started a day before presentation to ED. Vertigo worsened with movement, and associated with vomiting and a few minutes of oscillopsia. Upon arrival to ED, vertigo resolved. He had benign prostate hyperplasia. He does not smoke, drink alcohol or use illicit drugs. Blood pressure was 138/54 mmHg. He had direction-fixed horizontal nystagmus to the right, aggravated by rightward gaze. Head impulse test was abnormal, and there was no skewed eye deviation. Dix-Hallpike test to the right side triggered geotropic torsional nystagmus. He had no appendicular ataxia but gait was wide-based. Other neurological examination was normal. NIH stroke scale was 0. Next day, nystagmus resolved. MRI of the brain showed AIS in the antero-medial portion of the right superior cerebellar hemisphere.

Discussion: There are two bedside tools used for the initial evaluation of vertigo “Head Impulse, Nystagmus, Test of Skew (HINTS) exam to predict cerebrovascular disease (96.5% sensitivity 84.4% specificity, when nystagmus is present) and Dix-Hallpike test to predict benign paroxysmal positional vertigo (79% sensitivity, 75% specificity). This patient had AIS despite negative HINTS exam and positive Dix-Hallpike test.

Conclusion: AIS can mimic peripheral vertigo and should be considered in patients with cerebrovascular disease risk factors. Developing an AIS risk predictive tool for patients presenting with vertigo would be useful.

Madeleine Coleman

Advisor(s): Arthur Grant

Delayed Hypersensitivity To Millepora Species Fire Coral In Two Sisters

Two sisters in their 20s were exposed to a Millepora species of fire coral on a descent rope while SCUBA diving in Key Largo, Florida. An acute mild allergic reaction on their hands was followed 3 – 4 weeks later by a delayed hypersensitivity reaction that resolved after 3 – 4 days of steroid treatment. About one week later both sisters developed small red papules in the web between the thumb and index finger that resolved spontaneously over 3 days. A delayed hypersensitivity reaction to fire coral toxin has not previously been reported. Furthermore, this case is especially interesting because the two sisters developed near-identical reactions along a similar time course. This may indicate a genetic susceptibility for delayed hypersensitivity to fire coral species. Millepora species are common in tropical Atlantic, Pacific and Indian waters. Divers should be aware that fire coral may grow and proliferate on common rope material, and should take appropriate precautions.

Anna Groysman

Advisor(s): Deborah Gustafson

Depressive Symptoms, Leptin, Adipokines And Obesity In Women With And Without HIV Infection

The Jolly Fat hypothesis stated that there is a positive relationship between substantial obesity and depression. Since then there have been many controversial publications on this association. BMI is an indicator of the amount of adipose tissue in the body, which functions as the largest endocrine organ. Adipokines such as leptin and adiponectin affect processes in the nervous system and may be dysregulated in individuals with HIV infection, perhaps due to lipodystrophy syndromes. The association of obesity and depressive symptoms onset and the role of adipokines on the nervous system beget the question of whether there is an association between adipokines and depressive symptoms and whether they can be used as biomarkers for depression onset.

In the present study, we explore the association of depressive symptoms and plasma levels of the adipokines, leptin, total adiponectin and HMW adiponectin; and the anthropometric measures body mass index, waist circumference, and waist to hip ratio in adult women with and without HIV infection who are participants at the WIHS (Women's Interagency HIV Study).

A total of 357 participants in the Brooklyn WIHS were evaluated for plasma levels of leptin and adiponectin. Participants completed self-reported depression questionnaires known as CES-D (Center for Epidemiological Studies Depression scale). We performed cross-sectional analyses of plasma leptin and adiponectin levels and CES-D scores using Spearman correlations, T-tests, logistic regression analyses, and Receiver Operating Characteristic test.

We report that women participating in Brooklyn WIHS have leptin and adiponectin levels that are not associated with depressive symptoms. Across the BMI spectrum, there is no association between leptin or adiponectin and depressive symptoms. This epidemiological study is the first to investigate some of the endocrine and anthropometric measures that may have an impact on the mental health of women coping with HIV infection.

Prad Selvan

Advisor(s): Frank Barone

Rat Model Of Adjunctive Intra-Arterial Infusion After Large Vessel Ischemic Stroke Revascularization

Ischemic stroke caused by emergent large vessel occlusion (ELVO) is associated with significant morbidity and mortality. Despite the recent validation and increasing use of mechanical thrombectomy (MT) studies have shown over 50% of patients who undergo MT still remain significantly impaired. There is significant opportunity for adjunctive therapies used in conjunction with MT. Sprague-Dawley rats (250-300gm) are anesthetized using ketamine/xylazine. Neck dissection is performed to visualize the common carotid (CCA) bifurcation. A endoluminal suture is inserted to the internal carotid artery (ICA) bifurcation to occlude the middle cerebral artery (MCA). Occlusion is maintained for 2hrs. After occlusion time is completed the neck is re-opened. After removal of the suture and prior to re-establishing flow, normal saline is administered through an arterial infusion catheter (polyurethane 2.3F rounded tip). After flow is reestablished the catheter is maintained in the ICA and externalized through the neck and connected to a continuous infusion system. To measure distal microvascular perfusion, a Laser Doppler Flowmetry (LDF) probe is glued on the skull in the center of the ipsilateral MCA field. Scanned images of 2,3,5-triphenyltetrazolium chloride (TTC) stained sections of rat forebrain are compared between left and normal right hemisphere to determine amount of cerebral edema and ischemic injury. The procedure successfully establishes continuous selective intra-arterial catheter access in the rat ICA. The microcatheter does not change distal microvascular perfusion when compared to normal LDF values. Pre-reperfusion infusion is successfully demonstrated by LDF. At 6 and 12hrs post-catheterization, TTC staining reveals no significant cerebral injury. Continuous selective intra-arterial catheterization of the rat ICA using the described method is safe, does not compromise distal microvascular perfusion, and does not cause significant cerebral injury.

Manan Nath

Advisor(s): Frank C. Barone

Demyelination, Cognition And Imaging In A Translational Model Of Rat Vascular Cognitive Impairment (Vci)

VCI is a heterogenous group of diseases that can involve stroke, large vessel stenosis and small vessel disease resulting in parenchymal inflammation, a progressive deep white matter demyelination and axonal degeneration/loss.

Goal: To better understand brain pathology and potential markers in this non-stroke/infarct VCI experimental model.

Hypothesis: In this model relevant to human VCI, deficits in complex cognitive functioning involves diffuse fiber tract changes that can be quantified and validated histologically.

Methodology In hypertensive rat (SHR) (N=5-7/grp; ~250g) cervical bilateral carotid artery stenosis is done using two ties of 3-0 silk; 2mm apart against a 30Ga tube that was immediately slid out (No stenosis in Sham). Cognition Assays; executive functioning (T-maze delay based decision making); complex cognition/navigation (Active Place Avoidance; APA). MRI Brain; Arterial Spin Labelling (ASL); Diffusion Tensor Imaging (Fractional Anisotropy FA; Axial Diffusivity AD; Radial Diffusivity RD). Histology was used to measure neuronal changes/cell loss.

Results: In the T-Maze “delay-based” decision making task, stenosis surgery decreased correct decisions (N=4-5/grp; p<0.05). In APA, stenosis produced progressive learning impairment while Sham learning progressively improved (N=5-7/grp; p<0.05). ASL indicates stenosis persistently reduced forebrain perfusion in corpus callosum and cortex. DTI indicates changed Corpus Callosum (low FA, high RD); changed External Capsule (low FA, high AD, high RD); (N=5-6/grp; p<0.05). Histology: No differences in the number of forebrain neurons. (N=6/grp)

Conclusions: Carotid stenosis in hypertensive rats creates forebrain hypoperfusion and cognitive deficits as in man. MRI measurements suggest opportunities to localize forebrain white matter parameters as markers to monitoring VCI fiber tract pathology and VCI intervention; histological cross-validation of MRI to cellular and protein changes is necessary.

Cemal Karakas

Advisor(s): Geetha Chari

Primum Non Nocere: First, Do No Harm.

Levetiracetam (LEV) has proven efficacy for the control of generalized tonic-clonic (GTC) seizures associated with idiopathic generalized epilepsy (IGE). Seizure aggravation triggered by antiepileptic drugs (AEDs), known as paradoxical effect, is a well-documented phenomenon, and it has been described with many different AEDs. However GTC aggravation by LEV in IGE in pediatric age group has rarely been reported. We present a 12-year-old patient with idiopathic generalized epilepsy, who experienced paradoxical aggravation of GTC seizures following treatment with LEV. The patient had significant improvement of the electro-clinical picture after LEV was discontinued. This report highlights that exacerbation of frequency of GTC seizure in IGE can be associated with LEV use and clinicians should be alert about the possibility of a paradoxical effect.

Keywords: Epilepsy, Levetiracetam, Paradoxical effect, Antiepileptic, IGE, GTC

Indira Kommuru

Advisor(s): Geetha Chari

Measures To Improve Epilepsy Quality Of Care In Neurology And Epilepsy Clinics

Introduction: There are considerable gaps in the quality of care delivered to patients with epilepsy. Measuring the quality of care delivered is the first step to its improvement. The first epilepsy quality measures were approved in 2009. Eight measures were published, covering diagnosis, evaluation, counseling, and referral (Neurology 2011). AAN has updated a review of these measures in January 2014. A 2015 study from Boston, MA showed that adherence to quality measures is important as it does improve patient outcomes and seizure control.

Objective: To compare epilepsy care quality measures between patients seen in KCHC neurology and epilepsy clinics.

Methods: A retrospective chart review was done on 90 adult patients with diagnosis of epilepsy between July to December 2015. 17 of the 90 patients were later followed in the recently set up epilepsy clinic. Adherence to the ten quality measures were compared between the two clinics. Significance of results was established using McNemar's Chi-square test.

Results: Epilepsy clinic was significantly better in counseling the patients about seizure related safety measures, finding out the seizure frequency since prior visit, reviewing or ordering EEG's and documenting etiology for epilepsy. Regarding counseling women of childbearing age, bone health and behavioral health both clinics did not do well.

Conclusion: Recent setup of the epilepsy clinic at KCHC along with utilization of template for documentation could be the reason for better adherence to epilepsy care quality measures. Emphasizing usage of a similar template in the general neurology clinic should likely improve the adherence to quality measures.

M. Amin Banihashemi

Advisor(s): Ivan Bodis-Wollner

Non-Invasive Measurement Of The Thickness Of The Fovea In Humans: A Focus On The Photoreceptor Layer

Introduction: Lower vertebrate cone photoreceptors contract with dopaminergic stimuli and from darkness to light,¹ which may be regulated by the circadian rhythm.² Retinal thickness changes throughout the day,³ can be measured using optical coherence tomography (OCT).⁴ We describe a measurement method of the photoreceptor layer thickness in the foveola, which is comprised of cone photoreceptors.⁵

Methods: The retinal map scan OCT protocol, covering an area of 5 mm x 5 mm in the foveally centered grid, was utilized.

For manual measuring, a line is drawn from the Inner Segment/Outer Segment (IS/OS) junction's peak at the foveola to the Retinal Pigment Epithelium (RPE), perpendicular to the RPE. This distance includes photoreceptors (Fig. 1).

For semi-automated measuring, the line separating the inner and outer retinal layers for automatic equipment calculation can be drawn at the level of the IS/OS junction to provide a new reference value. After recalculation, measurements reported as "outer retinal" will be the distance of interest. Using the grid pattern, measurements can be made in 250 $\hat{1}$ /₄m increments from the foveola (Fig. 2).

Measuring from the foveola to the RPE yield total retinal thickness in either method.

Results: There was a match between manual and semi-automated measurement methods (Fig. 3). With each adjustment and recalculation the foveola marked by the OCT equipment shifts. This adjustment is automatically performed by the equipment and can be ignored as part of the normal process. However the location of the intersection representing the true foveola calculated before shift adjustments needs to be marked in order to assist in navigating.

Discussion: Indirect measurement and quantification of human cone photoreceptor layer thickness in vivo is feasible. The method carries the promise to serve as an ocular biomarker of Parkinson's disease, in which dopamine depletion impacts vision and circadian rhythm,^{4, 6} and possibly cone cell length.

Ilana Lasner

Advisor(s): Jonathan Perk

Neurocysticercosis: An Important Cause Of Epilepsy Worldwide

Neurocysticercosis is due to infection with the larval cysts of the parasite *Taenia solium*. It is a leading cause of epilepsy worldwide, but rarely seen in developed countries. Neurocysticercosis is considered a neglected parasitic infection by the CDC with an estimated 1000 new cases in the United States every year. A 34-year-old Haitian man presented to the ED with worsening headaches and blurred vision for 3 weeks. He was recently hospitalized in Haiti for seizures and encephalopathy of unknown etiology but recovered with persistent headaches and blurry vision. The headaches were diffuse and exacerbated by coitus. Initial neurologic exam demonstrated normal mental status and left homonymous hemianopsia. CT of the head showed innumerable cystic lesions throughout the brain of variable sizes with central dot calcification and no rim enhancement characteristic of the vesicular stage (viable parasite) of neurocysticercosis. MRI of the brain and orbits performed one day later revealed multiple cystic lesions in both cerebral hemispheres, in the lateral ventricles, and the left orbital apex. HIV test was negative. The patient was started empirically on albendazole, dexamethasone, and levetiracetam for seizure prophylaxis. Subsequent neuroimaging two months and one year later showed interval decrease in size of lesions with post-contrast enhancement consistent with the granular nodular stage (nonviable cysts) and successful treatment. Patient's seizures remitted, and he was successfully tapered off antiepileptics. This case illustrates the classic presentation of neurocysticercosis--an unusual cause of epilepsy in the developed world. The radiographic features of various stages of neurocysticercosis before and after successful antiparasitic treatment are demonstrated. Neurologists should be aware of clinical and radiographic features of neurocysticercosis, especially in regions with patients from endemic regions, as it is a treatable cause of epilepsy.

David Mao and Kevin Kyle

Advisor(s): Jonathan Perk

Unusual Presentation Of Hemichorea Due To Nonketotic Hyperglycemia

Rationale for the research: To discuss a rare cause of hemichorea

Methods: Case report

Results: 83 year old Afro-Caribbean woman with hypertension, poorly controlled diabetes, and prior right basal ganglia lacunar infarct presented with new acute onset left sided uncontrollable limb movements. Patient awoke one morning with left arm jerking movements that were large amplitude and non-rhythmic. Later her symptoms progressed to also involve the left leg. These movements resolved once she was able to fall asleep. Neurologic exam was significant for residual left upper motor neuron facial weakness and left hemiparesis from prior stroke.

On initial presentation, her blood glucose was 86. Her A1c was later found to be 12.1. Laboratory workup for TSH, Iron panel, ACE, ceruloplasmin, and HIV were unremarkable. EEG did not show electrographic seizures during these events. MRI demonstrated right lentiform nucleus T1 hyperintensity. No additional findings were noted on diffusion weighted imaging or T2 sequences.

Discussion: Hemichorea secondary to nonketotic hyperglycemia with classic imaging findings is a recognized clinical syndrome. Review of the cases in literature show that it tends to affect elderly and female patients. Its prevalence is higher in Asian countries, which suggest possible genetic link or regional variations. Resolution of symptoms can take days to months.

Despite aggressive control of her blood glucose levels and initiation of haloperidol, the patient's symptoms persisted for several months. Pathophysiology of this syndrome has been hypothesized to be related to hypoperfusion and gabaergic dysfunction secondary to metabolic changes. We postulate that history basal ganglia stroke may be a risk factor, and is associated with longer recovery time.

Neil Patel

Advisor(s): Mahendra Somasundaram

A Classic Case Of Pernicious Anemia Causing Subacute Combined Degeneration Of The Spinal Cord

35M presenting with tingling sensations in body. It first started two months ago in his right thumb, which then spread to the rest of his hand, and then a few weeks later spread to his left hand. Soon after the process started in both of his feet spreading proximally. Recently he noticed his gait changed due to what felt like "tightness" in his hips. He noticed that he was dropping things with his hands, but denied overt weakness. He noticed some new difficulty with urination. He had significant family history for autoimmune disorders including Lupus in his aunt and Raynaud's in his mom and grandfather.

His neurological exam was significant for mild action tremor in his right hand, proximal weakness in his hips bilaterally, decreased reflexes symmetrically throughout, and stocking and glove sensory loss to pin prick, temperature and vibration/joint position. He was found to have serum B12 levels of 138, elevated homocysteine & methylmalonic acid, macrocytosis with hypersegmented WBCs. MRI was classic for subacute combined degeneration of the spinal cord. Further antibody studies were positive for both intrinsic factor blocking antibody and parietal cell antibodies.

This gentleman responded to replacement of B12 IM supplementation. This patient exemplifies the classic teaching point of peripheral neuropathy. B12 is commonly tested for in both hospitals and in clinics for several neurological conditions as it is important in myelin synthesis. A deficiency can lead to neuropathy to dementia. There are several etiologies of Vitamin B12 deficiency ranging from malnutrition, Gastric/Intestinal diseases, to medications.

Pernicious anemia is a result of auto antibodies towards IF or Parietal Cells which prevent B12 from being absorbed in the body. Its prevalence is between 50-4000/100,000 persons. It is associated with other autoimmune disorders such as thyroid disease, vitiligo, and diabetes.

This patient was unique in that he had antibodies to both IF and Parietal Cells.

Sandro Corti

Advisor(s): Susan Law

Characterization Of Striatocapsular Hemorrhage In A Community Hospital Cohort Of African-Caribbean Patients

Clinical and neuroimaging information in 45 patients of African-Caribbean descent with striatocapsular hemorrhage seen at Kings County Hospital Center between 2011 and 2016 were reviewed retrospectively. Characteristics like sex, ethnicity, blood pressure on initial evaluation, presence of neglect, language deficits, dysarthria, unilateral weakness and ataxia were examined. Additional factors like NIHSS, mRS, ICH score, and involvement of neurosurgery were also evaluated. Striatocapsular hemorrhages were divided into anterior, middle, posteromedial, posterolateral, lateral and massive types. Survival in middle and posteromedial types were significantly higher than in massive type hemorrhages. The presence of intraventricular hemorrhage in large hemorrhages was less likely to occur than in massive type hemorrhages. A comparison of each type of hemorrhage and various characteristics examined in the study sample were assessed for statistic significance. This study demonstrates a unique and close look at striatocapsular hemorrhage and its characteristics in Caribbean stroke patients. Further studies will be helpful in better improving stroke care that will help optimize and improve morbidity in this population.

Yazan Radaideh

Advisor(s): Suzan Law

A Dural Arteriovenous Fistula (Davf) Secondary To Cerebral Venous Thrombosis

Introduction: The incidence of intracranial Dural Arteriovenous Fistulas (DAVFs) is approximately 10-15% of all intracranial vascular abnormalities.

DAVF in adults represents an acquired disease with venous sinus thrombosis being a common predisposing factor.

Here we present a case of DAVF secondary to venous sinus thrombosis successfully treated with coiling.

Case Description: 63 y/o man with history of recurrent DVTs and PE on anticoagulation presented with right sided weakness altered mental status. Functional decline reported over the preceding month associated with multiple episodes of vomiting 2 days prior. At initial evaluation patient was found to have global aphasia and right side hemiparesis. Non-contrast CT head showed a left thalamic hemorrhage with intra-ventricular extension. MRI of the brain with contrast showed bilateral thalamic enhancement indicative of venous engorgement and a stable hemorrhage. CTA/CTV of the intracranial vessels revealed a straight sinus thrombus with an adjacent DAVF being fed by the posterior cerebral artery. The DAVF was confirmed on catheter angiography and the patient underwent successful super-selective embolization of the fistula. Patient developed recurrent lower extremities DVTs despite being on appropriate anticoagulation.

Extensive coagulopathy workup was unremarkable. After a prolonged hospitalization the patient was discharged to an acute rehab facility.

Discussion: Clinical presentations of DAVF vary, symptoms can range from mild tinnitus to fatal hemorrhages.

Diagnosis of DAVF can be made based on imaging modalities CTA and MRA/MRV. Catheter angiography remains the gold standard.

Treatment options for DAVF depend on severity of symptoms and vary from conservative management in asymptomatic patients to endovascular embolization, coiling and radiation therapy in the most severe cases. Early recognition and treatment are key in preventing devastating outcomes.

Simona Treidler

Advisor(s): Paul Maccabee

Upper And Lower Motor Neuron Findings In A Patient With B12 Deficiency And Leprosy

Leprosy affects 4 million people worldwide and is one of the most common causes of neuropathy. Approximately 175 new cases are found in the United States yearly. Mycobacterium leprae damages the peripheral sensory and motor neurons, causing numbness, weakness and paralysis.

A 57-year-old man visiting from Guyana had progressive numbness and left foot drop over a 6-month period. Over about two years he lost sensation in multiple fingers followed by spontaneous amputation. He also had ascending numbness up to his calves. He works as a cook and is a vegetarian.

Examination revealed multiple round hypopigmented lesions on his back, ulcerated wounds on his right fingers and palm, amputations of fingers 2nd, 3rd, 4th on the right hand and 3rd on left. His calves were atrophic. The greater auricular and ulnar nerves were palpable bilaterally. He had peroneal palsy worse on left than right, decreased pinprick, thermic and vibration sensations in stocking-glove distribution, diffuse hyperreflexia and right upgoing plantar reflex. Electrophysiologic testing showed diffuse sensorimotor axonal neuropathy with demyelinating features (left ulnar and peroneal partial motor conduction block, bilateral tibial CMAP temporal dispersion). Skin biopsy shows paucibacillary leprosy with focal epithelioid granulomas. The vitamin B12 level was low. He refused all treatment and was lost to follow up.

This case is noteworthy for hyperreflexia associated with polyneuropathy, a misleading finding resulting from concomitant vitamin B12 deficiency.

Due to modern transportation, leprosy is occasionally seen in the developed countries where physicians are less familiar with its manifestations. A good epidemiological history, clinical and neurological examination are needed for a prompt recognition to avoid complications.

Clotilde Balucani

Advisor(s): Steven Levine

Fatal Intracranial Hemorrhage Following Iv Tpa In A Patient With Acute Ischemic Stroke Induced By A Cardiac Myxoma

Introduction: Primary cardiac tumors are uncommon (autopsy frequency 0.001%-0.28%: 75% are benign, 50-75% are myxomas). Common neurological manifestations of a cardiac myxoma include TIAs and ischemic strokes. Although intravenous tissue plasminogen activator (IV tPA) represents the gold standard for acute ischemic stroke (AIS) treatment, its safety and effectiveness in stroke patients with myxoma is not well defined. Previously published literature suggested that IV tPA may be a safe treatment in these patients. Accordingly guidelines consider reasonable treatment with tPA in these case (Class IIb, Level of Evidence C).

We report a case of fatal intracranial hemorrhage (ICH) following IV tPA in a patient with AIS caused by a cardiac myxoma.

Case: 50 y/o man without prior medical history presented to the ED with 2 hours of left hand weakness and clumsiness. NIH Stroke Scale=3. Vitals Signs: BP 161/109, HR: 134, RR: 20, glucose: 104. EKG: possible widened P waves and sinus tachycardia. No contraindications to tPA were identified. He was treated with tPA and gradually improved in the initial hour post tPA. During infusion, BP was maintained <180/105mmHg.

Patient's mental status suddenly and rapidly declined with Glasgow Coma Scale (GCS) of 3. Head CT showed a right frontal ICH with mass effect and midline shift and early hydrocephalus. Patient was intubated and tPA was reversed No surgical evacuation of the ICH was indicated.

He had elevated troponins (1.72 at baseline to 18). Bedside echocardiogram showed a large left interatrial mass suggesting myxoma. Patient expired 3 days later. Autopsy confirmed a myxoma.

Discussion: Per published literature there are 23 cases of AIS associated cardiac myxoma treated with thrombolytic therapy. In these cases bleeding resulted in limited and small hemorrhages without clinical deterioration.

Our patient suffered a fatal ICH shortly following IV tPA treatment raising the possibility of increased risk in this population.

Fernando Cuascut

Advisor(s): Susan Law

The Effect Of Patient Characteristics On Recognition By Emergency Medical Service (Ems) Providers At Kings County Hospital Center

Purpose/Background/Objectives: Faster door-to-needle time has long been a key metric for acute stroke intervention. Early intervention with intravenous tPA and intra-arterial tPA administration have been associated with improved stroke outcomes. One of the important modalities of the door-to-needle paradigm is the role of EMS. Timely stroke recognition by EMS is the first step to increase chances of intervention, hence recovery. However, accurate stroke diagnostic can be challenging especially with a wide variety of stroke symptoms and complaints. The goal of our study is to identify patient characteristics that impacting pre-hospital identification of stroke en route to Kings County Hospital Center (KCHC).

Design/Methods: A retrospective study using a cohort of suspected stroke patients based on dispatch from January 2015 through December 2015, we evaluated and analyzed stroke detection by EMS. Patient who were transported by EMS within 6 hours of symptoms onset and with stroke like symptoms were included in the study. Strokes cases were evaluated at KCHC as per the AHA Get with The Guidelines (GWTG) national registry.

Results: 76 cases were identified: 76% ischemic strokes, 17% intracranial hemorrhage, 7% had a final alternative diagnosis. The sensitivity of EMS provider stroke detection is 38% (25-52%, 95% CI) and a positive predictive value of 85% (68-93%, 95% CI). Compared to correctly identified cases, missed stroke by EMS tend to lack weakness as a chief complain. Of interest, patients with confirmed intracranial hemorrhage diagnosis (n=13) were less likely to be identified as a stroke, EMS sensitivity 15% (2%-45%, 95% CI). These patients tend to have altered mental status (AMS), dizziness or headache with vomiting as their main complaint. Furthermore, dispatcher call type of stroke, AMS and weakness were found to be more likely to have a true stroke diagnosis.

Conclusions/Implications for Practice: Unfortunately, EMS providers failed to recog

Rafael Flores-Obando

Advisor(s): Charles Abrams

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, Cx47P87S causes 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 and colocalizes with the staining of the ER resident chaperone Grp94 compared to the puncta staining of Cx47WT and Cx47I33M. Also, 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 as well as an increased activation of Caspase-3. These results indicate that in primary OLs severe mutations in Cx47 protein, but not Cx47I33M, lead to ER protein retention, activation of the UPR pathway and apoptosis. Ongoing studies will determine the effect of Cx47P87S and other mutations in OL morphology and function.

Yoshimi Hisamoto

Advisor(s): Geetha Chari

Catatonia As A Rare Manifestation Of HIV-Associated Psychosis In Adolescents.

Objective: We report an adolescent patient with HIV associated psychosis presenting with catatonia.

Background: New onset psychosis occurs in 0.23-15% of HIV-positive patients as its neuropsychiatric complication with no evidence of other attributable causes. Catatonia has been reported as a rare manifestation of HIV-associated psychosis. In English literature worldwide, there have been six reported cases of HIV-associated psychosis presenting with catatonia. Of those six cases, most of them presented in the third to fourth decades of life, and only one patient was in the adolescent age group.

Design/Method: In this presentation we describe a case of an adolescent who presented with acute onset of psychosis accompanied by catatonia, who then was discovered to have HIV infection, without evidence of other causes.

Result: This is a 19-year-old right-handed African American young man with no significant past medical and psychiatric history, who presented with 10-day history of paranoid and bizarre behavior. On admission, patient was noted to be catatonic. He was stuporous with mutism, negativism and agitation without external stimuli. Neurological exam was remarkable for catalepsy with waxy flexibility. He was then found to be positive for HIV-1. CSF studies were negative for evidence of CNS infections. Autoimmune encephalitis antibody panel including NMDA-R antibody was also negative. CT of the head and MRI of the brain showed diffuse mild atrophy. Treatment was initiated with triple antiretroviral therapy, antipsychotics and lorazepam as needed. His neuropsychiatric symptoms improved gradually over the following months. At 6 months follow-up, he regained most of his functions, although there was some concern with his memory.

Conclusion: We described the second reported case of HIV-associated psychosis presenting with catatonia in adolescent age group. Although rare, HIV should be considered in the evaluation of new-onset catatonia, even in adolescent population.

Roudjesse Charles, Khearona Chev and Jeskia Donney

Advisor(s): Mary Valmont

The Effect Of Bmi On The Mean Size Of Nailfold Capillaries In Diabetic And Hypertensive African Americans In Brooklyn

Background: Nailfold capillaroscopy is a non-invasive technique used to view the morphology of the capillaries embedded beneath the nail folds. This technique can be used to determine the risk of development of future complications in patients with diabetes and hypertension.

Objective: Investigate the effect of BMI on the Mean Size of Nailfold Capillaries in Diabetic and Hypertensive African Americans in Brooklyn

Methods: Sample size consisted of 20 participants over 18 years with an average BMI of $28.54 \pm 4.85 \text{ kg/m}^2$. Spearman Rho test was used to determine the correlation between mean capillary size and BMI. An independent sample t-test was conducted to determine if there was a difference between mean capillary size in healthy and unhealthy participants. Unhealthy patients were defined as those with hypertension and/or diabetes.

Major Results: Results indicate that there was not a statistically significant correlation between: BMI and mean capillary size ($r=0.32$, $p=0.17$), between healthy ($\hat{I}^2_{\text{healthy}}=0.02380$, $\hat{I}^2_{\text{unhealthy}}=0.001153$), and unhealthy participants ($\hat{I}^2_{\text{unhealthy}}=0.02890$, $\hat{I}^2_{\text{unhealthy}}=0.002510$) ($t=-1.847$, $p=0.081$).

Conclusion: Mean capillary size was not correlated to BMI, nor was there any distinction between healthy and unhealthy patients. All the patients had the same mean capillary size of $0.026 \text{ mm} \pm 0.007 \text{ mm}$. Recommendations for future studies include recruiting more participants from other racial groups.

Ayde Amir and Jessica Green

Advisor(s): Mary Valmont

The Relationship Between Predialysis NaCl Intake And Albumin Levels In African-American/Afro-Caribbean Dialysis Patients

Background: Hemodialysis patients adhere to dietary and fluid restrictions to limit IDW gain and prevent malnutrition. However, patients don't always follow restrictions which results in fluid retention and consequently hypertension.

Objective: Improve the quality of care through the investigation of the relationship between predialysis NaCl and albumin levels in female and male hemodialysis patients.

Methods: The sample size was 129 patients (66 female;63 male). Patients were 18+ years and of African-American/Afro-Caribbean descent. Information was gathered on gender, age, NaCl, HGB, K+, albumin, CO2 and Cl-. Data was analyzed through SPSS, linear regression, Pearson correlation and Independent sample T-tests.

Major Results: Correlation between NaCl and albumin levels showed $p=0.058$; $r=0.167$. Predictive ability of NaCl on albumin had $p=0.029$; $f=3.653$. Difference in mean NaCl intake between men and women ($\delta \text{ } \alpha^{\dagger}_{\text{female}}=2576.77 \pm 1156.89$, $\delta \text{ } \alpha^{\dagger}_{\text{male}}=3463.25 \pm 1512.08$) had $p<0.001$, $t=-3.727$.

Conclusion: No relationship between NaCl and albumin found. Higher NaCl intake in men compared to women. Women follow diets more frequently and are more concerned with weight control. This suggests that the quality of care for hemodialysis patients would improve if men have stricter salt restrictions than women.

Michael Bistoury and Christian Salisbury

Advisor(s): Mary Valmont

Barbershop Talks With Brothers Project As A HIV Intervention On Condom Use In Heterosexual African American Men

Background: There are disproportionately high rates of HIV in Central Brooklyn for heterosexual Black men which the BTWB project is addressing through health education.

Objective: The Barbershop Talks With Brothers (BTWB) project is an HIV prevention program for heterosexual Black men in central Brooklyn. BTWB's objective is to educate these men about HIV and motivate them to practice safe sex.

Methods: Participants are screened at local barbershops, to be eligible they have to be: HIV negative, >18 years old, and have engaged in sex within three months. They take an Audio Computer Assisted Self Interview Baseline Survey (ACASI) before and after the educational intervention. We were interested in researching the change in condom use among participants. McNemar tests were used to analyze the data in SPSS.

Major Results: There was no significant change in behavior in men that did not use a condom, despite making an excuse to use one, when their partners did not want to, ($p=0.791$). However, there was a statistically significant change in participant responses before and after the +intervention regarding overall refraining from condom use ($p=0.01$).

Conclusion: The overall decrease in sex without a condom could be due to the knowledge they received during the intervention. While effective in this regard, future interventions similar to BTWB should strengthen their focus on having inclusive conversations with their partners.

Tyra Andus, Zakiya Briggs and Gloryjah Robinson

Advisor(s): Mary Valmont

Bathing Habits And Pruritus In The Afro-Caribbean Community Of Central Brooklyn

Background: Pruritus, more commonly known as an itch, is mainly a result of dry skin. Dry skin maybe a result of bathing habits, including temperature and/or duration of baths/showers.

Objective: There is a lack of literature addressing the presence of pruritus in the Afro-Caribbean Community and its possible relation to bathing habits. We expect to see that the frequency of bathing and the temperature of the water to be contributing factors to pruritus within this community.

Methods: Surveys, measuring respondents' bathing habits and scale of skin irritation were administered to patients at the Asthma and Allergy Clinic. The questions include: duration and frequency of baths, as well as a 5-D Pruritus Scale that measures the effect of pruritus on patients.

Major Results: Of the 15 respondents, length of time bathing: 55%, 5-10 minutes, 45%, 10-20 minutes. Water temperature: 9% lukewarm, 73% warm, and 18% bathed in hot water. Pruritus, hours per day: 67% itched <6 hours; 11% itched 6-12 hours; and 22% itched all day. Of the people that recorded that they itch: 44% mild, 11% moderate, and 11% was severe. This was a descriptive study and there were no significant findings.

Conclusion: One of the major limitations of this study was sample size, process of collecting data, and coding the information. Further research needs to be conducted in order to draw stronger connections between pruritus and bathing habits in the Afro-Caribbean community.

Denis Cherkalin

Advisor(s): Aditya Maheshwari

Total Hip Arthroplasty For Gun Shot Injury Induced Secondary Arthritis Of The Hip: What Are The Outcomes?

Introduction: Although most reports focus on acute management of gunshot wounds (GSW) around the hip, the literature is meager on detailing the management and outcomes of patients with primary total hip arthroplasty (THA) for posttraumatic arthritis after a GSW.

Methods: We retrospectively analyzed our prospectively collected total joint arthroplasty database from 2011 to 2015 to identify patients who had undergone a primary THA with a history of prior GSW to the same hip by a single fellowship trained adult reconstructive surgeon. Medical records and discharge summaries were reviewed to collect patient demographics, clinical, radiographic, and patient-reported outcomes. A Student's t-test was utilized to determine any the significance of the changes.

Results: Nine male patients underwent THA with a prior history of GSW. Mean age of 59 years (range 44 to 77 years) and a mean BMI of 30 kg/m² (range 24 to 42 kg/m²). The mean follow-up time was 24 months (range 8-60 months). Mean HHS score significantly increased from 43 (range, 9 to 73) and to 83 (range, 67 to 94), $p = 0.0001$. Mean VAS significantly decreased from 8 (range, 7 to 10) to 2 (range, 1 to 5), $p < 0.0001$. Mean UCLA significantly improved from 3 points (range, 2 to 5) to 7 (range, 5 to 9); $p < 0.0001$. Mean SF-36 physical component significantly improved from 27 (range, 15.2 to 42.5) pre-operatively to a mean of 49 (range of 43 to 58.4); $p < 0.0001$. Finally, Mean SF-38 mental component score significantly improved from 51 (range of 40 to 61), to a mean of 57 (range of 54 to 61); $p = 0.019$.

Conclusion: Significant improvement was shown in hip function, activity, and pain levels in patients undergoing THA with a history of GSW. Although they can be technically demanding, a THA seems to be a safe and effective procedure to reduce pain and improve function for GSW induced hip arthritis.

Jonathan Chevinsky

Advisor(s): Aditya Maheshwari

Septic Arthritis Of The Native Knee After Intra-Articular Injection Of Corticosteroids: A Systematic Review

Introduction: Intraarticular corticosteroid injections have been used in the conservative treatment of osteoarthritis and rheumatoid arthritis for the past several decades. While most patients obtain relief from these injections, it is not without known risks. The most damaging and possibly life threatening complications being septic arthritis. To our knowledge, this is the largest systematic review looking at septic arthritis in the native knee following to the use of intra-articular steroid injections. Methods: In December of 2016, a systematic review of the literature was performed on the Medline (PubMed), Ovid, and Embase databases. Studied analyzing septic arthritis attributed to the prior use of intra-articular steroid injections to the knee were included. The patient's demographics, past medical history, and clinical course were analyzed. Results: A total of 9 studies, published between 1976 and 2012, were found reporting on 35 cases of septic arthritis after corticosteroid injection of a native knee. The mean age was 61 (range 44-87 years), with 25 females, and 10 male patients. Past medical histories included, diabetes, tuberculosis, acute myelogenous leukemia, breast cancer, end stage renal disease, rheumatoid arthritis, hypertension, and coronary artery disease. The most common cultured organisms were Staphylococcus aureus (11), Mycobacterium massiliense (9), methicillin-resistant Staphylococcus aureus (2), and various other organisms. Treatments included 19 patients who had a total of 26 arthroscopic and 22 open washouts and debridement, 4 arthrodesis, 2 total knee replacements. One patient underwent an above knee amputation and eventually died due to a septic shock. Conclusion: Septic arthritis in the native knee is a rare but under reported complication of intraarticular injections. It is important to take into consideration the past medical history, and use proper sterile technique to prevent costly and possibly life threatening complications.

Patrick Mixa

Advisor(s): Aditya Maheshwari

Publication Rates And Changes In Authorship At The Aaos And Aahks Annual Meetings; 2013 To 2015

Introduction: In adult reconstruction surgery, the American Academy of Orthopaedic Surgeons (AAOS), and the American Association of Hip and Knee Surgeons (AAHKS) annual meetings provide the most up-to-date knowledge through podium and poster presentations. For presentations between 2013 and 2015, there is paucity of information on the publication rate, change in authorship, time to publication and impact factor (IF) of the journals where these presentations were published.

Methods: This is a comprehensive search of all posters and podiums that were presented at AAHKS, and adult reconstruction sections of the AAOS annual meetings 2013-2015. Published presentations were identified by computerized search on the Medline (PubMed) and Ovid databases using the key words. The publication rates for each annual meeting was calculated, and compared using Fischer's exact test. The mean changes in authorship, and journal IF were compared using a Student's t-test.

Results: AAHKS had higher publication rate for 2013 (The overall publication rate for the three years was comparable between AAOS and AAHKS (56% vs. 55%, $p=0.676$). For podiums only, AAHKS had significantly higher publication rate (73% vs. 61%, $p=0.004$). However, both had comparable rates for posters (48% vs. 49%, $p=0.815$). Similarly, IF and mean authors were similar (2.82 vs. 2.83 $P=0.915$) and (5.2 vs 5.3 $P=0.572$), respectively. The mean authors added and removed when the abstract went to publication was (0.8 vs. 0.7 $P=0.203$) and (0.7 vs. 0.6 $P=0.722$) respectively.

Discussion: The AAOS the AAHKS annual meetings present a similar overall rate of publication, changes in authorship and impact factor in regards to Adult Reconstruction. AAHKS Podium presentations had highest publication rate with almost 3 out of 4 podiums being PubMed indexed by minimum of 2 years.

Qais Naziri

Advisor(s): Aditya Maheshwari

Is Orthopaedic Department Teaching Status Associated With Adverse Outcomes Of Primary Total Hip Arthroplasty?

Purpose: The purpose of this study is to compare outcomes of patients undergoing total hip arthroplasty (THA) between teaching vs. non-teaching in regard to complications and 90-day readmission. **Methods:** A total of 60,894 patients underwent primary THA (2009 – 2012) in the New York Statewide Planning and Research Cooperative System. Perioperative medical and surgical complication categories were created using ICD-9-CM diagnosis codes. Costs were calculated using cost-to-charge ratios. Mixed-effects regression models accounted for hospital clustering and year of surgery and were controlled for age, gender, race, insurance, major complication or comorbidity status, and Deyo comorbidity score. **Results:** Mean length of stay was longer at teaching compared to non-teaching hospitals (3.77 vs. 3.71 days; $p=0.002$), (beta: 5.2%, $p=0.007$). Perioperative medical complications were less common at teaching hospitals (3.7% vs. 4.7%; $p<0.001$) (OR=0.88, $p=0.122$). Perioperative surgical complications were similar at teaching hospitals (0.8% vs. 0.9%, $p=0.130$), (OR=0.99, $p=0.948$). Mean costs were higher at teaching hospitals (21,568 vs. 19,579 USD; $p<0.001$) (beta: 15.3%, $p<0.001$). Disposition to inpatient rehabilitation was more common at teaching hospitals (20.4% vs. 14.2%, $p<0.001$), (OR=2.40, $p<0.001$). The rate of unplanned 90-day readmission was less common with patients undergoing THA at teaching compared to non-teaching hospitals (6.1% vs. 7.2%, $p<0.001$), (OR=0.95, $p=0.249$). **Conclusion:** Primary THA at teaching hospitals is associated with higher costs, increased length of stay and increased utilization of inpatient rehabilitation facilities. Teaching hospitals did not significantly differ from non-teaching hospitals in terms of inpatient complications or unplanned 90-day readmission.

Dean Perfetti

Advisor(s): Aditya Maheshwari

Is Orthopaedic Department Teaching Status Associated With Adverse Outcomes Of Primary Total Knee Arthroplasty?

Purpose: The purpose of this study is to compare outcomes of patients undergoing total knee arthroplasty (TKA) between teaching vs. non-teaching in regard to complications and 90-day readmission. **Methods:** A total of 98,669 patients underwent primary (2009-2012) in the New York Statewide Planning and Research Cooperative System. Perioperative medical and surgical complication categories were created using ICD-9-CM codes. Costs were calculated using cost-to-charge ratios. Mixed-effects regression models accounted for hospital clustering and year of surgery and were controlled for age, gender, race, insurance, major complication or comorbidity status, and Deyo comorbidity score. **Results:** Mean length of stay was longer at teaching compared to non-teaching hospitals (3.85 vs. 3.69 days; $p < 0.001$), (beta: 4.6%, $p = 0.014$). Perioperative medical complications were similar at teaching compared to non-teaching hospitals (4.9% vs. 4.7%; $p = 0.144$) (OR=1.09, $p = 0.200$). Perioperative surgical complications were less common at teaching hospitals (0.5% vs. 0.8%, $p < 0.001$), (OR=0.78, $p = 0.047$). Mean costs were higher at teaching compared to non-teaching hospitals (20,875 vs. 18,500 USD; $p < 0.001$), (beta: 12.8%, $p < 0.001$). Disposition to inpatient rehabilitation was more common at teaching compared to non-teaching hospitals (28.2% vs. 16.0%, $p < 0.001$), (OR=2.57, $p < 0.001$). The rate of unplanned 90-day readmission for patients undergoing TKA at a teaching compared to non-teaching hospital was similar (7.1% vs. 7.4%, $p = 0.135$), (OR=1.01, $p = 0.835$). **Conclusion:** Primary TKA at teaching hospitals is associated with higher costs, increased length of stay and increased utilization of inpatient rehabilitation facilities but borderline decreased surgical complication rates and no differences in 90-day unplanned readmission rates when compared to non-teaching hospitals.

Ross Ingber

Advisor(s): Bassel Diebo

Is Procalcitonin An Accurate Marker Of Postoperative Orthopaedic Infections? A Systematic Review And Meta-Analysis

Background: Procalcitonin (PCT) is a serologic marker that increases following inflammatory stimuli, especially those of bacterial origin. Postoperative orthopaedic periprosthetic infections (PIs) are common and difficult to diagnose. There are no guidelines on how best to incorporate PCT levels into the diagnosis and management of such infections, whether during the acute or chronic phase. This study aims to systematically review the literature to evaluate the statistical measures of performance of PCT as a marker of orthopaedic PI.

Methods: Following PRISMA guidelines, 762 studies were evaluated. After screening, 11 studies were included in the systematic review and 6 in the meta-analysis. The negative likelihood ratio (NLR), positive likelihood ratio (PLR), and diagnostic odds ratio (DOR) for pooled studies were determined. Additionally, pooled sensitivity and specificity were calculated for included studies. NLRs, PLRs, and DORs were calculated for PCT. Statistical heterogeneity across studies was tested using I².

Results: The weighted random effect pooled sensitivity for PCT was 67.3% (35.0-88.7; $p < 0.001$) whereas pooled specificity was 69.4% (37.6-89.5; $p < 0.001$). Patients with infections were found to have a significantly increased likelihood of having an elevated PCT test while those with no infection had low PCT levels (PLR=1.778 (1.184-2.670), $p = 0.005$, NLR=0.423 (0.267-0.671), $p < 0.001$). The pooled unweighted diagnostic odds ratio for PCT was 5.770 (2.512-13.251), $p < 0.001$.

Conclusions: This study is the first meta-analysis investigating the ability of PCT to detect PIs in orthopaedic surgery patients. PCT was found to be significantly elevated in infected patients as compared to non-infected patients. Additionally, this study has shown that overall utility of PCT is superior to that of many other serologic markers used in current practice. Additional and higher level studies should be performed to create guidelines for accurate serologic diagnosis of PIs.

George Beyer

Advisor(s): Carl Paulino

Adult Spinal Surgery In Patients With Previous Tha: Should We Do The Spine First?

Introduction: Patients with Spine-Hip syndrome could require both THA and spinal fusions. There is conflicting literature examining the outcomes of these patients when spinal fusion occurs after THA. **Methods:** A retrospective review of NY State Department of Health database (SPARCS) was performed. ICD-9 codes identified adult patients who underwent elective THA (2009-2011). Patients with subsequent spinal fusion (Short: 2-3 levels or Long: ≥ 4 levels; AIS or DDD) were identified. Univariate analysis and multivariate binary logistic regression models were used. **Results:** 50,300 THA patients were included (No fusion: n=49,579, short: n=484, long: n=237). Groups had comparable age, gender, and Deyo score. At 2 year FU, THA complication rate (3.4, 6.6, 11.8%), dislocation rate (1.7, 3.5, 7.2%), and hip enthesopathy/bursitis (1.0, 2.7, 2.5%) progressively increased between groups, $p < 0.05$. The THA revision rates also increased (3.7, 7.3, 11.6%, $p < 0.05$). Subsequent THA rate was significantly higher in Long fusion only (12.6%, 11.4%, 17.7%, $p < 0.05$). Regression models revealed that short and long increased the risk of dislocation by OR: 2.2 (1.4-3.6), OR: 4.4 (2.7-7.3), increased the risk of any THA complications by OR: 2.1 (1.4-3), OR: 3.9 (2.6-5.8), and THA revision for any reason by OR: 2.0(1.4-2.8), OR: 3.2(2.1-4.8). Only long fusion increased the rate of subsequent THA by OR: 1.5 (1.1-2.2). All OR $p < 0$. **Conclusion:** ASD surgery increases the risk of complications and revisions in patients with THA. Long spinal fusion pts had 4.4 greater odds of dislocating their hip, 3.2 and 1.5 greater odds of revising the same hip, or experiencing subsequent THA.

Steven Burekhovich

Advisor(s): Carl Paulino

Adolescent Idiopathic Scoliosis Care In An Underserved Inner-City Population: Screening, Bracing, Patients' And Parents' Reported Outcomes

Introduction: Underserved populations are a momentous challenge in the modern health-care system. Our objective was to investigate the quality of previous care received by underserved AIS patients. **Methods:** Pts who visited a single surgeon clinic for primary AIS from June 2016-January 2017 were included. Patients had 36 \times 36 \times inch full spine x-rays and completed a survey on demographics, health-care (screening for scoliosis, bracing, referral etc.), socioeconomic parameters and patient-reported outcomes: SRS-30, Body Image Disturbance Questionnaire (BIDQ). Parametric and non-parametric analysis was used appropriately. **Results:** 47 pts (15 \pm 3 y/o, 82.7% F, BMI: 20.3 \pm 3.3, 67.3% Black, 17.3% Hispanic) were included. 25.5% reported a family history of scoliosis, while 42.6% never heard about scoliosis. Based on SRS recommendation, 15 pts required observation, 22 pts were brace eligible, 10 pts were surgical candidates. 25% of pts were never screened for scoliosis, and 50% of those had a main curve $\geq 20^\circ$. Mean age at first screening was 14.1 \pm 3.3 y/o. 65.6% were screened by a primary care physician, 6.3% by a specialist, 6.3% by schools. 70% of surgical candidates reported never wearing a brace. 59.3% of previously screened pts eligible for bracing (Curve $\geq 20^\circ$), were not braced at time of presentation. All pts who were unbraced when eligible had worse BIDQ scores (1.7 vs. 1.4, $p < 0.05$). **Conclusion:** 1/4 children in our population were never screened for scoliosis, and nearly 3/5 did not receive optimal care. These results question the quality and authenticity of the healthcare services provided to underserved inner-city populations.

Frank Cautela

Advisor(s): Carl Paulino

Disseminated Intravascular Coagulopathy In Pediatric Scoliosis Surgery: A Systematic Review

Introduction: Disseminated intravascular coagulation (DIC) is an extremely rare comorbidity of scoliosis surgery. Limited literary reports create a need for data on causality and prevention.

Methods: A comprehensive search of Medline (PubMed), EMBASE, and Ovid databases was performed. Pediatric patients who experienced DIC with corrective scoliosis surgery were included. Patients were characterized based on demographics, past medical history, surgery performed, clinical course, probable causes of DIC, and outcomes. Results: 11 studies met the inclusion criteria and 13 patients (mean age 15.5 ± 4.4 years, 72% F) were identified, from 1974-2012. They included 7 neuromuscular (54%), 2 congenital (15%), 2 idiopathic (15%), 2 tumor-induced (15%) scoliosis patients. There were no histories of a prior bleeding disorder. Procedures included 7 posterior segmental fusions (54%), 4 Harrington rods (31%), 1 Cotrel-Dubousset (8%), and 1 unit rods (8%). 8 patients experienced DIC during the intraoperative period, 5 patients during the post-operative period. DIC was associated with coagulopathy after re-infusion of intra-operatively retrieved blood, infection from transfusion, rhabdomyolysis, and application of hemostatic matrix, heparin use, and hypovolemic shock. The most common complications were increased intraoperative blood loss (8 cases) and hypotension (7 cases). The mortality rate was 7.69%; one reported fatality in the acute post-operative period. Conclusion: 13 cases of DIC associated with scoliosis surgery were reported in the literature. Despite the lack of prior bleeding disorders in the patients' past medical histories, associative variables between DIC and corrective scoliosis surgery were identified in pediatric patients. Further studies are needed to determine predictive factors for DIC events.

Bassel Diebo

Advisor(s): Carl Paulino

Impact Of Preoperative Spinopelvic Alignment On Outcomes Of Total Hip Arthroplasty (Tha)

Introduction: In patients undergoing THA, postoperative component alignment may be affected by un-assessed spino-pelvic mal-alignment. Methods: This is a single center retrospective review of patients that underwent THA (2013 - 2016) for degenerative joint disease. Office notes were used to collect demographics, pre-op examination, and post-op complications or symptoms. Pre-op lateral lumbar xrays measured to assess spino-pelvic alignment (PT, PI, SS, PI-LL). Degree of spondylolisthesis and degenerative changes were assessed. Post-op acetabular anteversion, area of the acetabulum, femoral offset, Theta angle, and Neck Shaft Angle were measured. Patients were grouped based on spino-pelvic alignment thresholds (SRS-Schwab classification). Results: 48 patients with a mean age of 62.8 ± 8.8 . Average post-op AP pelvis x-ray was 4 months. Mean spino-pelvic parameters: PI-LL 8.3 ± 17 , SS 41 ± 9.9 , PT 18.2 ± 12.9 , PI 59.2 ± 15.9 . Patients with PI-LL > 10 had significantly higher acetabular anteversion after THA (25.2 vs. 20.6° , $P=0.044$), and greater acetabular abduction (Theta: 43.7 vs. 38.4° , $P=0.049$). Patient with PT more than 20 had also increase Theta angle post operatively (43.8 vs. 38.4). Patients with SS < 40 had increased area of the cup on AP pelvis. PI-LL was significantly correlated with anteversion $R=0.300$, $P=0.043$. Patients stratified into those with severe degenerative lumbar degeneration or spondylolithesis revealed no difference in their acetabular anteversion or abduction. Conclusion: Patients with PI-LL > 10 or PT > 20 had greater acetabular anteversion and abduction after THA. Spinopelvic alignment should be assessed preoperatively in each patient undergoing THA and for surgical planning.

Joshua Lavian

Advisor(s): Carl Paulino

Comorbid Psychiatric Diagnoses Are Associated With Poor Outcomes Of Adult Spinal Deformity Surgery At 2 Year Follow Up

Introduction: Recent research revealed that 1 in 3 patients (pts) admitted to the hospital to undergo surgical treatment for Adult Spinal Deformity (ASD) are psychologically impaired. However, previous data was limited to the hospital course only.

Methods: A retrospective review of NY State Department of Health database (SPARCS) was performed. ICD-9 codes identified ASD pts admitted from 2009-2011 who underwent ≥4 levels of thoracolumbar fusion, minimum 2yr follow-up. At admission, pts who had a clinical psychiatric diagnosis based on DSM IV were grouped (Psych). Univariate analysis compared demographics, complications, revisions and readmissions. Multivariate binary logistic regression models identified independent predictors of outcomes. Age, gender and Deyo score were covariates.

Results: 4,691 pts (Psych, n=817, 17.4% vs. NoPsych, n=3874, 82.6%) were included. Age (59.51 years) and gender (58.4%) were similar between groups. Within Psych, frequencies were 57.4% Depressive Disorder, 33.4% Sleep Disorder, 33.2% Anxiety Disorder, and 6.2% Stress Disorder. At minimum 2yr follow-up, Psych had significantly higher complication rates (47.1 vs. 32.5%), specifically device related complications (19.3 vs. 10.8%), sepsis (4.3 vs. 0.9%), infection (8.3 vs. 3.8%), hematoma (4.0 vs. 1.4%), and DVT (4.5 vs. 2.0%). Psych had higher readmission rates (85.6 vs. 49.6%) and higher revision rates (34.5 vs. 16.0%), ($p < 0.001$). Regressions revealed that Psych had increased risk of any complication: [OR: 1.59 (1.36-1.86)], revision surgery [OR: 2.54 (2.14-3.03)], and any readmission [OR: 4.32 (3.48-5.36)], all ($p < 0.001$).

Conclusion: Despite similar demographics, ASD pts with psychiatric diagnoses were more likely to experience surgical complications and revision. Psychological screening/support may benefit ASD treatment.

James Messina

Advisor(s): Carl Paulino

Relationship Between Spinal Curvature, Physical State, And Mental Status In An Underserved Population With Adolescent Idiopathic Scoliosis

Introduction: Differences in functional outcomes exist between ethnicities in AIS patients. This study assesses the correlations between spinal curvature, physical and mental state in an underserved population. Methods: Patients (10-25 y/o) who visited a single surgeon clinic for evaluation of primary AIS in 2016-2017 were included. Patients had complete full radiograph series and patient reported outcomes (PRO) [Scoliosis Research Society (SRS)-30, Spinal Appearance Questionnaire (SAQ) and Body Image Disturbance Questionnaire (BIDQ)]. Pearson/Spearman correlation investigated the relationship between radiographic parameters and PRO. Controlled regression models identified predictors of PRO. Results: 47 patients (66% Black, 19.1% Hispanic) were included. Average Main Cobb angle was $31.3^{\circ} \pm 17.3$ with locations of: 34.6% MT, 34.6% L, and 21.2% TL. BIDQ score reported the highest significant correlations with main and secondary curve magnitudes ($r=0.559$, $r=0.612$), and offset between CSVL and secondary Cobb apex ($r=0.537$), all ($p < 0.05$). SAQ Child reported better correlations with curve magnitude comparing to SAQ parent of any category. Regressions revealed C7PL offset from main Cobb apex was significant predictor of worse SAQ Parent appearance ($R^2=0.223$, B Coeff. 0.473). Younger age and male gender were significant predictors of better SRS30 Pain Score (B Coeffs: -0.395, and 0.357, respectively, $R^2=0.387$). Younger age (< 15 y/o) was the only predictor of better Mental Score ($R^2=0.140$, B Coeff. 0.374). Conclusion: Curve magnitude correlates with worse body image disturbance, mental state, and self-image. Children appear to have better deformity perception than parents. Females and those older than 15 y/o exhibit worse mental state with coronal deformity.

John Moon

Advisor(s): Carl Paulino

The Scoliosis Research Society Annual Meeting Over The Last Decade: A Review Of Trends And Authorship

Introduction: Podium and poster presentations at SRS annual meetings (AM) go on to publication, and influence evidence based medicine. Investigation of authors and institutions who presented their studies over the last decade allows us to better understand the diversity, expertise, and affiliations of those researchers.

Methods: Using the available programs from 2008-2016, a database was created for all the podiums and posters (traditional and E-Posters). The title, authors, and country of origin were extracted. A search was performed on physician databases, the PubMed database, and the Google search engine to determine the gender and the institutional affiliation of each first author in the year/month of presentation. Statistical analysis using loop and selective aggregation was performed to identify top authors, affiliations, and track trends in the annual meetings over time.

Results: In 8 years, 1,916 presentations (1106 podiums and 810 posters) from 46 countries were presented by 3,678 authors at SRS AM. Female first authors increased from 5.4% in 2008 to 11.2% in 2016, and international first authors increased from 25.8% to 42.6%, $p < 0.05$. Of all authors, 56.1% had MD, 14.9% had PhD, 7.9% BS and 6.9% MS degrees. The top 3 authors over the last 8 years were: Lawrence G. Lenke (11% of all presentations), Keith Bridwell (7.25%), and Frank J. Schwab (7.2%). Wash U was the top institution ($n=105$), followed by NYU Hospital for Joint Diseases ($n=65$) and Johns Hopkins ($n=63$). Female first authors increased from 5.4% in 2008 to 11.2% in 2016, $p=0.03$, and international first authors increased from 25.8% to 42.6%, $p < 0.001$. The #1 Study Group was International Spine Study Group ($n=106$), followed by Harms (53) and Growing Spine (33).

Conclusion: Top 10 authors and institutions were presented in this 8 year systematic review of the scientific programs of the SRS AM. Female and international first authorship has also increased significantly.

Daniel Murray

Advisor(s): Carl Paulino

Hepatitis C: Does It Increase The Risk Of Complications After Cervical Radiculopathy Or Myelopathy Surgery?

Introduction: Hep C is a world-wide epidemic. This study investigates Hep C as a risk factor for surgical complications in cervical radiculopathy (CR) and myelopathy (CM) patients. Methods: This study is a retrospective review of the Nationwide Inpatient Sample from 2005-2013. ICD-9 codes identified patients (≥ 25 yrs) with/without Hep C who underwent anterior or posterior cervical spine surgery for CR or CM. Descriptive and Chi-Square analysis compared complication rates and mortality of patients with and without Hep C. Binary logistic regression models identified independent predictors of complications, length of stay (LOS), and hospital charges. Results: 227,310 patients were identified (Hep C: 2,546, 0.11%). Hep C patients were younger (52.8 vs 53.6 y/o), had higher Deyo score (0.788 vs 0.461), more likely male (60.8% vs 47.8%), black or Hispanic, and less likely to have private health insurance (35.9% vs. 55.5%), (all $p < .001$). They had significantly ($p < 0.01$) longer hospital stays (4.1 vs 2.3 days) with greater charges (\$76,335 vs \$54,615). CR patients with Hep C had increased overall complication rates (9.4% vs 6.5%, $p < .001$), specifically, device related, hematoma and sepsis. The same holds true for CM patients with Hep C (14.8% vs 11.5%, $p < .001$). Regressions showed CR+CM patients with Hep C had increased chances of any complication (CR: OR 1.23, CM: OR 1.19), longer LOS (CR: OR 1.74, CM: 1.86), and greater hospital charges (CR: OR 1.52, CM: OR 1.73). Conclusion: Hep C is a risk factor for increased overall complication rates, greater LOS, and greater charges among CR and CM patients.

Frank Segreto

Advisor(s): Carl Paulino

Vertebral Osteomyelitis: A Comparison Of Outcomes In Patients With Early Versus Delayed Surgical Treatment

Introduction: The recommended timing of surgical intervention for vertebral osteomyelitis (VO) is controversial. This study investigates in-hospital outcomes of VO patients who underwent surgery on the day of admission (<24hrs), vs. delayed (>24hrs) treatment. **Methods:** A retrospective review of the National Inpatient Sample was performed. ICD-9 codes identified operative VO patients from 1998-2013. Patients were divided into 6 groups (G1-G6) based on incremental delay of surgery. A neurologic index (NI) was created using the American Spinal Injury Association impairment scale (NI 0: no neurologic deficit, NI 1: incomplete neurologic deficit, NI 2: complete neurologic deficit). Univariate analysis compared demographics, complications, mortality, and NI. Multivariate logistic regression models calculated independent predictors of any complication, mortality, and NI. Group 1 (<24hrs) was the reference. **Results:** 34,485 patients were identified. Delayed surgical groups were older (G1: 53.5 vs. G5: 61.1 y/o), had increased Deyo score (G1: 0.4901 vs. G6: 1.66), length of stay (G1: 4.2 vs. G6: 34.04 days), all $p < 0.001$. Delayed surgical groups had higher combined anterior/posterior approach rates (G1: 9.1% vs. G6: 31.5%), and lower anterior surgical approach rates (G1: 42.4% vs. G6: 24.2%). Regressions revealed all delayed surgical groups (G2-G6) as the strongest independent indicators. G6 was the greatest predictor of any complications (OR 3.384), mortality (OR 10.658), and NI > 0 (OR 4.823), all $p < 0.001$. **Conclusion:** Patients with delayed surgery had a significantly increased risk of developing any complication, mortality, and discharging with neurologic deficits. Our data shows it's favorable to operate within 24 hours of admission for VO patients.

Neil Shah

Advisor(s): Carl Paulino

Should Decision Making For Lower Instrumented Vertebra Go Beyond Traditional AIS Classification? A Dynamic 3D Gait Assessment Of Adolescent Idiopathic Scoliosis

Introduction: AIS surgeons determine lower instrumented vertebra (LIV) based on static xrays. This study investigates whether this decision affects postoperative walking patterns.

Methods: Patients underwent gait assessment and full spine radiographs. Gait analysis was performed in a 6-DOF motion analysis laboratory, sampling frequency was 100 Hz. 34 reflective markers were placed on each patient, who underwent straight-line walking trials. Pts were grouped based on lower instrumented vertebra (LIV) into: Cephalad (LIV: T12, L1 or L2) and Caudal (LIV: L3 or L4). BL and 1yr FU demographics, radiographic and gait parameters were compared between LIV groups. Logistic regression models identified independent characteristics of LIV groups.

Results: 37 patients were included (Cephalad (n=15, 15.2 y/o, 87.5% F) vs. LIV (n=21, 15.1 y/o, 71.4% F), $p > 0.05$. Average UT, TH, or LL curves were similar between the groups (~26, 53 and 28°, $p > 0.05$). Thoracolumbar curve was smaller in Cephalad (33.1 vs. 55.2°, $p < 0.01$). Groups at 1 yr FU had similar correction, with Caudal having a larger TL curve (19.9 vs. 12.5°, $p = 0.025$). Pts with Caudal LIV had smaller range of motion (ROM) of the pelvis in the horizontal plane (7 vs. 10.6°, $p = 0.017$), less knee flex/ex ROM during the entire gait cycle (46.6 vs. 56.9°, $p = 0.043$) and less plantar flexion in stance phase (-23 vs. -30.9°, $p = 0.006$), affecting their walking speed (1.1 vs. 1.2 m/s $p = 0.045$). These patients spent significantly more time with knee extension in stance (39.5 vs. 33.1 ms, $p = 0.016$), to increase stability of the extended limb while transferring the contralateral limb. Increased plantar flexion [OR: 1.7 (1.1-2.7)] and decrease hip horizontal range of motion [0.65 (0.43-0.96)] remained significant characteristics of Caudal LIV patients, $R^2 = 0.670$, $p = 0.004$.

Conclusion: Walking patterns for AIS patients were significantly affected after surgery. Our data shows that determining LIV should take into account the dynamic consequences.

Barrett Torre

Advisor(s): Carl Paulino

Comorbid Psychiatric Diagnoses Are Associated With Poor Outcomes Of Adult Cervical Spine Surgery At 2 Year Follow Up

Introduction: Psychological burden of cervical radiculopathy (CR) and myelopathy (CM) is established. The impact of this burden on long term outcomes after surgery is poorly understood. **Methods:** A retrospective review of NY State Department of Health database (SPARCS) was performed. ICD-9 codes identified CR or CM patients (pts) admitted from 2009-2011 who underwent anterior or posterior cervical surgery, minimum 2 year follow-up. Pts who had a clinical psychiatric diagnosis based on DSM IV were grouped (Psych). Univariate analysis compared demographics, complications, revisions and readmissions. Multivariate binary logistic regression models identified independent predictors of outcomes. Age, gender and Deyo score were covariates. **Results:** 20,342 pts (Psych, n=4,819, 23.7% vs. NoPsych, n=15523, 76.3%) were included. Age (52.4 years) was similar, Psych had more females (58.6 vs 47.8% p<0.001). Psych Disorders were Depressive (57.8%), Anxiety (28.1%), Sleep (25.2%), and Stress Disorder (2.9%). Percentages of anterior, posterior, primary and/or revision surgeries were similar between groups. With minimum 2yr FU, Psych had significantly higher complication rates (13.9 vs 10.3%, p<0.001), specifically device related (5.6% vs 3.7%, p<0.001), and infection (2.0 vs 1.3%, p<0.001). Psych patients had higher revision surgeries (11.9 vs 9.4%) and re-admittance rates (47.1 vs 39.0%), all P < 0.001. Regressions revealed that Psych had increased risk of any complication [OR: 1.39 (1.26-1.54)], revision surgery [OR: 1.25 (1.13-1.39)], and any readmission [OR: 1.36 (1.27-1.46)]. **Conclusion:** Nearly 1 in 4 CM/CR surgical candidates were psychologically impaired, and more likely to have surgical complications, readmission or revision after surgery. Psychological screening/support may benefit CM/CR treatment.

Peter Zhou

Advisor(s): Carl Paulino

Global Sagittal Angle (GSA) Defines The Fan Of Full Body Alignment

Introduction: Predicting full body sagittal alignment following adult spinal surgery is a challenge for surgeons. Defining the relationship between surgically modifiable parameters and established full standing parameters such as Global Sagittal Angle (GSA) might be of benefit.

Methods: Inclusion: Patients(pts) ≥18 yrs with full body stereographic x-rays with various spinal pathologies. Exclusion: Pts with radicular complaints, fractures, tumor and congenital diseases. Pts were stratified based on published normative reference of GSA (Knee-S1 vs. Knee-C7) into: G1: GSA < -3, G2: GSA (-3 to 3), G3: GSA > +3 and G4: GSA > +6°. Surgically modifiable angles that don't change based on patients' positioning were compared between groups. ANOVA and Bonferroni analysis were used, p<0.05 significance threshold.

Results: 3,606 patients were included. Groups significantly differed in Age (G1: 37.5, G2: 51.2, G3: 62.4, G4: 66.6), BMI (23.5, 25.8, 28.3, 28.9) and gender (86, 65, 61, 69%). Groups significantly differed in GSA (-4.2, 0.2, 4.5, 7.3°). T1PA, T4PA, T9PA and L4PA progressively increased; T1PA: (0.3, 11, 20, 25.8), T4PA: (-2.5, 7.5, 16.1, 21.5), T9PA: (-4.3, 4.2, 11.5, 15.8), L4PA: (6.5, 9.7, 12.6, 13.4°), all p< 0.05. Apex of cervical lordosis, thoracic kyphosis and lumbar lordosis was similar among groups p>0.05. Cervical spine groups had greater C0-C2 (13.8, 14.9, 15.9, 16.6°), C2-C7 lordosis (-4.2, 3.4, 8.3, 11.5°), and C2-C7 SVA (20.3, 21.3, 24.0, 26.7 mm), all p<0.05. Groups below the GSA start point had greater ankle dorsiflexion: (3.3, 4.9, 6.9, 8.0°), p< 0.05.

Conclusion: Predicting how a patient stands postoperatively is a challenge for surgeons. This study proposes thresholds of surgically modifiable parameters that correlate with GSA measured full body sagittal postural alignment.

Karen Paltoo

Advisor(s): Emmanuel Illical

Continuing The Paradigm Shift For The Management Of Extra-Articular Distal Humerus Fractures

Introduction: The purpose of this study is to describe the surgical technique for single column, dual plate fixation using a lateral paratricipital approach for comminuted EADHF, identify fractures that require this technique, and retrospectively look at approach and fixation strategies completed over a 10 year period. **Methods:** All patients with AO/OTA 12 and 13-A2/3 fractures treated with a posterior approach were included. Group A was a retrospectively analyzed multi-surgeon cohort from 2006-2016. Group B was a prospectively collected single surgeon cohort from 2015-2016 using only a lateral paratricipital approach and single column fixation. **Results:** Group A had 28 patients using various surgical approaches. The majority of constructs were dual column, dual plate (16). Only nine had single column, single plate fixation. Group B had 15 patients only using a lateral paratricipital approach. The majority of constructs were single column, single plate (11). Four patients required single column, dual plate fixation. All single column, single plate fixation constructs (Group A+B) were posterior/posterolateral. Group A dual column, dual plate fixation were all posterior/posterolateral + medial. Dual plating was done at surgeon discretion (no specific criteria). Group B single column, dual plate fixation was employed only if the medial column could not be anatomically reduced. In both groups there were no plate failures. All fractures united without complication. **Conclusion:** EADHF can be treated with single column plate fixation via a lateral paratricipital approach. Single column, dual plate fixation can be employed for comminuted fractures that have traditionally advocated for dual column fixation.

Westley Hayes

Advisor(s): Jaime Uribe

Rotational Deformity Of The First Ray Precludes Accurate Distal Metatarsal Articular Angle Measurement In Hallux Valgus

Introduction: The distal metatarsal articular angle (DMAA) is used to assess correction of hallux valgus postoperatively. No studies have examined if the DMAA accurately assesses the rotational component of hallux valgus correction.

Methods: The diaphysis of the 1st metatarsus and the 1st metatarsophalangeal joint of 8 cadavers were fixed with a cylindrical bolt passed transversely through the talus. The bolt was perpendicular to the long axis of the metatarsus and parallel to the plane of simulated foot weight bearing. AP X-rays were taken at 15° caudad. The foot was then dorsiflexed 90° with a longitudinal X-ray taken to verify initial rotation. A transverse, diaphyseal first metatarsal osteotomy was performed. The distal fragment was internally rotated 15° and an AP image was taken. Specimen was dorsiflexed 90°, with a longitudinal X-ray taken for axial rotation measurement. This was repeated for 30, 45, and 60° distal fragment internal rotation.

Results: Pearson correlation (0.97) was positive between the pre-set and measured angle ($p < 0.001$), confirming the accuracy of the pre-set angles. IMA remained stable for each AP image despite distal segment rotation ($\hat{I} \pm 0.05$). Rotation occurring in the first metatarsal osteotomy contributed no additional angulation to metatarsal alignment. The DMAA differed significantly ($\hat{I} \pm 0.05$) as distal segment rotation increased. There was no significant trend of variance.

Conclusion: DMAA measurement varies significantly with rotation of the distal first metatarsus. Caution is advised using the DMAA to assess first MP joint congruency, as it may inaccurately estimate the 3-dimensional deformity often encountered in pathologic hallux valgus.

Harleen Kaur

Advisor(s): William Urban

A Radiographic Analysis Of Closed Reduced Distal Radius Fractures At The Time Of Union

Purpose: The purpose of this study is to quantify the efficacy of closed reduction and casting as a form of definitive treatment, using radiographic parameters of Distal Radius Fractures in the coronal and sagittal planes at time of union and during the post-reduction period.

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 (coronal plane: radial height, radial inclination; sagittal plane: volar tilt and teardrop angle) were measured on initial injury and post-reduction films. Another set of measurements was taken on films at time of fracture union, with mean follow-up of 6.4 months (range: 2-51). 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 pre-reduction 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 post-reduction 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 post-reduction radiographs, there was regression of all parameters toward initial injury measurements at the time of union. Future studies with correlation of radiographic parameters and clinical outcomes are warranted.

Kwaku Opare-Sem

Advisor(s): William Urban

Non-Contact Sports Participation In Adolescent Idiopathic Scoliosis: Effects On Parent And Patient Reported Outcomes

Introduction: The benefits vs risks of AIS patients participating in sports is controversial. This studies objective was to determine if sports participation has a significant impact on pain, function, mental status and self-perception in AIS patients and their parents.

Methods: Patients (10-25 y/o) who visited a single surgeon for evaluation of primary AIS in 2016-2017 were included. Patients had full radiograph series and completed patient reported outcomes (PRO) surveys [Scoliosis Research Society (SRS)-30, Spinal Appearance Questionnaire (SAQ) and Body Image Disturbance Questionnaire (BIDQ)]. Patients were grouped into those participating in non-competitive sports (Sports) vs those that did not (Non-Sports). Parametric and non-parametric tests were used appropriately, comparing demographics, radiographic parameters and PRO. Linear regression models identified significant predictors of PRO. Results: 52 patients were included (Sports n=32, Non-Sports n=20). Groups had comparable age, gender, BMI, bracing status, and hx of physical therapy; all $p>0.05$. Sports and Non-Sports had similar coronal deformity: Major Cobb (31.1° vs 31.5°). All sagittal alignment profiles were similar between groups ($p>0.05$). Sports had better SRS-30 (Function, Self-Image, and Total) scores, better SAQ-Child Expectations, and SAQ-Parent Total Scores (Table; $p<0.05$). Regressions revealed that Major Cobb (B Coeff. -0.300) and Sport Participation (B Coeff. 0.415) were significant predictors of SRS-30 Function score, $R=0.431$, $P<0.05$. Conclusion: Our data shows that for the same coronal and sagittal deformity, patients participating in sports exhibited better functionality, self-image, lower expectations, and better parental perception of deformity. AIS patients should be encouraged to participate in safe sports, maintaining appropriate levels of physical activity.

Andrew Yang

Advisor(s): William Urban

Improvement In Sleep Quality After Carpal Tunnel Release

Carpal tunnel syndrome (CTS) has multiple implications on patient quality of life. In particular, CTS may impact quality of sleep, causing sleep deprivation in extreme cases. Carpal tunnel release (CTR) surgery may aid in resolving these disturbances. The purpose of our study was (1) to determine whether patients who have undergone CTR have improved sleep quality and (2) the timeline for such improvement. Twenty-one patients were prospectively enrolled and followed-up for two years. They were asked to complete a Pittsburgh Sleep Quality Index (PSQI), a pain visual analogue scale (VAS), a sleep perception VAS, and both components (Symptom Severity and Functional Status Scale) from the Levine questionnaire. Patients had overall improvement in their postoperative outcome measures; however, the improvement in PSQI became significant at the 12-24 month follow-up while both of the VAS scores significantly improved at an earlier 6 month follow-up. Both components of the Levine questionnaire significantly improved in the immediate postoperative period. Our findings allow surgeons to counsel their patients on realistic expectations following carpal tunnel release and its impact on sleep quality.

Anmol Goyal

Advisor(s): Maria-Anna Vastardi

Anaphylaxis: Impact Of A Targeted Educational Intervention On The Knowledge And Practices Of Pediatric Residents

Introduction: Anaphylaxis is a life-threatening systemic hypersensitivity reaction. Food allergy is the most common cause for anaphylaxis in children. Over the last decade, food allergies have increased by 50% and hospital admissions for severe allergic reactions by seven fold. Prevention of anaphylaxis mortality depends on correct diagnosis and early epinephrine injection. Studies show that current pediatric training does not include adequate education regarding anaphylaxis recognition and management. **Methods:** An anonymous survey was distributed to pediatric residents. Survey tool consisted of 13 multiple choice knowledge questions and 4 demographic questions. A teaching intervention was performed which consisted of a lecture with demonstration on how to use Epi-Pen. World Allergy Organization (WAO) guidelines posters were distributed in pediatric resident continuity clinic, inpatient ward and pediatric emergency department. Post-intervention survey was re-distributed 1 week after intervention. **Results:** 42 residents responded to the pre-intervention survey. 35 responded to post-intervention survey. 50% respondents were PGY1, 26% PGY2 and 10% were PGY3 or above. 62% had seen a case with anaphylaxis and 76% had a prior Allergy and Immunology(A&I) rotation. The mean composite knowledge score was 66% pre-intervention and 82% post-intervention, $p < .001$. There was no significant difference in knowledge scores between residents who had prior anaphylaxis case exposure, emergency room or A&I rotation. **Conclusions:** Pediatric residents have poor knowledge of anaphylaxis in the clinical setting, requiring improved educational interventions, with the ultimate goal of improving patient outcomes. Posters depicting anaphylaxis guidelines with hands on training in the use of epinephrine autoinjectors made a significant difference in residents knowledge in identifying and preventing life threatening anaphylaxis. Next step is to determine whether this knowledge is retained over time

Swashti Agarwal

Advisor(s): Sheila Perez-Colon

Role Of Social Factors In Glycemic Control Among Minority Children And Adolescents With Type 1 Diabetes

Objectives: With the rising incidence of Type 1 diabetes (T1DM), it is important to recognize deficiencies in care to provide better resources for T1DM patients. The objective of the study was to recognize self reported social factors and compliance barriers affecting A1c level in minority children and adolescents with T1DM.

Methods: Study questionnaires were distributed to patients with T1DM during pediatric endocrine clinic visits at our institution. Knowledge score (KS) was calculated based on 14 questions. Patients' charts were reviewed retrospectively. T-tests, one-way ANOVA and Spearman correlation were used for analysis.

Results: Eighty four T1DM patients, ages 3 to 21 years, 52% males, 87% African American participated in the study. Mean A1c was 10.4% and mean KS was 10.1 out of 14. There was no significant correlation ($r=0.12$, $p=0.26$) between A1c and patients' KS. Patients with more frequent blood sugar (BS) checks (3-4 x/day) had 2 points lower A1c (9.6 vs 11.6 %, 95% CI 0.2-3.7, $p=0.03$) than those with 2 or less x/day. There was no significant difference in A1c between 3-4x/day vs ≥ 4 x/day BS checks. Some patients reported "forgetfulness" (20%) followed by "time consuming" (17.8%) and "discomfort checking around friends" (14%) as important barriers to BS checks. Most patients (85%) reported friends were aware of the diagnosis. There was no significant difference in A1c between pen or pump users (10.5 vs 10.2 %, $p=0.55$). Frequencies of home supervision are: always (21%), most times (30%), sometimes (25%) and never (24%). Surprisingly, those with home supervision had higher A1c than those without (10.7 vs 9.4 %, $p=0.04$) while there was no significant difference between those with or without nurse supervision at school (10.5 vs 9.9 %, $p=0.33$). Those with happy mood interestingly had higher A1c than those with sad/depressed mood (10.7 vs 9.4 %, $p=0.04$). On multiple linear regression analysis, frequency of BS checks, home supervision and mood were the most sign

Albara Marwa

Advisor(s): Sheila Perez-Colon

Improving Pediatric Residents' Knowledge And Perspectives Regarding The Insulin Pump Using A Novel Educational Workshop

Objectives: As a pilot study, we assessed the knowledge and perceptions of categorical pediatric residents (RES) at our institution and its change following a targeted workshop regarding the insulin pump. An insulin pump (IP) use in patients with diabetes including children in US is increasing as it has proven to be safe and effective in carefully selected pediatric patients.

Methods: All RES at our institution in attendance at a routine noon conference voluntarily participated in a workshop, completing an anonymous survey before and right after the workshop to evaluate knowledge, attitudes and self-reported comfort regarding the IP. The workshop consisted of a didactic lecture followed by insulin pump device demonstration of three commonly available IP. Knowledge score (KS) was based on the total correct responses. Attitudes were assessed via 5-point Likert scale. Frequencies, T-test and McNemar tests were used to analyze data.

Results: Thirty-four completed surveys were analyzed out of 49 RES (69.3%) who attended the workshop (19 PGY1, 8 PGY2 and 7 PGY3). Following the workshop, KS increased significantly ($p<0.001$) with progression in residents' attitudes. More residents reported being comfortable with handling the IP including looking and changing the settings after the intervention ($p<0.001$).

Conclusion: Our study assessed pediatric residents' awareness regarding the IP in view of the increasing incidence of pediatric diabetes and IP use. Following the targeted interventional workshop, the residents' knowledge, attitudes and practices improved significantly. With the continued interest and rising use of the IP in pediatric diabetic patients, in our opinion, the health care team including the residents should have basic knowledge of an IP. Educational intervention like ours are needed to familiarize our future physicians with the IP. This will allow hospitals to provide systematic and safe inpatient use of IP.

Sumeet Arora

Advisor(s): Vivian Chin

Management Of Transient Neonatal Diabetes With An Insulin Pump

Neonatal Diabetes Mellitus (NDM) is a rare disorder that poses several challenges in the diagnosis and management as there is no consensus on the optimal insulin delivery system in neonates. We report our experience of a case of transient neonatal diabetes. Full term baby girl born at 38 weeks with IUGR (2125 grams, 3rd percentile) developed intermittent self-resolving hyperglycemia since DOL 2. She was treated empirically with antibiotics for presumed sepsis. She had severe failure to thrive and only regained her birth weight by 1 month of life. On DOL 29, prior to anticipated discharge, NDM was suspected when routine blood glucose (BG) was elevated. Her significant findings were macroglossia, umbilical hernia, low subcutaneous fat, low-normal c-peptide and insulin levels during hyperglycemia, negative pancreatic antibodies, and a visualized pancreas on sonogram. Genetic testing revealed paternal uniparental isodisomy of chromosome 6 in the 6q23-24 region. She was managed with an IV insulin drip (started at 0.01 units/kg/hr) and transitioned to continuous subcutaneous insulin infusion (CSII) via Medtronic 630G pump using the Sure T- infusion set and weaned off the pump on DOL 55. A basal rate only (0.0025-0.025 u/hr) with diluted 1:10 lispro was used to maintain euglycemia with no episodes of hypoglycemia and less frequent BG checks. She had rapid catch up growth thereafter. Upon follow-up, she has had no recurrence of hyperglycemia. In conclusion, IV insulin drip and CSII for the management of NDM has been described in literature. Using basal only regimen via the newest commercially available Medtronic infusion pump, she was managed successfully without hypoglycemia or need for boluses. By using the Sure-T infusion set the risk of kinking was reduced with only post-infusion induration noted which self-resolved. There are no specific recommendations on weaning protocol for resolving transient NDM and we report our unique experience of weaning off the insulin pump.

Elna Kochummen

Advisor(s): Vivian Chin

Screening For Autoimmune Thyroiditis And Celiac Disease In Minority Children With Type 1 Diabetes

Background: Autoimmune thyroiditis (AIT) occurred in 20% and celiac disease (CD) in 6% of participants in the Type 1 Diabetes Exchange Clinic Registry. The ADA and ISPAD guidelines similarly recommend testing for thyroid function (TFT), thyroid antibodies and TTG IgA (tissue transglutaminase antibody) soon after diagnosis of T1DM. Repeat TFT should be done every 1-2 years or sooner if symptomatic and TTG IgA repeated in 2-5 years. We hypothesize that screening should be revised to reflect the lower prevalence of AIT and CD in our minority children with T1DM.

Methods: An IRB approved retrospective chart review was conducted on children with T1DM in the past 10 years. Age, sex, race, A1C, TFT, thyroid and celiac antibodies were obtained. Statistical analysis with t-tests, Wilcoxon-Mann-Whitney and stepwise regression were performed.

Results: Of 225 children with T1DM with mean age $15.8 \hat{\pm} 5.53$ years, mean A1c $11.1 \hat{\pm} 1.9\%$ who were followed for $6.1 \hat{\pm} 4.0$ years, 53% were female and 86% were Black. Three were diagnosed with Graves' disease (1.3%), 3 with Hashimoto's thyroiditis (1.3%), and 97% were euthyroid. Screening for TFT occurred on average every 1.3 years and for thyroid antibodies every 2.5 years. Positive thyroid antibodies were found in 11%, negative in 57% and unknown in 32%. The positive antibody group had significantly higher mean A1C (11.8 vs. 10.9%, $p=0.03$) and TSH (6.7 vs. 1.6 mIU/L, $p=0.02$) compared to the negative antibody group. Stepwise regression analysis found free T4 ($\hat{I}^2=2.33$) and positive thyroid antibody status ($\hat{I}^2=1$) predicted higher A1C. No biopsy confirmed cases of CD were found when screened on average every 2.3 years. Only 1 had positive TTG IgA and a normal biopsy.

Conclusion: There is lower risk for AIT and CD in our minority population than previously reported in children with T1DM so screening may be considered with less frequency than previously suggested, unless symptomatic.

Gayathri Naraparaju

Advisor(s): Steven Schwarz

Educating Pediatric Residents About Inflammatory Bowel Disease Scoring And Its Application

Background: Pediatric residents take care of IBD (Inflammatory Bowel Disease) patients in various settings. Yet, not many residents are aware of the IBD scoring and its clinical use. IBD scoring provides objective data to assess patients'™ severity of symptoms.

Design: We prepared 14 questions based on the scoring systems, of which 3 questions involved calculating the IBD score. Eighty (80) residents in the SUNY Downstate Pediatric Residency program participated in the study; 100% took the pretest and 92% of them completed the post-test. One month after the pre-test, a monograph describing the scoring systems was emailed to all participating residents. Over one month (six weeks following the pre-test), post-test responses were collected, which included the same 14 questions. We introduced IBD scoring app and online calculators to calculate the scores for the 3 questions which required computing the scores, in the post test.

Outcomes: The data was interpreted by using paired t-test to compare pre-test and post test scores. There was a significant increase in the mean number of correct answers in the post test, both among the entire cohort and within each post graduate level. P-value was statically significant ($p < 0.0001$) for each individual cohort and total cohort. Use of the app and on-line calculator improved the ability of residents to correctly determine disease severity and recognize the need for therapeutic intervention ($p < 0.0001$). Taking care of IBD patients had a positive impact ($p = 0.0025$) and having completed a gastroenterology rotation during residency had no significant impact on test scores ($p = 0.17$).

Discussion: There are no studies in the literature about resident education and IBD scoring as well as the use of tools such as an IBD app or on-line calculator. Our project demonstrated that a combination of didactic and online self-directed learning techniques improves the knowledge and applied skills of residents caring for children and adolescents with IBD.

Ezekiel Melquist

Advisor(s): Stephan Kohlhoff

Eliminating Perinatal HIV Transmission Via Quality Improvement

Background: Elimination of mother-to-child HIV transmission (MTCT) is defined as $< 1\%$ among exposed infants and < 1 case in 100,000 live births. Near elimination of MTCT is a public health success story. With current guidelines, perinatal infection decreased to approximately 2% in the US and Europe. New York state has eliminated MTCT. However, higher rates are reported in low socioeconomic settings and among African Americans. As such, we expected our hospitals to experience a high rate of HIV.

Objective: This study audited potential targets for quality/performance improvement. The hypothesis was that we would find MTCT rates up to 6% (as other studies demonstrated) and that we could identify targets for intervention which would focus on meeting standards of care more effectively.

Design/Methods: We conducted retrospective chart review of MTCT at Kings County Hospital Center and University Hospital Brooklyn, in infants born between 1/1/04 and 12/31/13. During this time, there were ~40,000 births at the two centers, including ~ 500 infants born to HIV positive mothers. Information was collected on risk factors for MTCT.

Results: Four cases of perinatal transmission were identified, giving an estimated transmission rate of 0.8% among exposed infants and 1 in 10,000 live births. Each case had unique characteristics. Two were related to maternal factors; in one, the mother refused to engage in care at all and in the other, the mother was nonadherent despite several interactions with medical care. Two cases were errors relating to reporting of positive HIV test: one was a reporting error, in which a new test was reported in a way that obscured the result. In the second, the mother tested negative initially but later was positive.

Conclusion(s): MTCT is highly unlikely to be completely eradicated, especially when secondary to maternal noncompliance. Of note, our last case of perinatal HIV was in 2012. No single point of failure to intervene was identified.

Aviva Szigeti

Advisor(s): Stephan Kohlhoff

Chlamydia Pneumoniae (Cpn) Induces IFN- γ Responses In Peripheral Blood Mononuclear Cells (Pbmc) From Pediatric Asthma Patients: Effect Of Inhaled Corticosteroids.

Background: *C. pneumoniae* (Cpn), which causes 10–17% of community-acquired pneumonia, is unique in its ability to cause chronic infections without overt disease, and may have a role in triggering asthma exacerbations and subsequent asthma development. This may occur via cytokine imbalance caused by a Th2 response, which induces IgE switching, initiating and perpetuating a chronic inflammatory process. Studies have demonstrated that developing Th1 mediated immunity and producing IFN- γ are critical for clearing chlamydial infections. Persistent or recent infection by Cpn can be identified in vitro by detecting the T-helper cytokine IFN- γ produced by peripheral blood mononuclear cells (PBMC) containing antigen-specific memory T-cells stimulated by Cpn elementary bodies (EBs). Inhaled corticosteroids may have an inhibitory systemic effect on production of IFN- γ .

Objective: To determine the effect of inhaled corticosteroids on the IFN- γ inflammatory response to Cpn in PBMC from pediatric patients with moderate persistent or severe asthma.

Methods: PBMC (1.5×10^6) obtained from patients with moderate persistent or severe asthma were stimulated with Cpn EBs (MOI=0.1) in vitro for 48 hrs. IFN- γ levels in culture supernatants were determined by ELISA. IFN- γ levels were compared between patients receiving inhaled corticosteroids and not.

Nasopharyngeal swabs were tested for Cpn using Real-Time PCR.

Results: 13 subjects (mean age 12.2; range 8-20y; 8M, 5F) with asthma were enrolled, 8 received steroids (budesonide & fluticasone, dosage range 176-1000mcg). None were positive for Cpn by PCR. IFN- γ levels were higher in the 5 patients who did not receive inhaled corticosteroids compared with the 8 patients who did receive corticosteroids (848 ± 956 pg/ml v. 32 ± 36 pg/mL; $P=0.002$) (Mann-Whitney U Test).

Conclusions: Cpn-induced IFN- γ levels were higher in PBMC obtained from pediatric patients with asthma who did not receive inhaled corticosteroids. These findings may have clinical impl

Minyoung Kwak

Advisor(s): Dr. Gainosuki Sukiayama

End-Stage Renal Disease Increases Mortality in Falls with Rib Fractures

Introduction: Falls are the most common mechanism of injury for which patients are admitted to trauma centers in the United States. Patients at highest risk for ground level falls (GLF) include the elderly, who are also more likely to have comorbidities such as end-stage renal disease (ESRD). Patients with ESRD are at higher risk for fractures and bleeding. We performed an observational study of a national database to assess whether ESRD affects outcomes of patients with GLF and rib fractures.

Methods: Using the Nationwide Inpatient Sample (NIS) from 2005-2012, we identified patients 18 years and older, experiencing a fall from standing or similar height (E-codes) with confirmed diagnosis of rib fracture(s) (ICD-9). Cases missing demographic or inpatient death information were excluded. The Trauma Mortality Prediction Model (TMPM) score and the Elixhauser-Van Walraven score were used to assess trauma and comorbidity status respectively. Multivariable logistic regression analysis, using inpatient mortality as the outcome, was performed adjusting for demographics, TMPM score, Elixhauser-Van Walraven score, ESRD status, and presence of hemothorax.

Results: There were 58,095 patients meeting criteria. Inpatient mortality occurred 1,992 patients (3.43%). On a multivariable logistic regression analysis, statistically significant independent variables associated with mortality were age (OR 2.43 [2.21-2.68, 95% CI], $p < 0.0001$), males (OR 1.49 [1.36-1.64, 95% CI], $p < 0.0001$), TMPM score (OR 1.09 [1.08-1.10, 95% CI], $p < 0.0001$), having hemothorax (OR 1.25 [1.09-1.45, 95% CI], $p < 0.0001$), Elixhauser-Van Walraven Score (OR 2.22 [2.09-2.35, 95% CI], $p < 0.0001$), and having ESRD (OR 1.74 [1.35-2.25, 95% CI], $p < 0.0001$).

Conclusion: In this large observational study of a national database, we found that ESRD is highly associated with inpatient mortality for patients after a GLF resulting in rib fractures, even after adjusting for trauma mechanism and sequelae of injury.

Mathavan Sivarajah

Advisor(s): Gratiias Mundakel

Readmission For Jaundice In Newborns 35 Or More Weeks Of Gestation At An Inner-City Hospital: Causes And Risk Factors

Background: Hyperbilirubinemia is the most common reason for hospital readmission for newborns.

Objectives: To identify the causes and risk factors for rehospitalization for jaundice in newborn infants 35 or more weeks of gestation.

Design: Case-control study.

Methods: Charts for infants born at Kings County Hospital, during 2010-2016 were reviewed. Cases were newborns \geq 35 wks who were readmitted with jaundice within 10 days of life. Controls were newborns \geq 35 weeks who were followed up in our clinics, but not readmitted for jaundice. For each case, two controls born on the same day were selected. Pertinent data were recorded for cases and controls.

Results: Of the 14,966 newborns \geq 35wks born during the study period, 177 were readmitted for jaundice (1.18%). 353 controls were selected. All cases were treated with phototherapy and none required exchange transfusion. The main causes for readmission for jaundice were: exclusive breastfeeding (62%), prematurity (19%), G6PD deficiency (18%), and ABO hemolytic disease (15%). We confirmed that as reported in other studies, the following factors were associated with an increased risk for readmission: vaginal delivery, male gender, gestational age \leq 39 weeks, high predischarge bilirubin, early discharge and exclusive breastfeeding. Term and post-term newborns, as well as infants delivered via meconium stained amniotic fluid had significantly lower risk of readmission. However, some risk factors for readmission for jaundice previously reported in the literature, such as maternal age \geq 25 years, primiparity, and lower maternal education were not associated with an increased risk for readmission in our study.

Conclusion: Our study results suggest that some risk factors for readmission for jaundice in inner-city newborns may be different from those described in the literature for US newborns. Prospective studies to prevent hospital readmission for jaundice in this population needs to be explored.

Kimberly Wisecup

Advisor(s): Gratiias Mundakel

G6Pd Deficiency In Newborns Readmitted For Jaundice

Background: G6PD deficiency is an important cause of jaundice in the newborn especially among African Americans. Affected infants are at risk of brain damage/kernicterus unless jaundice is identified and treated early.

Objectives: For newborns rehospitalized for jaundice within the first ten days of life, we aimed to determine differences in the clinical presentation and outcomes between newborns who were G6PD deficient and those who were not.

Design: Case-control retrospective study

Methods: We reviewed the records of newborns \geq 35 weeks of gestation readmitted for jaundice at Kings County Hospital Center, Brooklyn, NY for the years 2010-2016. Cases were newborns who tested G6PD deficient, and controls were those with normal G6PD levels. Pertinent demographic and clinical data were collected.

Results: During 2010-2016, 177 newborns with gestational age 35 weeks or more were readmitted for hyperbilirubinemia. Of these, 97 newborns were tested for G6PD deficiency of whom 33 tested positive and 64 tested normal. No statistically significant differences between the two groups were found for maternal age, birth weight, age at discharge from the hospital, bilirubin levels before discharge, age at readmission, or bilirubin, hematocrit and reticulocyte levels at readmission. On subset analysis G6PD deficient newborns were more likely to have a serum bilirubin level of \geq 20 mg/dL at the time of readmission. All newborns readmitted for jaundice, including those who tested G6PD positive, responded well to phototherapy and no infant required exchange transfusion or developed kernicterus.

Conclusions: 1. Among newborns readmitted for jaundice, G6PD deficient newborns are clinically indistinguishable from G6PD normal newborns 2. Hemolysis does not play a significant role in contributing to jaundice seen in G6PD deficient newborns and 3. With appropriate follow-up, most G6PD-deficient, jaundiced newborns can be detected and treated in time to prevent kernicterus.

Natalie Bannietts

Advisor(s): Stephan Kohlhoff

Seroprevalence Of Chlamydia Trachomatis In Inner-City Children And Adolescents' Implications For Vaccine Development

Background: Prevention of *C. trachomatis* infection is an ideal application for a vaccine program, which should optimally be administered before sexual debut. However, there are limited epidemiologic studies of *C. trachomatis* infection in an unselected pediatric population since universal screening and treatment of pregnant women was implemented in the USA in 1993.

Methods: Anonymized serum samples were obtained from children <21 years of age in 2 medical centers in Brooklyn, New York from 2013 – 2015. Anti-*C. trachomatis* IgG antibody was determined by a validated enzyme immunoassay. Infants <1 year of age were excluded from the final analysis due to interference of maternal antibody.

Results: 1002 sera were included in the final analysis. 57% were females. No antibody was detected <11 years of age. Anti-*C. trachomatis* IgG antibody was detected in 9.1% (73/806) of subjects ≥11 years of age and seropositivity increased with age. There was no significant difference in the distribution of age at infection (AaI) between the centers ($P = .432$), but a difference was detected between genders ($P = .012$) with a higher percentage of female subjects testing positive.

Conclusions: Antibody was first detected at 11 years of age, likely coinciding with sexual debut. The prevalence of antibody was higher and appeared earlier in females, mirroring national surveillance trends based on nucleic acid amplification testing. The delay in male antibody detection may be due to biological or behavioral differences between the genders. These data are critical in informing potential *C. trachomatis* vaccine strategies. A compartmental heterosexual transmission model developed by the CDC concluded that a hypothetical chlamydia vaccine given at age 14 – 15 years could potentially eliminate chlamydia infection and is cost-effective. However, initiation of vaccination at age 14 may be too late for our population and may not be applicable globally.

Sibel Guzel

Advisor(s): Sukhvinder Ranu

Early Onset Gbs Sepsis In Newborns- Effect Of Perinatal Prevention Guidelines

Background: Incidence of neonatal Group B Streptococcus (GBS) disease has decreased to 0.3/1000 live births after universal screening for GBS and increased use of Intrapartum antibiotic prophylaxis (IAP) therapy. However challenges remain as interval conversion of maternal colonization, low sensitivity of the standard cultures, suboptimal collection techniques and low levels of colonization.

Objective: To determine the local incidence of GBS EOS for term and late preterm newborns, the significance of clinical, laboratory and maternal risk factors in assessing GBS risk.

Methods: The study was conducted at Kings County Hospital as a retrospective electronic chart review of all term and late preterm babies born between Jan 2010 and Dec 2014, who were evaluated for EOS. Fisher exact test was used to compare these babies in terms of 10 potential risk factors.

Results: Our hospital had 12,268 deliveries over the study period of 5 years, 3659 newborns were admitted to NICU. 771(21%) of admitted newborns were evaluated for EOS. 667/ 766 (87%) mothers were screened for GBS. 189 / 667 (28%) mothers were screened positive. Of these 154 (81%) received adequate prophylaxis. None of the babies born to these mothers had GBS infection. 19 newborns had positive blood cultures, 5 of them were considered contaminant, 14 (1.9 % of evaluated newborns) were true positives. GBS was the most common organism 7/14 (50%). Incidence of GBS sepsis was 0.57/ 1000 live births. All the mothers of GBS positive infants were negative for GBS colonization except one was unknown. None of these mothers received intrapartum antibiotic prophylaxis.

Conclusion: Our study confirmed that the current perinatal screening guidelines for prevention of GBS sepsis still leaves an important number of newborns at risk for early onset GBS sepsis. Easy availability of rapid molecular testing is warranted in order to improve accuracy of standard perinatal screening technique and to detect late colonization.

Krittika Joshi

Advisor(s): Tena Meseret

Differences In Safe Sleeping Practices Between Mothers Of Neonates Discharged From Nicu Versus The Well Baby Nursery

Background: The AAP recently reiterated guidelines pertaining to safe sleeping environments in infants in October 2016. An important recommendation is that Neonatal Intensive Care Unit (NICU) healthcare providers should both endorse and model SIDS risk-reduction recommendations from birth. Currently there is sparse recent data regarding differences in emphasis of safe sleeping guidelines by providers in the NICU versus the well baby nursery (WBN).

Additionally, reported literature shows variable levels of staff knowledge and discharge teaching of supine positioning in the NICU setting.

Objective: The objective of our study was to determine the incidence of supine positioning and safe sleeping surface of newborns and to compare results between infants discharged from NICU versus the Well Baby Nursery.

Design/Methods: Subjects were parents of newborns discharged from an academic tertiary care inner-city perinatal center. 175 mothers completed an anonymous questionnaire querying their newborn's sleep position and sleep surface at their first newborn clinic visit after hospital discharge. 74 responses were obtained from mothers whose infants were discharged from NICU and 101 from WBN. The primary outcome measures were the differences in percent of correct survey practice responses in the 2 groups.

Results: The overall incidence of supine positioning was 96%. 91.8% of NICU mothers reported supine positioning versus 99% of WBN mothers ($P=0.0172$). The most common non-supine sleep position reported by NICU mothers was side-positioning. The overall incidence of use of safe sleeping surface reported was 96.5%. No significant difference ($P=0.67$) existed between NICU mothers (97.2%) and WBN mothers (96%) in use of safe sleeping surface.

Conclusion(s): We found a significant difference between the incidence of supine positioning during sleep amongst infants discharged from the NICU versus the WBN. We theorize that this may be due to practice of non-supine positioning in NICU.

Rachel Levene

Advisor(s): Michael Keenaghan

Procedural Skill Competence And Confidence Among Pediatric Senior Residents

Background: Clinical exposure is the primary vehicle to develop technical skills in pediatric residency yet the majority of senior residents do not feel prepared in several ACGME required procedures. While many studies have characterized poor procedural confidence among pediatric residents; few have objectively evaluated procedural skill competence and associated confidence levels.

Objective(s): To assess pediatric senior resident competence in peripheral IV placement (PIV), lumbar puncture (LP) and neonatal intubation (NI), and to determine if skill competence is associated with self-reported procedural confidence.

Design: Senior pediatric residents from a large academic program were enrolled. Skill confidence was rated with a pre-assessment survey. Skill assessment checklists were scored by faculty observing the resident perform all three procedures on infant patient simulators. A post-workshop confidence survey was distributed.

Results: 44 residents participated; PGY2 ($n=21$) and PGY3 ($n=23$). Overall mean competency scores were: PIV (80%), LP (76%) and NI (64%). PGY3s had higher means compared to PGY2s: LP (79% vs 71%, $p<0.05$) and NI (71% vs 56%, $p<0.05$). There were no significant differences in skill competency means when compared with confidence levels, across all three skills. Post session confidence improved by 11% ($p<0.05$), 16% ($p<0.0001$) and 9% ($p<0.05$) in PIV, LP and NI, respectively. 95% of residents found the workshops to be beneficial.

Conclusion(s): Senior pediatric residents did not demonstrate skill mastery defined by a competency score of 80% or higher, in NI and LP. Mastery was achieved in PIV. Overall, self-perceived skill confidence was not associated with skill performance proficiency; demonstrating confidence is unlikely to be a valid predictor of competence; however, confidence improved post simulation in all three procedures. Residents who participated, felt simulation workshops were beneficial, and would improve their procedural skills.

Michael Henry

Advisor(s): Antoni D'Souza

Comparative Effects Of Probiotics, Prebiotics, And Synbiotics For Restoration Of Paneth Cell Activity In The Terminal Ileum Of Rats Exposed To Intermittent Hypoxia

Necrotizing enterocolitis (NEC) is a devastating disease that occurs in preterm infants. While its pathogenesis is multifactorial, chronic intermittent hypoxia (IH) have led to inflammatory responses consistent with NEC in animal models. Alpha-defensins ($\hat{I}\pm$ -5-D, $\hat{I}\pm$ -6-D), produced by Paneth cells are bactericidal against noncommensal gut bacteria. Probiotics have been shown to preserve intestinal homeostasis and reduce the incidence of NEC. Our objective is to test the hypotheses that: 1) IH adversely affects Paneth cell production of $\hat{I}\pm$ -5-D, $\hat{I}\pm$ -6-D; and 2) Supplementation with probiotics, prebiotics, or synbiotics will improve Paneth cell production of $\hat{I}\pm$ -5-D, $\hat{I}\pm$ -6-D and reduce inflammatory biomarkers for NEC. Design/Methods: At birth (P0), neonatal rat pups (n=18 pups/group) were exposed to IH (50% O₂ with brief 1-minute episodes of 12% O₂), or room air (RA) during which they were either: 1) maternally-fed (MF); 2) hand-fed with unsupplemented formula (FF); or 3) hand-fed with formula supplemented with probiotics (PRO), prebiotics (PRE), or synbiotics (SYN) from P0 to P3. Terminal ileum (TI) was examined for histopathology using H&E. Levels of $\hat{I}\pm$ -5-D, $\hat{I}\pm$ -6-D, IL-8 and IL-17A in TI tissue homogenates were assessed using ELISA.

Consistent with the findings by Grootjans et al. (Gastroenterology 2011), which showed Paneth cell preservation despite exposure to ischemia, our data showed that production of $\hat{I}\pm$ -defensins was conserved during acute IH exposure and supplementation with PRE, PRO, and/or SYN did not significantly influence $\hat{I}\pm$ -defensin production. Elevation of IL-8, a known biomarker for inflammation and NEC, in formula-fed rats exposed to IH was correlated with the severity of damage seen pathologically. Supplementation with PRE, PRO and/or SYN led to lower IL-8 levels and restoration of normal villi architecture consistent with MF rats. Therefore, we conclude that supplementation with PRE, PRO and/or SYN appears to be protective and requires further investigation.

Yan Yan

Advisor(s): Vastardi Maria-Anna

Association Between Obstructive Sleep Apnea And Allergen Sensitization In Pediatric Asthmatic Patients

Rationale: Whether obstructive sleep apnea (OSA) is associated with presence of allergic disease is not fully known. Research has shown that allergic rhinitis is a risk factor for snoring in children and allergic rhinitis might worsen OSA in adults. However there have been no studies on the association between OSA and allergen sensitization in the pediatric age group.

Methods: This is a retrospective case-control study (2010-2013) of pediatric asthma patients (1-21 years) treated in a university based pediatric asthma clinic. OSA was diagnosed in 48 out of 78 patients who were referred for a sleep study with apnea hypopnea index (AHI) \geq 1.5. Specific IgE for aeroallergen sensitization (ImmunoCAP®) was measured. Data were analyzed using t-tests and Chi-square tests.

Results: 75% of children had a positive ImmunoCAP® test indicating sensitivity to allergens in our cohort. Patients with positive ImmunoCAP® tests had significantly higher hypopnea index (p=0.03) but not AHI. There were no significant differences in allergen sensitization, total IgE, absolute eosinophil count, eosinophil percentage, asthma severity or BMI in OSA group compared to non-OSA group. The most common sensitized allergens were dust mite and cockroaches in the OSA group and dust mite and mouse in non-OSA patients. There was higher prevalence in perennial allergen sensitization (dust mites and animal dander) in the non-OSA group compared to OSA group (60.7% vs 35.4% respectively, P=0.15).

Conclusions: Allergen sensitization complicates sleep disordered breathing with hypopneas but is not a significant risk factor for OSA in our cohort. A higher prevalence in perennial allergen sensitization was noted in non-OSA patients.

Noam Fine

Advisor(s): Jeffrey Weiss

Relationship Between Diuresis Rate And The Urge To Void

Objective: To explore the relationship between diuresis rate and urge perception grade.

Methods: Ninety-two bladder diaries were analyzed from men who presented to the Brooklyn VA with lower urinary tract symptoms (LUTS) from 2014-2016. Each diary was recorded over 24 hours and included the subject's bedtime and waking time, the time and volume of each void, and the urge perception grade (UPG) associated with each void. The UPG had five possible responses (0-4), with the lowest score indicating a void without urge and the highest score indicating a void with desperate urge. The diuresis rate (DR) associated with each void was calculated, defined as the volume of urine produced per unit time. The relationship between DR and UPG was analyzed using Spearman's correlation coefficient.

Results: In total, 1118 micturitions were evaluated. The mean ($\hat{\mu}$ ±SD) DR and UPG were 1.59±1.80 ml/min and 2.4±1.0, respectively. The mean intra-subject Spearman's rho was 0.048±0.34 with considerable variation in individual correlations. Among patients, 21 (32%) showed a negative correlation ($r < -0.1$), 16 (25%) showed no correlation ($-0.1 < r < 0.1$), 12 (18%) showed a weak correlation ($0.1 < r < 0.3$), 9 (14%) showed a moderate correlation ($0.3 < r < 0.5$), and 7 (11%) showed a strong correlation ($r > 0.5$).

Discussion: This study suggests that the relationship between DR and intensity of the urge to void is not straightforward. No correlation was found between DR and UPG across the entire cohort, but a moderate to strong correlation was found for a subset of patients. The variability between subjects supports the notion that urgency is multifactorial, with DR being one determinant for select individuals. Distinguishing between individuals is an important consideration in selecting appropriate treatments for patients with LUTS. For patients with a strong correlation between DR and UPG, behavioral therapies that successfully lower the DR may lead to symptomatic improvement.

Daniel Segal

Advisor(s): Llewellyn Hyacinthe

The Addition Of Ceftriaxone To Standard Fluoroquinolone Prophylaxis Before Transrectal Ultrasound Prostate Biopsy Decreases The Incidence Of Post-Biopsy Sepsis: A Single Institution Analysis

Introduction: Prostate biopsy via transrectal ultrasound (TRUS) remains the gold-standard for the diagnosis of prostate cancer (PCa). According to current AUA Guidelines, a fluoroquinolone (FQ) or cephalosporin are first-line options for infection prophylaxis; which remains important with infection rates reported as high as 5.0%. At Kings County Hospital Center (KCHC), patients are given dual therapy with a 3-day course of a FQ and a 1g dose of IM ceftriaxone before the biopsy. We assess the efficacy of our prophylactic dual antimicrobial regimen in preventing the development of post-biopsy sepsis.

Methods: Demographic data from 622 patients who underwent prostate biopsy between 2010-2014 including age, PSA, DRE, and use of medications were collected from the EMR. Patients not receiving dual therapy prophylaxis were excluded. Risk factors for infection such as prior prostate biopsies, foley catheter, other procedures performed within 30 days of biopsy and positive pre-biopsy urine cultures (with species and resistance) were also collected. Data regarding emergency department (ED) visits within 30 days of prostate biopsy were analyzed for urological complaints, infection, and markers for SIRS or sepsis.

Results: Of the 622 patients undergoing TRUS prostate biopsy, 580 (93%) received ceftriaxone and a FQ. The median age was 62 yrs (range 41-93 yrs). There were 24 (4.14%) patients that visited the ED within 30 days of biopsy with urological complaints. Of these patients, 3 (0.52%) met SIRS criteria; 0 (0%) had a positive urine culture. Interestingly, 26 (4.48%) patients were found to be pre-colonized, 7 (1.21%) of which were FQ-resistant, but none of these patients presented to the ED.

Conclusions: Dual antimicrobial prophylaxis using ceftriaxone and a FQ is effective in preventing post-prostate biopsy infection and secondary sepsis. This regimen was shown to be effective in preventing infection in patients that were pre-colonized, even in the setting of FQ resistance.

Ajibola Adedayo

Advisor(s):

Relation Between Microvascular Function And Large Artery Stiffness In African-American Patients With Type-2 Diabetes Mellitus

Rationale: Diabetes is prevalent among African Americans and poses high risk for vascular complications in this population. Socioeconomic factors are known to influence outcomes, true biologic differences in risk factor vulnerability have been suggested. Vascular complications have been viewed as either macrovascular (myocardial infarction and stroke) or microvascular (retinopathy, nephropathy, neuropathy). Better glycemic control improves microvascular but not macrovascular complications. There is growing appreciation that microvascular dysfunction may promote large artery disease and vice versa. Given this notion of vascular “cross-talk” and since subclinical dysfunction is known to precede target organ damage, we sort to determine whether subclinical microvascular dysfunction is related to large artery stiffness.

Methods: 94 patients with diabetes were recruited from outpatient clinics at our institution over a 6-month period. Information was obtained via patient interview and medical record review. Microvascular function was assessed by vascular reactivity index (VRI), which assess changes in digital temperature before and after release of arterial cuff occlusion. Large artery stiffness was assessed by carotid-femoral pulse wave velocity (PWV) using applanation tonometry.

Results: Mean age was 60±0.8 years and 62% were female. 83.8% had hypertension and 84% had dyslipidemia. 16% had estimated glomerular filtration rate < 60ml/min. For the entire group, VRI was significantly correlated with PWV ($r=-.31$, $p<.01$). The correlation between VRI and PWV was stronger in subjects with Hemoglobin A1c levels > 8% ($n=35$) ($r=-.52$, $p<.01$) than in those with A1c levels < 8% ($r=-.2$, $p=0.1$).

Conclusions: Among African Americans with diabetes, subclinical microvascular dysfunction is significantly correlated to large artery stiffness. This relation is stronger in patients with poorer glycemic control. Further study is needed to clarify mediating factors of these relationships.

Ayobami Eluwole

Advisor(s):

Relation Between Glycemic Control And Microvascular Function In Patients With Type-2 Diabetes Mellitus

Rationale: Diabetes mellitus is a well-known risk factor for cardiovascular and cerebrovascular disease. Diabetes has been shown to impair vascular function long before the onset of target organ damage. Diabetes is often accompanied by the presence of other cardiovascular risk factors and co-morbid conditions that contribute to vascular disease and confound assessment. While better glycemic control is known to prevent microvascular but not macrovascular complications, the effects of glycemic control on subclinical vascular dysfunction are less well understood. The objective of this study was to determine whether poorer glycemic control was related to subclinical small and large vessel dysfunction.

Methods: 94 patients with diabetes from our outpatient clinics (diabetes, cardiac, and nephrology) were studied. Medical information was obtained via patient interview and medical record review including laboratory results. HbA1C was determined for all patients. Large artery stiffness was assessed by carotid-femoral pulse wave velocity (PWV) using applanation tonometry. Microvascular function was assessed by the vascular reactivity index (VRI), which assess changes in digital temperature before and after release of arterial cuff occlusion.

Results: Mean patient age was 60±0.8 years and 62% were female. 83.6% had hypertension and 83.9% had dyslipidemia. 16% had estimated glomerular filtration rate < 60ml/min. Mean HbA1C levels were 7.9±2%. Among subjects with HbA1c < 8 there was significant correlation between HbA1c and VRI ($r=-.28$, $p=0.04$) but not with PWV ($r=-0.24$, $p=0.09$). No correlation was found between HbA1c and PWV or VRI in subjects with HbA1c ≥ 8.

Conclusions: Microvascular dysfunction appears to manifest even in ranges of HbA1c values that indicate acceptable glycemic control. The role of glycemic control in the progression of subclinical small vessel dysfunction and factors linking large artery stiffness to macrovascular complications merit further study.

Maushmi Savjani

Advisor(s): Sami McFarlane

Contrast-Induced Thyrotoxic Periodic Paralysis With Normokalemia

We report a case of a 73 y/o Haitian woman with h/o hyperthyroidism secondary to Grave's disease and non-compliance with medications who was admitted for thyrotoxicosis with a storm score of 30. On admission, she was in AFib with RVR. Additionally, she had hyperreflexia, weight loss, proptosis, large goiter and TFTs significant for TSH <0.008 and total T4 >30 . Methimazole, Steroids and Propranolol improved her symptoms; however, her course was complicated by acute onset flaccid paralysis after inadvertently receiving a CT scan with IV iodinated non-ionic radiocontrast (Omnipaque 300 90mL). She had quadriplegia and areflexia with intact sensations. MRI brain and C-spine showed encephalomalacia; acute stroke and transverse myelitis were ruled out. A diagnosis of thyrotoxic periodic paralysis (TPP) was made, which is known to be associated with hypokalemia. However, our patient's potassium was normal.

TPP is an acute onset episode of generalized weakness in the setting of hyperthyroidism. The duration of paralysis can last from hours to days. Thyroid hormone is presumed to upregulate sodium-potassium ATPase activity that drives potassium into the cell, resulting in hypokalemia and hyperpolarization of muscle membranes, which causes inexcitability of skeletal muscles. Restoring euthyroidism generally reverses the paralysis as in our case. TPP is known to be precipitated by many factors including strenuous physical activity, stress, high carbohydrate meal, infections, cold exposure, alcohol intake, menses, pulse corticosteroid therapy and albuterol use. The pathogenesis of iodinated non-ionic radio-contrast in precipitating TPP, especially in the setting of normokalemia is unknown. Three cases of iodine-induced TPP with hypokalemia and several cases of TPP with normokalemia have been previously reported, but contrast-induced normokalemic TPP is being reported for the first time to our knowledge.

Jennifer Martindale

Advisor(s):

Serial Sonographic Assessment Of Pulmonary Edema In Patients With Hypertensive Acute Heart Failure

Objective: The aim of this study was to determine whether repeated lung ultrasound could semi-quantitatively capture changes in pulmonary edema (B-lines) in patients with hypertensive AHF early in the course of treatment.

Methods: We conducted a feasibility study in a cohort of adults with acute onset of dyspnea, severe hypertension in the field or at triage (systolic blood pressure ≥ 180 mm Hg), and a presumptive diagnosis of AHF. Subjects underwent repeated dyspnea and lung ultrasound assessments using a 10-cm visual analog scale (VAS) and an 8-zone scanning protocol. Lung ultrasound assessments were performed at the time of triage, initial VAS improvement, and disposition from the emergency department. Sonographic pulmonary edema (SPE) was independently scored offline in randomized and blinded fashion using a scoring method that accounted for both the sum of discrete B-lines and degree of B-line fusion.

Results: SPE scores from initial to final ultrasound assessments decreased in each of the 20 subject encounters included in the analysis ($\bar{x} \pm 2 = 31.6$, $p < 0.001$). The median decrease in SPE scores between initial and final measurements was 81% (IQR 55%, 99%). SPE scores correlated with VAS scores ($r = 0.64$, $p < 0.001$), but the magnitude of change in these scores did not correlate with each other ($r = -0.04$, $p = 0.89$).

Conclusion: Changes in SPE can be semi-quantitatively measured by serial 8-zone lung ultrasound using a scoring method that accounts for B-line fusion. SPE improves in patients with hypertensive AHF during the initial hours of treatment.

Susane Frith

Advisor(s): Laila Sedhom

Tackling The Problem Of Glucose Management In Type 2 Diabetes Mellitus Patients

Diabetes Mellitus type 2 is a complex global health concern that is associated with many debilitating complications that seriously influence patients' quality of life. According to the International Diabetic Foundation, Diabetes Mellitus type 2 affects an estimated 246 million adults and is expected to increase to 380 million by the year 2025. In the US alone, in 2014 an estimated 29 million people have been diagnosed with diabetes and more than 100 million are at risk for developing the devastating complications of diabetes.

An extensive literature review revealed that self-monitoring blood glucose (SMBG) in combination with oral anti-glycemic agents and proper management effectively lowers HbA1c in patients with type 2 diabetes. In 2014, The American Diabetic Association (ADA) recommended that non-insulin dependent patients should be taught how to use SMBG data to adjust food intake and exercise to achieve specific goals. However, current practice does not recommend SMBG for patients with non - insulin- treated type 2 diabetes. Therefore, the purpose of this study is to demonstrate the effect of SMBG on hemoglobin A1C levels in patients living at home with non - insulin- treated type 2 diabetes. A convenient sample of patients seen at a diabetic clinic that are diagnosed with type 2 diabetes, 18 years and older and on oral anti-glycemic medication will be invited to participate in the study. A t- test will be used to measure the difference in hemoglobin A1C levels between those who use SMBG at home and those who do not. Findings will add to the existing knowledge and will assist in determining if SMBG is helpful in the diabetic management of patients with type 2 diabetes.

Helene Brodsky

Advisor(s): Shirley Girouard

Improving Colonoscopy Bowel Preparation Adherence In An Urban Minority Population: An Evidence-Based Practice Project Proposal

Poor bowel prep may affect up to 30 % of colonoscopies when patients do not fully adhere to the protocol. Missed lesions, increased mortality, & increased health care costs may result. There are many reasons: lack of understanding of the importance, difficulty following instructions, taste & large volumes of agents, or, physical discomfort. The goal of this project is to improve prevention & identification of colon cancer by assuring quality of preps with better patient education & support. Multiple instructional modalities demonstrate improved adherence: educational booklets, videos, follow-up calls, & small group sessions help patients anticipate the experience, & support them during the process. But there is a paucity of studies that have evaluated which instructional modalities work best in urban minority populations. Participating staff will provide enhanced bowel preparation instructions to patients scheduled for colonoscopy using verbal, written, & visual modalities. Patients will receive telephone call reminders 48 hours prior to the procedure & on the day before the procedure to assess the patients' understanding of the instructions & address current concerns (i.e., the need for transportation arrangements or an escort). A quasi-experimental pretest/posttest study will be conducted using a convenience sample in an urban hospital-based endoscopy unit. Following IRB approval, data will be collected before & after the intervention from existing administrative reports. Number of incomplete or cancelled colonoscopies due to inadequate prep will be assessed. T-statistic will be used to determine difference in the numbers inadequate preps before & after. A scale will be used to rate quality of prep. If the intervention results in improved bowel preps, it will become routine in the endoscopy suite. If the intervention is not effective, other interventions will be tested with this population.

Wing Yee Cheung

Advisor(s): Shirley Girouard

Promoting Human Papillomavirus (Hpv) Immunization Among Adolescents: An Evidence-Based Practice (Ebp) Project Proposal

Despite Centers for Disease Control and Prevention (CDC)'s guideline on routine human papillomavirus (HPV) vaccination at age 11, the uptake rates for both genders by age 13 to 15 remain lower than 50% in New York City, imposing risk of future HPV-related cancers among unprotected children. Many providers do not provide parents with strong recommendations and thus, parents are not likely to immunize their children. The goal of the project is to increase HPV vaccine rates of boys and girls aged 11-17 years by increasing parental acceptance of provider recommendations. Providers' strong recommendations were reported as the key parent-focused intervention to promote adolescent HPV vaccine. Research also supported the recommendation message by emphasizing the vaccine efficacy in future HPV-related cancer prevention. Parental attitudes and beliefs about adolescent HPV were validated measures of the intervention effectiveness. Based on evidence in the literature, gynecology providers will give participants recommendations on adolescent HPV vaccination during gynecology consultation. Parents will be given a 2-page CDC supplemental leaflet about teenage HPV vaccination before the consultation. The project is a one-group pretest-posttest design in a local gynecology outpatient clinic. A convenience sample of the parents of children 11-17 years old will, following IRB approval, be invited to complete a 46-item 7-point Likert HPV Attitude and Beliefs Scale developed by Perez and colleagues (2016) before and after intervention. Descriptive statistics will be used and pre- and post-data will be compared by Wilcoxon signed ranks test at a 95% confidence level. If the proposed intervention works, HPV vaccine promotion among parents should be expanded into gynecology settings. If the intervention does not work, additional interventions will be explored to improve the skills of pediatric providers in giving strong recommendation about adolescent HPV vaccination to parents.

Liana Chiew

Advisor(s): Shirley Girouard

Identifying Informal Caregiver Burden In Primary Care: An Evidence-Based Practice Project Proposal

Informal caregivers (ICG), unpaid family and friends, number more than 43.5 million in the United States. Given the number and complexities of caregiving demands, many suffer significant burdens that negatively impact the health and well-being of the caregiver and care recipient. The population of ICG continues to grow with the aging population and increasing disease morbidity. Primary care providers, while focusing on the needs of the care recipient, often overlook the physical and psychosocial needs of the caregiver, especially if that individual is not his/her patient. Goal: To increase the number of primary care providers assessing and supporting ICD needs. Objective: To increase provider knowledge of ICG burden. Surveys of ICG reveal the need for providers to meaningfully engage and assess their needs for education, training, and supplemental social services. Research strongly suggests that the most promising interventions to address caregiver burden in the primary care setting were multimodal approaches that incorporate multidisciplinary education tailored to both the ICG and the healthcare provider. A two-hour, educational class, based on a United Hospital Fund's ICG provider toolkit, will be developed and conducted. Content will include: scope of the problem; assessment; communication strategies and community resources. Participants will explore how to identify ICG and assess for caregiver needs. A descriptive study will be done using a convenience sample of 10 staff at a community-based primary care clinic. Upon IRB approval, pre-test and post-tests will be administered by an investigator. Data will be analyzed using descriptive statistics and t-tests to assess for changes in provider knowledge. The findings may indicate an increase in provider knowledge regarding caregiver burden and appropriate assessment tools. Results will be shared with participants. If intervention is not successful, other strategies will be identified and tested.

Ann DeAngelo

Advisor(s): Shirley Girouard

Mitigating Pain Produced By Propofol: An Evidence Based Project Proposal

Problem: With the injection of the most widely used anesthetic agent propofol, 70% of patients experience pain at the IV injection site. Despite evidence that interventions can alleviate the pain, anesthesia providers often fail to follow an induction sequence to address the problem.

Goal: To decrease the pain experienced by patients from the use of propofol.

Objective: To educate anesthesia providers on best practice to mitigate the pain propofol causes upon injection.

Literature Review: The research suggests that the use of lidocaine effectively reduces the pain produced by propofol and lidocaine paired with venous occlusion is the optimal intervention to alleviate pain.

Project design/Intervention: Conduct a one-time, 30-minute presentation highlighting best practice to mitigate propofol-induced pain for anesthesia providers. The session will be held during morning rounds at an inner city public hospital.

Implementation/Methods: A comparative study design will be used with a convenience sample of anesthesia personnel in an urban hospital. Following IRB approval, an investigator designed survey will be administered before and after the presentation to assess knowledge and intent to employ the recommended changes to practice.

Evaluation: Descriptive statistics and T-tests will be used to assess whether or not this intervention improved knowledge and intent to improve practice to address the clinical problem.

Results: If the intervention is effective, we plan to conduct the same intervention with various local anesthesia groups once a month and assess changes in practice. If our intervention does not work, we will post recommendations and add a tourniquet to the anesthesia work station so practice can be modified at the time of induction.

Nadine Fils-Aime

Advisor(s): Shirley Girouard

Reducing Inappropriately Prolonged Fasting Times Among Elective Surgery Patients: An Evidence-Based Practice Project Proposal

NPO after midnight is commonly used despite more than 20 yrs of ASA fasting recommendations to the contrary. Inappropriately restrictive preop fasting may lead to negative patient experiences & outcomes including irritability, headaches, hypovolemia, dehydration & hypotension. The goal of the proposed project is to reduce inappropriately prolonged fasting by improving periop staff knowledge & attitudes about guidelines. Providers' lack of knowledge, attitudes & perceptions about fasting procedures are associated with inappropriate fasting. Protocol standardization can improve outcomes. When providers were informed about guidelines & facility wide fasting, recommendations were adopted & practice changed. A 30-day facility-wide education program offered at several meetings & forums will be developed by the investigator to introduce appropriate fasting practices & hospital approved preoperative fasting policy. Perioperative personnel will have a class about current ASA fasting guidelines & discrepancies. Information will also be included in the hospital newsletter & practice improvement flyers. A quasi-experimental study using a structured interview tool developed by Crenshaw & Winslow will assess fasting before and after the intervention. Upon approval from IRB, a convenience sample of patients will be interviewed using a 16-question structured interview schedule regarding instructions received & adherence. 25 patients will be interviewed before & 25 patients, after staff education. Data will be analyzed using descriptive statistics and t-tests to assess before & after differences. If patient fasting times are reduced following the program, education will become a regular part of orientation & practice updates. Also, actual fasting times will be assessed quarterly to determine policy adherence. If there is no reduction in fasting, additional interventions such as developing formal policies & procedures & patient instructions can be considered.

Shawn Gumbs

Advisor(s): Shirley Girouard

Increase Provider'S Knowledge About And Attitudes Towards Atelectasis In Obese Patients Undergoing General Anesthesia: An Ebp Project Proposal

Obese patients are at increased risk of intraoperative atelectasis & thus to hypoxemia & postop pulmonary complications. In 38% of obese patients, intraoperative atelectasis may last up to 48 hours postop & contribute to acute lung injury, hypoxemia & pneumonia. In the supine position, increased adipose tissue leads to chest wall compression & displacement of the diaphragm cephalad, decreasing lung volumes. This, the administration of 100% O₂ & decreased release of alveolar surfactant contribute to atelectasis. Several interventions can reduce the incidence of atelectasis among obese patients: elevating the back & the head of the obese patient during induction to increase lung volumes; use of noninvasive positive pressure ventilation during pre-oxygenation; use of 30 to 50% of inspired oxygen to avoid absorption atelectasis; & recruitment maneuvers with the application of PEEP to recruit alveoli & keep them open. Although there is evidence to reduce this complication, interventions are not widely used. Project goal is to reduce atelectasis among obese patients by increasing knowledge & attitudes of providers. A best practices poster will be made and hung in the OR. A class for anesthesia providers will be given on the unit & cover positioning, noninvasive ventilation, & recruitment maneuvers with PEEP. A descriptive study using a pre & post-test questionnaire administered following IRB approval to assess the effectiveness of the educational intervention. A convenience sample of anesthesia providers at an urban hospital will be the subjects. Data will be collected using a researcher designed tool. Data will be analyzed using descriptive statistics & before & after knowledge & attitudes compared using a paired sample t-test. If the poster & one-time class changed knowledge & attitudes, actual practice could be assessed for practice changes & outcomes improvement. If it does not make any difference, alternative & additional interventions can be explored.

Sean Mahoney

Advisor(s): Shirley Girouard

Reducing Clostridium Difficile Infections Using A Liquid Probiotic: A Quality Improvement Project

Hospital-acquired Clostridium difficile infections (CDI) are common in ICU & lead to higher costs of care & adverse patient outcomes including prolonged & complicated hospitalization. Goal: To decrease the incidence of CDI by at least 50% among critically ill patients. Objectives: To use an oral probiotic to reduce CDI rates when coadministered with antibiotic therapy to decrease the incidence of CDI. The literature offers several approaches to solving the problem of CDI. The literature suggests that the implementation of probiotics containing certain strains of Lactobacilli decreases the incidence of CDI in acute care settings in patients receiving antimicrobial therapy. A probiotic containing *L. casei*, *L. bulgaricus*, & *S. thermophiles* will be administered twice daily to patients without contraindications & who are receiving antimicrobial therapy. Staff & patients will be informed of intervention & its benefits by nurses & dietitians. This project will use a descriptive methodology that will include a convenience sample of high risk patients in a suburban medical center. A daily tool will be used which includes patient demographics, compliance with the intervention, presence of diarrhea, presence of CDI, & whether a laxative has been prescribed. The nursing staff will directly report these parameters to the data collector. Once initiated, patients will remain on the probiotic until discharge. This project has been deemed a quality improvement initiative by the IRB & thus further approval for the protection of human subjects is not needed. Data will be analyzed by T-test, comparing data from a twelve-month period pre-intervention versus post-intervention from the same setting. If the study finds a reduced incidence of CDI, the probiotic will be suggested for use in critical care patients on antibiotic therapy. If it does not, further research will be indicated to determine which probiotics are effective in reducing CDI incidence.

Faith Uti

Advisor(s): Shirley Girouard

Propofol As An Adjunct To Sevoflurane Inhalational Anesthesia To Reduce The Incidence Of Emergence Delirium In Pediatric Patients: An Ebp Project Proposal

Emergence delirium (ED) is a postop complication with up to 80% occurrence in children upon emergence from general anesthesia. It is a brief state of mental disturbance with agitation, hallucination, & confusion. ED is a safety risk & poses challenges for caregivers, parents, & institutions. Rapid acting inhaled anesthetics are greatest factor contributing to ED in children. The goal of the proposed project is to reduce the incidence of emergence delirium in pediatric patients undergoing sevoflurane inhalational anesthesia by increasing anesthesia provider awareness of best practices. Adequate pain management, total IV anesthetic technique, & administration of 1 mg /kg of propofol can prevent ED, without delaying time of awakening. A poster & a one hour class for anesthesia staff at an urban hospital will be developed & provided & will include definition of ED, scope, significance, contributing factors, & methods to reduce ED. Anesthesia providers will learn about the best practice - using propofol 1 mg/kg towards the end of emergence, how to use a pediatric anesthesia emergence delirium scale to assess & evaluate & the benefits of attenuating the incidence of ED in the pediatric population. A descriptive study design will be used to evaluate the intervention. An investigator designed survey will be administered to a convenience sample of the anesthesia staff at an urban hospital following IRB approval. The survey will assess knowledge of ED, incidence, risk factors, significance, & use of the PAED scale. Data will be analyzed using descriptive statistics & t-tests. If the outcome of the intervention is positive, actual changes in practice can be assessed and the educational intervention reinforced at the site & shared with other anesthesia groups. If it is not successful, other educational methods, use of protocols & establishing practice standards may be alternatives.

Hanna Vo

Advisor(s): Shirley Girouard

Improving Satisfaction Without Compromising Quality Home-Based Care For Post Hip Fracture Patients: An Ebp Project Proposal

Problem: Many patients are less satisfied & care is more costly for elderly post hip fracture surgery patients receiving center-based as compared to home-based care. Despite benefits & comparable outcomes, many providers continue to refer patients to center-based care.

Goal: To increase the number of patients receiving home based care.

Objective: To increase health care providers' knowledge of the benefits of home-based care.

Literature review: Studies comparing home & center-based rehabilitation programs for post hip fracture patients have found comparable functional and quality of life outcomes. Patients receiving home care are more satisfied with their care than those receiving center-based care. Also, center-based care is more labor intensive & thus is more expensive than home-based care.

Project design/intervention: A one-hour class summarizing the research about the advantages of home-based care will be presented to doctors, nurses, physical therapists & others involved in making discharge plans.

Implementation/Methods: A descriptive, comparison study will be done using a convenience sample of providers caring for hip-surgery patients on an orthopedic floor in an urban hospital. Following IRB approval, an investigator developed pre & post-test survey will be used to assess knowledge gained after the class.

Results: Data will be analyzed using descriptive statistics and t-tests.

Recommendations: If knowledge increases after the class, assessment can be done to see if there is an increase in number of home-based discharge plans. If the class does not work, additional education and guidelines may be helpful in bringing about change.

Shakima Wiggins

Advisor(s): Shirley Girouard

Increasing Breastfeeding Among Young Black Moms: An Evidence-Based Practice Project Proposal

US Black women initiate & sustain breastfeeding far less than their racial counterparts. Black families in NY City are no different. Breastfeeding rates in Brownsville, a predominantly black neighborhood in the city, showed rates of exclusive breastfeeding, as low as 1.4%. This is 18% lower than the rest of the city. The literature suggests that being a teen mom poses additional challenges related to their psycho-social development. The literature offers several approaches to solving this problem including using prenatal education classes & support groups. Education & social support can be enhanced by using a social media based program. The purpose of this project is to increase accessible support & education that enhances normalization resulting in increased breastfeeding. A social media based education & support program using visual media, webcasts, question & answer sessions & anticipatory guidance will be used and include online exposure to content that is relatable to the black teen moms, web series of short videos with "how to" guides for breastfeeding instruction & troubleshooting. The study design is a prospective observation. A convenience sample of young mothers of color who use the website (followers) from an urban community will be recruited through targeted advertisement, page suggestion & direct invite. Data will be collected on-line with a researcher-designed survey to assess satisfaction & effectiveness of the support group & education along with breastfeeding status. Data will be analyzed using descriptive statistics. Tallying will be done for 6 months to determine numbers of followers & numbers of views for each video. If 50 % or more, reported being helped by the online support program, it would continue, with revision from suggestions. If less than 50%, other interventions would be considered. Social media may provide opportunities to reach this demographic. More programs that utilize social media as a vehicle may be beneficial.

Julia Hess

Advisor(s): Veronica Arikian

The Long Term Effectiveness Of Palliative Care Nurse Resource Training: An Evidence-Based Project

Palliative care helps patients by improving quality of life, relieving suffering, and prolonging survival, increasing family well-being, and decreasing costs. Regardless, many hospitalized patients die without adequate supportive care, often due to lack of education for healthcare providers. Nurses are uniquely poised to impact quality of palliative care, but literacy varies depending on specialty, level of interest and familiarity.

An urban medical center's Palliative Care Resource Nurse course (PCRN, 2016), "trains nurses to be better equipped to advocate for patients with advanced illness." Topics are: communication, symptom management, care of the dying, ethical and moral issues and self care. Led by palliative staff, the PCRN was given to 138 nursing staff in June and November 2016 and March 2017. An immediate post-program survey reported that nurses indicated their practice and advocacy skills would improve due to PCRN, but actual changes in practice have not been evaluated.

The purpose of this project is to assess the nursing staff's (RN's and APRN's) self-reported practice changes they have made giving palliative care since they attended the PCRN course.

This quantitative, longitudinal study will offer an e-survey at 6 and 12 months post attendance to nursing staff who attended the PCRN. The original post-education survey will be used to reassess knowledge and practice changes. Additional questions will be added to elicit: (1) nurses' perception of palliative care and (2) attitudes about barriers to giving this care.

RM-ANOVA will analyze data collected at 3 points in time. If results demonstrate changes in practice, then the program will be disseminated to all nursing staff. If results do not show practice change, then educators may modify course content, and address barriers to integrating palliative care in the hospital.

Jeanne-Marie Macchio

Advisor(s): Veronica Arikian

The Use Of Hpv Co-Testing: Evidence-Based Practice Proposal

Pap cytology for cervical cancer screening has reduced this cancer incidence in the U.S. However, research that revealed oncogenic strains of human papilloma virus (HPV) (strains 16 and 18) as the main cause of cervical dysplasia and malignancy prompted a revision in cervical cancer screening guidelines (2012) to include HPV co-testing as a viable option for average risk women ages 30-65.

The purpose is to encourage providers to practice according to guidelines, allowing for longer intervals between Pap screenings for cancer, and to promote HPV co-testing for average risk women. Providers will thereby reduce invasive testing by cervical biopsy due to false positive results often obtained as a result of annual Pap screening. While Pap cytology is a standard screening method, there are advantages to using HPV co-testing as the primary screening method for average risk women ages 30-65, however, evidence has not altered screening practices among providers. This project will use a descriptive design. A sample of providers from 20 clinics in Brooklyn, NY will receive a survey tool to assess knowledge of guidelines, screening methods and patient preferences. Providers will then receive education about current guidelines. At 6 months, a post-education survey will be given to the providers to assess knowledge, changes in self-reported practices and patient preferences. Data will be analyzed using descriptive statistics and the t-test to compare pre and post responses and will yield information about the effectiveness of the education and barriers to changing practice.

Results will shed light on education effectiveness and how patient and provider preferences are linked, influencing provider screening practices in most settings.

Alina Yu

Advisor(s): Veronica Arikian

Cesarean Delivered Infants And The Use Of Probiotics: A Research Proposal

In the U.S., the cesarean section (CS) rate rose by 53% from 1996-2007, reaching 32%, the highest rate reported. Researchers have linked CS deliveries to the rise in autoimmune and allergic disorders. In fact, the incidence of atopic dermatitis and other allergic disorders has increased 2-3 fold in the US for the last several years. This is proposed to be due to absent bacteria in the gut of infants delivered by CS, primarily *Lactobacillus* and *Bifidobacterium*, in contrast to infants born vaginally and exposed to such bacteria in the vaginal tract.

It is suggested that replacing the absent bacteria in CS delivered infants through the use of probiotics, can decrease the risk of developing pediatric atopic dermatitis (PAD), the most common allergic disorder that presents in the first 12 months of life. However, the literature regarding the role of probiotics in the prevention and/or treatment of PAD has been contradictory.

The purpose of this study is to determine a difference between intake of probiotics in CS delivered infants and the development of PAD compared to infants not receiving probiotics.

This quasi-experimental, comparison, longitudinal study focuses on 100 healthy infants who were delivered by CS and who attend a local pediatric practice in Brooklyn. IRB approval and parental consent will be obtained.

Fifty infants will receive probiotic drops as prescribed by the provider beginning at the first newborn visit, and 50 will not. Follow up will be at 3 month intervals to 12 months with infants checked for PAD. It is anticipated that infants receiving probiotics will have fewer or no episodes of PAD.

Outcomes for both groups will be compared: the development of PAD, recorded as follows: diagnosis, age at onset, and duration. Groups will be compared using descriptive statistics and t-test.

The role of probiotics in promoting nutritional and overall health in CS delivered infants is not well understood. Further study in this area is vitally needed.

Miemie Vidal

Advisor(s): Shirley Girouard

Using Intravenous Lidocaine To Prevent Laryngospasm In Children Having General Anesthesia: And Ebp Project Proposal

Problem: Children less than 9 yrs old having general anesthesia with intubation are at increased risk for laryngospasm after extubation. Laryngospasm increases the risk of hypoxemia, pulmonary edema, bradycardia, & death. Despite evidence that interventions can decrease this problem, they are not widely practiced. **Goal:** To decrease the incidence of laryngospasm in children under 9 yrs old undergoing general anesthesia with intubation. **Objective:** To increase anesthesia provider knowledge about administration of IV lidocaine before extubation to decrease laryngospasm in children undergoing general anesthesia. **Literature review:** Research suggests that accurate anesthesia provider knowledge about the problem, risk factors & better pre-op assessments help to reduce the incidence of the problem. Also, the use of lidocaine before extubation can blunt laryngeal reflexes & decrease laryngospasm. **Project design (intervention):** A one hour presentation developed by the investigator will include: data about occurrence of problem; identifying risk factors; comprehensive pre-op assessments; & the use of lidocaine before extubation. **Implementation (Method):** A quasi-experimental design, using a tool developed by the investigator, will be administered after IRB approval to a convenience sample (N =11) of anesthesia providers in an urban hospital to assess their knowledge. **Data Analysis/Results:** Descriptive statistical analysis (mean, median & mode & standard deviation); t-tests will be used to assess knowledge before & after the intervention. **Recommendations:** If anesthesia providers have increased knowledge about the problem and its prevention, they are likely to change their practice which could be assessed at a later date and the class given on an ongoing, regular basis. If the class does not result in increased knowledge, other strategies will be sought to bring about the desired practice change.

Tenya Steele

Advisor(s): Laura Geer

I Get All My Information Through Online: Mobile Health, Text4Baby, And The Lived Experiences Of Urban/Immigrant Pregnant Women In Flatbush Brooklyn

Study Aim: The purpose of this transcendental phenomenological study is to describe the experiences of low-income urban/immigrant pregnant women with access to prenatal health care and information; and to assess their knowledge, attitudes, and beliefs about the use of mobile technology (mhealth) and the Text4Baby program as a source of prenatal health communication, promotion, and educational intervention; and as a channel for prenatal health information seeking.

Method: We used purposive sampling to recruit pregnant woman aged 18-45 at Downstate's prenatal health clinic to participate in focus groups and 1-on-1 interviews. We also conducted key informant interviews with clinical staff and performed patient observations in the clinic waiting areas. All interviews were audio recorded, and transcribed verbatim by study investigator. Colaizzi's method of analysis was used to analyze the dataset and analysis was supported by the use of NVivo 11 software.

Results: Pregnant women in Brooklyn reported many common, as well as unique experiences with receiving prenatal care and information. Eight patients participated in two focus groups and a 1-on-1 interview; and two clinicians with many decades of experience at the clinic served as key informants. Six major themes were identified: (1) time as a barrier to care (2) patient/provider engagement (3) feelings of indifference (4) social support (5) the online and mobile community and (6) immigration, acculturation and nationality.

Conclusion: Disparities in access to quality prenatal healthcare and information can exacerbate poor infant health outcomes which gravely affects population health, especially in minority communities. Study participants reported many common as well as unique experiences receiving care at Downstate however all participants believe that using mobile health and Text4baby would help increase access to prenatal health information and resources that can promote healthier pregnancies and infant outcomes.

Jeanine Botta

Advisor(s): Laura Geer

Noise Complaint Research And Its Effects On Policy, Attitudes, And Culture

For more than half a century, empirical and technical noise complaint behavior research has indicated that non-complainers outnumber complainers, that many who are impacted by noise do not complain, and that complainers tend to be of higher socioeconomic status (SES). Research has focused more on complainers than on those who do not complain, sometimes probing emotional and psychological factors that might influence the likelihood of complaining. Some research focuses on a very small population who submit hundreds of complaints about aviation noise "calling them serial complainers" rarely perceiving such behavior as civic engagement or activism. Instead researchers have ascribed psychological disturbance and other negative characteristics to that population.

This review addresses noise complaint behavior literature and briefly explores literature from other disciplines to locate empirical findings about those affected by noise who do not complain, considering hypotheses about associations with low SES and "learned helplessness," the perception of being powerless to change a situation. Data and concepts presented will introduce contemporary noise complaint communication that occurs online in discussion forums, reader comment sections, and petitions, and consider the limitations of continued use of complaints as a means of quantifying noise exposure and health impacts.

Considering the strengths and weaknesses of complaint-based research, survey research, and newer methods of data collection that use mapping and sensing technology, the author proposes a multidisciplinary applied research approach to addressing environmental noise that includes a social marketing component to raise awareness about noise and health.

Stephanie Myers

Advisor(s): Paul Landsbergis

Trends In Work Characteristics, 2002-2014: Findings From The U.S. National Niosh Quality Of Work Life Surveys

Background: Major technological, political, economic and labor market changes have likely had an impact on work characteristics associated with cardiovascular disease (CVD). The Quality of Work Life (QWL) surveys were developed and conducted by the National Institute for Occupational Safety and Health (NIOSH), CDC, and are based on a representative sample of the U.S. employed population. This study examined whether job and work schedule characteristics are becoming more stressful and potentially increasing CVD risk in the U.S.

Methods: Eligibility criteria were participation in the 2002, 2006, 2010 and 2014 NIOSH QWL surveys, English speaking, aged 18 years or older, and employed in civilian labor force for at least 20 hours/week. There were 5,361 QWL participants eligible for analysis. Trends in work characteristics over 12 years, adjusted for age, gender, race/ethnicity, education, occupational category, work hours, and unemployment rate, were examined using linear regression and logistic regression. All analyses were conducted using SPSS v.23 Complex Samples to account for the multi-stage area probability sample of the survey to produce more precise sample estimates.

Results: Statistically significant increases, from 2002 to 2014, were observed for 2 of the 5 main work characteristics scales examined; Low job control (B=.025, 95%CI .005-.045, p=.016) and Work-family conflict (B=.012, 95%CI .000-.024, p=.043). Linear trends for 3 of the 13 remaining exploratory variables were statistically significant: Job strain (B=.391, 95%CI .037-.744, p=.030) and Hard to take time off during work for family (B=.013, 95%CI .005-.020, p=.001), both increased, while Race discrimination (OR=.954, 95%CI .919-.990, P=.014) decreased.

Conclusion: Evidence was found for increases in some stressful work characteristics from 2002 to 2014 in a nationally representative sample of US workers, which could potentially contribute to increasing the incidence of CVD.

Zerin Kashem

Advisor(s): Paul Landsbergis

Assaults From Students And Threats And Harassment Faced By K-12 Educators: Association With Physical And Mental Health

Background: Student violence against teachers has been associated with impaired work performance, and worse emotional and physical health outcomes among teachers. Research suggests that work-related stress contributes to increased dissatisfaction with the occupation and higher rates of teachers leaving the profession. There are few studies addressing violence directed toward teachers.

Methods: A survey was administered in 2016 to members of the Oregon State Education Association and the Oregon Education Association. Data was available from 4 Oregon school districts (N=743; 85.9% female; 88.4% White; 69.5% special education teachers/assistants). The survey response rate was 23.5%

Results: About half of all respondents (51.3%) reported having been physically assaulted at work at least once during their employment in the school district, with 21.8% of those assaulted reporting >1 assault and 97.8% reporting that the assault was from a student. The annual assault rate was 0.43 among special education teachers/assistants, and 0.15 among other school staff. In addition, 48.4% of special education staff reported threats, verbal abuse, bullying or sexual harassment in the past year, compared to 20.4% among others. Respondents who had been assaulted or subject to threats, verbal abuse, bullying or sexual harassment reported, during the past 30 days, significantly higher levels of work stress, poor or fair health, and more than 10 days per month of poor physical and mental health. Many (73.8%) respondents reported receiving “evidence-based” training on physical restraint and de-escalation techniques as mandated by a 2011 Oregon law.

Conclusion: Assaults and non-physical workplace violence were associated with higher levels of work stress and worse physical and mental health. Further research is important for promoting awareness, developing and evaluating interventions, and increasing the quality of classroom learning, and retention of teachers in the education field.

Veronica Sebastian

Advisor(s): Todd Sacktor

Atypical Pkc Expression And Astroglisis In A Mouse Model Of Alzheimer'S Disease

Alzheimer's disease (AD) is a progressive neurodegenerative disorder, which results in severe cognitive and behavioral deficits, including memory loss. The classic pathological hallmarks of AD are the presence of amyloid- β ($A\beta$) plaques and neurofibrillary tangles in the brain. Recent human post-mortem studies and animal models of the disease have identified another key feature of AD: progressive astroglisis. This proliferation and hypertrophy of reactive astrocytes begins during the early stages of AD, even prior to detectable $A\beta$ plaque formation, and continues to advance throughout the course of the disease, particularly in the hippocampus. The function of astroglisis in AD, whether as a neuroprotective response to plaque formation or as a means of inducing apoptotic pathways in damaged tissue, remains to be elucidated. In the present study, we show increased astroglisis in the hippocampi of APP transgenic mice (Tg-SwDI) compared to age-matched controls. Interestingly, these astrocytes strongly co-express the atypical PKC, PKC/M δ , with the reactive astrocytic marker, glial fibrillary acidic protein (GFAP). These results suggest that atypical PKCs may play a role in astroglisis and glial activity in AD.

John Hessburg

Advisor(s): Joseph Francis

Decoding Reward, Punishment, And Motivation In The Primary Sensory And Motor Cortices Of Non-Human Primates

Signals of reward, punishment, and motivation have been recorded in a number of areas in the brain, including a reward signal in the primary motor cortex (M1). This work is continuing this investigation in the hand and arm regions of M1 and the primary sensory cortex (S1). 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, 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 to investigate reward and punishment prediction and error. Neural data were recorded from the hand and arm regions of M1 and S1, and spike sorted to isolate individual units. Time intervals around the cue presentation and reward or punishment delivery were analyzed and used as input into machine learning classifiers to investigate how the value of reward and punishment were represented in these regions, and how the interplay between the two was represented as motivation. We hypothesize that in addition to reward and punishment, motivation is represented in M1 and S1. Investigating the intricacies of these signals in M1 and S1 will allow future brain-machine interfaces (BMI) to capture the breadth of these signals in one or two brain regions that also contain sensorimotor information, rather than requiring multiple implants in multiple regions. These data will be useful in creating algorithms for more robust and nuanced BMI control, taking greater advantage of the range of information available in these regions for better neural control of robotic prostheses.

Aditya Tarigoppula

Advisor(s): Joseph Francis

Dynamics Of The Reward Prediction Signal In M1.

The ability to predict reward provides individuals the opportunity to modify their behavior to increase their probability of attaining reward. We reported previously that the primary motor cortex (M1) in nonhuman primates modulates differentially to the presence and absence of a juice reward. Expanding on this work, here we detail the nature of this signal. Specifically, we show that the reward signal in M1 is increasingly predictive of the yet-to-be delivered juice reward as the monkey learns to successfully associate multiple reward predicting cues (conditioned stimuli) with corresponding juice rewards (unconditioned stimuli) in sessions both within and across days. Such behavior in M1 is also observed to modulate with respect to the increased certainty in the reward probability structure of the external environment thus representing the animal's confidence in understanding the reward landscape of the environment it is dealing with.

Yao Zhao

Advisor(s): Joseph Francis

Context-dependent reward coding in monkey's motor and sensory cortical areas

Neural correlates of reward in the primary motor cortex (M1) and primary sensory cortex (S1) have been investigated for decades. In this investigation, a more complex paradigm has been designed. The experimental situation requires the encoding of two or four cued reward-punishment level. / The animals were trained to perform a grip move task. For manual task, monkey is required to apply and maintain an instructed (with tolerance) amount of grip force (applied force shown as red bars, instructed force shown as blue bars) post initialization of the grasping phase until the robot had automatically moved the cylinder to target from the start. Monkey was required to release the grip to complete the task and receive juice reward (if successful) or time out punishment based on the visual cue represent at the beginning of each trial. For observation task, the task is done automatically and the monkey will get reward at the end of each trial based on the cue. We have 2 different cue sets. One is green bar cue. The number of green bar represents the amount of reward at the end of trial. The other is yellow symbol cues. Different yellow symbol represent different reward/punishment combination. We have two sections for each cue set. Section one only have 2 possible cue. Section 2 have 4 possible cues. / The results show that in both observation and manual task, for both cue sets, some neural are able to adjust their firing pattern to encode more complex task (from 2 possible cues to 4 possible cues). That suggests neural can encode reward/punishment level based on the context.

Christine Ghobrial

Advisor(s): Mark Stewart

Cardiac Lineage Protein 1 (Clp1) Haplodeficiency Exacerbates Post Myocardial Infarction Injury In Mice

Cardiovascular disease is one of the leading causes of death worldwide. Atherosclerosis, for example, can contribute to loss of blood supply to the heart, and damage or destroy cardiomyocytes. A sufficient loss of these cells can lead to heart failure. Cardiomyocyte loss 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 mouse strain with the gene knocked down. We are exploring whether CLP1 plays a role in remodeling the heart following myocardial infarction in mice. Specifically, we are studying the role of CLP1 in the development of fibrosis in cardiac tissue, and we are studying Smad3 and NFkB activity, which are known to play a role in myocardial infarction.

Preliminary data show that both wildtype and CLP1^{+/-} hearts exhibit cardiac remodeling, as measured by percent of collagen deposition, 1 week following ischemic injury both above and below the ligation. CLP^{+/-} hearts had a lower amount of remodeling below the ligation following ischemic injury compared to wildtype.

Also, there is increased pSmad3 and NFkB activation and translocation into the nucleus in the infarcted zone following ischemic damage in both wildtype and in CLP1^{+/-} hearts. Cardiac function in CLP1^{+/-} mice was worse in comparison to the wildtype, as measured by fractional shortening and by ejection fraction. There was not a large difference in LVmass between CLP1^{+/-} and wildtype mice. Increasing the sample size will better elucidate the impact of CLP1 on the function and remodeling of the heart following ischemic injury.

Data suggest that CLP1 limits the remodeling response by either delaying or by decreasing the amount of collagen deposition in the infarcted area, and result in a poorer functional recovery after ischemic damage.

Sophia Villiere

Advisor(s): Mark Stewart

Seizure-Associated Central Apnea In A Rat Model: Evidence For Resetting The Respiratory Rhythm And Activation Of The Diving Reflex.

Respiratory derangements, including central apnea, are consequences of seizure activity in epilepsy patients and animal models. Irregular, tachypnic breathing during seizure activity indicates an impact of seizure spread on respiratory rhythm generation.

We studied episodes of central apnea, defined as periods \geq 1 second with no evidence airflow during plethysmography, in rats anesthetized with urethane and given parenteral kainic acid to induce recurring seizures. Our aim was to determine when in the respiratory cycle apneic periods start and if apneic periods end with 1) a reset of the breathing cycle to a common phase at apnea offset, 2) a continuation from the point at which the respiratory cycle was aborted at apnea onset, 3) a continuation from a point predicted by a continuation of the breathing pattern preceding apnea, or 4) a random re-entry into the respiratory cycle.

Animals were monitored with continuous ECG, EEG, and whole body plethysmography. One hundred ninety central apnea episodes (1.04 to 36.18 seconds, mean: 3.2 ± 3.7 seconds) were recorded during seizure activity from 12 rats. The majority of apneic period onsets occurred during expiration (125/161 apneic episodes, 78%). Apneic period offsets were more uniformly distributed between early and late expiration (27%, 34%) and inspiration (16%, 23%). Differences between the actual respiratory phase at offset and the phase predicted by extending the pre-apneic breathing pattern to the offset time were equally variable.

Central apneic periods were associated with a burst of high frequency activity in the EEG. These bursts could be used to identify periods in plethysmography records where airflow was maintained, indicating that periods of no airflow were likely due to activation of the diving reflex.

We conclude that seizure-associated central apnea is associated with 1) a reset of the respiratory rhythm, and 2) activation of the diving reflex to suppress respiratory behavior.

Yekaterina Merkulova

Advisor(s): Nicholas Penington

Role Of Intracellular Calcium And Atp In Modulation Of Trpc4 Channels.

TRPC4 are non-selective, calcium-permeable ion channels that are found throughout the body, most notably in the central, gastro-intestinal and cardiopulmonary systems. How TRPC4 channels are modulated, for the most part, remains unknown. While it is known that TRPC4 channels are activated by G-protein coupled receptors (GPCR's), the specific downstream components of G-protein pathways that directly interact with TRPC4 are not known. Two components of two separate G-protein pathways ($G_{12/13}$ and $G_{i/o}$), intracellular calcium and ATP, respectively, interact with TRPC5 (calcium activates and ATP inhibits TRPC5), the most closely related TRP channel to TRPC4. Due to similarities in structure and sequence, we hypothesized that intracellular calcium and ATP will also modulate TRPC4 channels. Whole cell, voltage-clamp electrophysiological recordings were conducted on transiently transfected HEK293 cells to test this hypothesis. Preliminary findings demonstrate that calcium may not activate TRPC4, but ATP potentiates TRPC4-mediated currents. Furthermore the findings regarding calcium's effect on TRPC4 channels may be confounded by the presence of a poorly characterized, calcium activated current in HEK293 cells. An attempt was made to minimize this interference by using 9-phenanthrol, a known blocker of TRPM4 channels that are activated by calcium and can be expressed in HEK293 cells. However, it was discovered that 9-phenanthrol may also block TRPC4-mediated currents. This information provides insight into modulation of TRPC4 channels and may be useful in understanding their physiological functions.

Elena Nikulina

Advisor(s): Peter Bergold

Minocycline And N-Acetylcysteine Dosed 72H After Closed Head Injury Preserve Ca1 And Ca3 Contralateral Hippocampal Neurons And Improve Performance In Barnes Maze Test.

Years of research in the field of central nervous system injury brought up a better understanding of the pathological mechanisms behind the loss of neurons and glia following traumatic brain injury (TBI). Yet no effective therapy for TBI has reached the clinics. One of the crucial obstacles for bringing the results of basic research into clinic is the unfavorable therapeutic window of majority of proposed treatment what precludes their translation into clinically relevant therapies. In contrast, the combination of Minocycline and N-acetylcysteine prevents behavior deterioration as well as neuronal and myelin loss when delivered at 6 hours after TBI in mouse close head injury (CHI) model. (Sangobowale et al, 2015). Furthermore, mice treated at 72 hours after injury performed well in Barnes Maze Test, unlike saline treated animals. Since it has been reported that only one working hippocampus is required to perform in Barnes Maze test, we hypothesized that both hippocampi are rendered non-functional in saline treated animals, while in mice treated with Minocycline and N-acetylcysteine the contralateral hippocampus is preserved. Here we demonstrate that treatment prevented neuronal loss in CA1 and CA3 areas of the hippocampus contralateral to the injury. Importantly Minocycline and N-acetylcysteine delivered at 72 hours after TBI preserved both PKMzeta and Synaptophysin, pre-synaptic markers, as well as MAP2, a post-synaptic marker. Treatment with combination of Minocycline and N-acetylcysteine delivered 3 days after injury improves behavioral outcome and prevents neuronal and synaptic loss in the mouse TBI model. Since Minocycline and N-acetylcysteine are FDA approved drugs, the fact that they improve the outcome when delivered at a late point after TBI makes them excellent candidates for an effective treatment of TBI in human patients.

Michael Tekin

Advisor(s): Sheryl Smith

Synaptic Pruning Of Layer 5 Pyramidal Cell Mushroom Spines In The Primary Somatosensory And Motor Cortex

Increased synaptic pruning during puberty is a well-known phenomenon. During puberty age dependent, experience driven spine elimination has been observed in layer 5 pyramidal cells in both somatosensory and motor cortex. To test the hypothesis that adolescent synaptic pruning occurs on layer 5 pyramidal cells of motor (M) and primary somatosensory (S1) cortex, the spine densities of two groups, pubertal (P35) and post-pubertal female mice (P56), were compared. There were two groups of P56 mice, mice that were shipped from the breeding facility before puberty (P56-wait), and mice shipped during puberty (P56-shipped). Golgi staining was used to assess spine density and spine type in each group from z-stack projection photomicrographs taken with a Nikon DS-U3 camera mounted on a Nikon Eclipse Ci-L microscope at 100_x oil objective within the Motor (M) and primary somatosensory (S1) cortex. No significant difference in total spine density was observed between the P35 mice and the P56 regardless of when the P56 mice were shipped. However, when comparing P35 and P56-wait mice, there was a significant reduction of proximal mushroom dendritic spines in the M cortex and both medial and distal dendritic spines in the of S1 cortex in layer 5 pyramidal cells ($P < 0.05$). In contrast, when comparing P35 and P56-shipped mice, the M cortex had no significant change in mushroom spine and the S1 layer 5 pyramidal cell proximal dendrites had a significant increase in mushroom spines ($P < 0.05$). Therefore, although overall spine density was not reduced during puberty, selective reduction in the mushroom spine population in these cortical areas was observed which was affected by environmental factors. Additionally, it appears that shipping the mice during puberty either delays or prevents this process which may be due to the stress of shipping.

Adam Newton

Advisor(s): William Lytton

Expanding And Accelerating Reaction-Diffusion Support In NEURON

The NEURON simulation platform is widely used by both theoretical and experimental neuroscientists with over 500 models available at ModelDB. Traditionally the simulator focused on electrophysiology, but the recent introduction of the reaction-diffusion module (NRxD) has allowed models to probe intracellular calcium dynamics in persistent neuronal spiking activity. Stochastic reaction-diffusion is essential for small spatial domains. These simulations in NEURON are performed via an interface that connects with the stand-alone stochastic solver Neural Time Warp.

The originally NRxD was written in vectorized Python, which offered limited performance. New accelerated reaction-diffusion methods are being developed as part of a separate NEURON module. This new module will ultimately be a fully compatible replacement for the existing NRxD module. While the interface code remains in Python, the structures of the models are transferred to C code via the ctypes package, which performs all run-time calculations so that python is no longer invoked during simulation. Dynamic code generation allows arbitrary reaction schemes to run at full compiled speed. Preliminary tests suggest an approximately 10x speed-up in 1D run-time, making larger-scale studies more practical.

Reaction-diffusion in the extracellular space is essential to capture the distant effects of neuromodulators and the spillover of neurotransmitters. A macroscopic view of the extracellular space (ECS) is characterized by its tortuosity (the increase in path length due to obstacles, ~1.6) and volume fraction (~20%). The addition of reactions allows the ECS be modeled as an active medium, to account for enzymatic degradations, transporters and glial buffering. NEURON enables this macroscopic model of tissue to be coupled with detailed biophysical models of cells. Thread-based parallelization accelerates extracellular reaction-diffusion simulations. Using 4 cores currently reduces the runtime by a factor of 2.3.

Karrah St. Laurent-Ariot

Advisor(s): Peter Bergold

An Agonist To Tspo, The Peripheral Benzodiazepine Receptor Limits Fear-Induced Anxiety In Model Of Comorbid Traumatic Brain Injury And Post Traumatic Stress Disorder

Traumatic Brain Injury (TBI) and Post Traumatic Stress Disorder (PTSD) currently affect millions of civilians and veterans in the United States. Patients that have comorbid TBI/PTSD have greater cognitive and affective deficits than those with TBI or PTSD alone. Co-morbid TBI/PTSD may arise from a single head injury, or by a head injury in a patient with pre-existing PTSD. Patients with TBI/PTSD are more refractory to therapy than those with TBI or PTSD alone. Our laboratory developed a mouse model of comorbid TBI/PTSD that displayed increased neuroinflammation including elevated hippocampal expression of the 18kD mitochondrial transporter protein (TSPO). TSPO mediates production of neurosteroids that are both anxiolytic and anti-inflammatory. The increased TSPO expression suggests that agonists to TSPO could reduce neuroinflammation and alleviate cognitive and affective deficits following comorbid TBI/PTSD. TBI/PTSD is modeled by exposing mice to Chronic Variable Stress followed by Closed Head Injury. Experimental animals received oral administration of the TSPO agonist, AC 5216; control animals received vehicle. Beginning 7 days after closed head injury, the behavior of vehicle and AC 5216-treated mice were tested on Barnes maze, Elevated Plus maze, Active Place Avoidance, and Acoustic Startle. The two groups did not significantly differ on Barnes maze or the Active Place Avoidance. The group receiving AC 5216 showed a trend toward more entries into the open arm on Elevated Plus maze suggesting decreased basal anxiety. AC 5216-treated mice significantly decreased the number of freezing episodes on acoustic startle ($p < 0.001$) suggesting decreased fear-induced anxiety. We are presently testing for reduced neuro-inflammation in AC 5216-treated mice. The anxiolytic effect of AC 5216 suggests that TSPO agonists are potential therapeutics to treat comorbid TBI/PTSD.

Kristen Whitney

Advisor(s): Peter Bergold

Minocycline Plus N-Acetylcysteine Restores Synaptic Plasticity, Limits Gray Matter Injury And Improves Navigation In A Closed Head Injury Mouse Model

Traumatic brain injury (TBI) leads to long lasting cognitive and behavioral deficits. Patients often wait days after a TBI to seek treatment only when their symptoms do not abate. Therefore, to be effective, a drug to treat TBI must retain potency when dosed hours to days after an injury. We tested the potency of minocycline (MINO) and N-acetylcysteine (NAC) when first dosed 72 hours after a closed head injury (CHI) to mice. CHI produces both behavioral deficits as well as gray and white matter damage. The hippocampus is particularly susceptible to TBI. We show that CHI damages the hippocampus both ipsilateral and contralateral to the impact site. This results in hippocampal neuronal loss, decreased dendritic density and altered spine morphology. Fourteen days after injury, hippocampal slices isolated from injured mice have impaired LTP. Injured mice with impaired LTP also have behavioral deficits on Barnes maze, a spatial memory task that requires one intact hippocampus. MINO and NAC treatment beginning at 72 hours after CHI restored hippocampal LTP in the contralateral hippocampus. The treated contralateral hippocampus maintained dendritic structure, spine density and spine morphology. MINO and NAC also improved performance on Barnes maze. These data suggest that: (1) CHI induces long-term changes to synaptic connections that result in electrophysiological and behavioral impairments and (2) MINO plus NAC can be dosed within a clinically useful time window to reverse these impairments. Thus, our results identify dendritic morphology and synaptic plasticity as injury mechanisms that can be targeted pharmacologically. Both MINO and NAC are FDA-approved drugs suggesting that this combination could be used to limit cognitive and behavioral deficits after clinical TBI.

Alexandra Seidenstein

Advisor(s): William Lytton

Multiscale Computer Modeling Can Identify Penumbra Subzones

Ischemic stroke produces oxygen and glucose deprivation in brain cells, leading to cell dysfunction and death. We developed a series of multiscale models, using computer simulation to evaluate the interactions of cell activity, intracellular chemistry, and extracellular molecules in the development of the penumbra in ischemic stroke. Tissue affected by ischemic stroke is divided into three regions; 1. the core where cells suffer irreparable damage and death, 2. a penumbra where cells may recover with reperfusion, 3. a further region of edema where spontaneous recovery is expected. We create tools to understand damage across temporal and spatial scales and to suggest where there is potential for neuroprotection.

We extended the NEURON reaction-diffusion modules (NRxD) to include the extracellular space (ECS), with the penumbra cells and its embedded extracellular environment. Here, we explored cellular failure initiated by ATP depletion at a central location. Ischemia impedes ATP production which results in a failure of the Na⁺/K⁺-ATPase pump and a rise in extracellular K⁺. This rise in extracellular K⁺ will cause neurons to depolarize, further increasing extracellular K⁺. Simulations were undertaken to model the spreading depression seen in ischemic stroke by coupling a detailed biophysical model of cortical pyramidal neurons equipped with Na⁺/K⁺-ATPase pumps with reaction-diffusion of ions in the ECS.

Multiscale modeling of ischemia combines the dynamics of direct synaptic connectivity and diffusion of ions across ECS, giving varying effects of core on the penumbra. Different penumbral subzones will produce differing intracellular dynamics biasing the cell to either cell death or potential recovery. The tools presented in this model allow for greater experimentation and understanding of potential mechanisms to prevent permanent penumbra cell death.

Kristen Lu

Advisor(s): Christopher Hellen

Characterization Of Novel Mechanisms Of Translation Initiation

Translation initiation is a key step in gene expression. The canonical mechanism is coordinated by >10 factors and involves 5' cap-dependent ribosomal attachment. Many viral RNAs use alternative mechanisms that involve 5' cap-independent binding of ribosomal complexes to an internal ribosome entry site (IRES). The simplest example occurs on the ~200nt-long intergenic region (IGR) in the genomes of dicistroviruses e.g. Cricket Paralysis virus (CrPV). IGR IRESs adopt a triple pseudoknot structure that mediates factorless ribosome binding by mimicking an authentic tRNA-mRNA interaction. Advances in metagenomics have led to the identification of novel dicistrovirus-like viruses with shorter, unrelated IGRs. We are characterizing Nedicistrovirus (NedV) and Antarctic picorna-like virus 1 (APLV-1) IGRs to determine structure and function, and to identify novel mechanisms of IRES-mediated initiation. In *in vitro* reconstitution experiments, elongation-competent 80S ribosomes assembled on these IRESs without initiation factors or Met-tRNA^{iMet}. These IRESs preferentially bind 80S ribosomes and, in contrast to CrPV, do not interact stably with 40S alone. RelE cleavage experiments demonstrated that the initiation codon GCU is predominantly placed in the ribosomal A site and, in contrast to CrPV, its positioning on these IRESs is not eEF2-dependent. Binding of termination factors to stop codon variants confirmed A site accessibility in IRES/80S ribosomal complexes. We derived possible structures of the IRESs using bioinformatic approaches and tested them by mutational analysis. These data confirmed the predicted presence of pseudoknots and identified structural deviations from CrPV-like IRESs that can account for functional and mechanistic differences between them and NedV-like IRESs. These results suggest that NedV-like IRESs mediate initiation by a novel mechanism. Their further characterization will provide new understanding by establishing novel paradigms for IRES-mediated initiation.

Abhimanyu Amarnani

Advisor(s): Christopher Roman

The Transcription Factor Mitf Regulates Expression Of Genes That Control B Cell Responsiveness And Enforce Immunological Tolerance To Self.

B cells are key in the development of many autoimmune diseases, such as systemic lupus erythematosus (SLE). Normally, autoreactive B cells are inactivated or eliminated, but in autoimmune disease these survive and differentiate into antibody-secreting plasma cells. We are interested in the role of the microphthalmia transcription factor Mitf in preventing the survival of these autoreactive B cells. Through two mouse models of Mitf inactivation, we have previously observed 1) spontaneous splenomegaly (enlarged spleen size), which was accompanied by 2) increased plasma cell numbers, and 3) autoantibody production. Moreover, B-cell-specific Mitf inactivation on an otherwise mild SLE genetic background caused fulminant SLE-like disease characterized by accelerated mortality, renal damage, and high production of organ damaging autoantibodies. Preliminary flow cytometry analyses of splenocyte and B cell cultures after LPS (TLR4) stimulation showed heightened responsiveness of Mitf-inactivated B cells to mitogens and protection from cell death. This was evidenced by increased surface expression of the activation markers CD69, CD25, CD80, and MHCII after lipopolysaccharide (LPS) stimulation, and decreased surface expression of AnnexinV after LPS stimulation compared to controls. In order to explain this mechanistically, we sought to identify genes regulated by Mitf. Preliminary RNA-sequencing results and pathway analysis of B cells from age and gender matched wildtype (WT) and Mitf-inactivated mice highlighted differential expression of mRNA transcripts related to cell proliferation, toll-like receptor (TLR) responses, apoptosis, and antigen processing and presentation. Overall, these results suggest that Mitf regulates a multiplicity of genes central to calibrating B cell responsiveness to immune signals and to self molecules.

Michael Mann

Advisor(s): Christopher Roman

The Role Of Tfe3 In Immunoregulatory T Cell Activity In The Intestinal Mucosa

Inducible T regulatory (iTreg) cells are anti-inflammatory cells that are derived from naïve CD4⁺ T cells and are dependent on expression of the FoxP3 gene for reaching maturity. Mice with FoxP3 expression silenced in CD4⁺ T cells are susceptible to certain inflammatory conditions in the gastrointestinal tract. Current research out of Dr. Roman's lab has demonstrated that the transcription factor TFE3 is necessary for the expression of FoxP3 in vitro, but the importance of this in vivo is not yet known. We hypothesized that if TFE3-deficient mice were unable to generate iTreg cells in vivo, we would see a measurable increase in inflammatory activity. We analyzed by flow cytometry white blood cells from the intestine and secondary lymphoid organ tissue for the presence of cells that express T follicular helper (Tfh) cell surface markers CD4 and CXCR5, because these cells are known to be influenced by iTreg cells and are known to be promoters of inflammation. We found no significant difference in CD4⁺CXCR5⁺ T cells in these organs between the experimental and wild type control mice. These results, while preliminary, suggest that under homeostatic conditions, TFE3 may not be essential for controlling Tfh function via allowing the development of Treg cells in vivo. Further experiments are needed to better discern TFE3's role in iTreg functions and Tfh cell populations under conditions of immunologic challenge.

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 (CNS). Microsomal triglyceride transfer protein (MTP) is an essential chaperone for the biosynthesis of apolipoprotein-B (apoB) containing lipoproteins mainly in the liver and intestine. MTP is expressed in the brain but its function is unknown. Our data show that MTP expression is the highest in the cortex and both major brain cell types, neurons and glial cells express MTP. Our studies show that the acute inhibition of brain MTP by intracerebroventricular (ICV) microinjections of Lomitapide (an MTP inhibitor) to the lateral ventricles reduces plasma lipids, hepatic and intestinal MTP activity, and increases hepatic lipids in a dose and time dependent manner. Also, the acute overexpression of brain MTP by ICV microinjection of Ad-MTP to the lateral ventricles increases plasma cholesterol, hepatic and brain MTP activity and brain MTP mRNA levels. We also generated brain MTP specific knockout (KO) mice (B-Mttp^{-/-}). B-Mttp^{-/-} mice have significantly reduced mRNA levels of all the MTP isoforms in the brain. These mice also have low MTP activity in the brain and the liver compared to controls mice. Based on these preliminary data we hypothesize that brain MTP may be involved in neuronal signaling to the liver and intestine and in controlling plasma lipid levels. To test this will disrupt the signaling between the brain and the liver by performing hepatic vagotomy in normal mice and then study the effects of MTP inhibition. We anticipate that vagotomy will abolish changes in the plasma lipids seen after the acute inhibition of MTP. Second, we will examine the consequence of chronic brain MTP ablation on diet induced obesity and hyperlipidemia. These studies will discover the role of brain MTP and its link to the neurological problems seen in abetalipoproteinemia (ABL) subjects that are deficient in MTP activity.

Olipriya Das

Advisor(s): Richard Kollmar

The Role of the C1q Domain of Otolin1 in Otolith Morphogenesis

Otolin1 is an extracellular matrix protein of otoliths ("ear stones" of fishes), and otoconia ("ear dust" of higher vertebrates). These acellular biominerals are essential for the sense of balance; dislodging results in the most common human balance disorder, benign paroxysmal positional vertigo. Otolin1 comprises of a collagen and a C1q domain, similar to atypical collagens VIII and X. We propose that Otolin1 forms a scaffold to which other otolith proteins, Ca²⁺ and CO₂⁻ ions bind during otolith morphogenesis, with C1q trimers as hubs and collagen triple- helices as spokes. To test this model, we investigated whether the Otolin1 C1q domain is necessary and sufficient to form trimers and higher complexes in vitro. The zebrafish Otolin1a C1q domain was expressed in bacteria either alone or fused to thioredoxin. Multimerization of affinity purified recombinant proteins was assessed by size-exclusion chromatography and gel electrophoresis. Under denaturing conditions, recombinant C1q 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. 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.

Oluwatobi Olufeko

Advisor(s): Richard Kollmar and Marc Larosiliere CUNY Medgar Evers College

The Structure Of The Recurrent Laryngeal Nerve In The Rat

Injuring a recurrent laryngeal nerve (RLN) alongside the trachea causes unilateral vocal-fold paralysis, hoarseness, shortness of breath, and possibly bacterial pneumonia. Potential drug treatments that promote RLN regeneration could be tested in rats as animal models. Our previous attempts to damage the RLN in rats, however, caused highly-variable degrees of injury. To improve our surgical approach, we investigated the anatomy of rat RLNs relative to the trachea.

Adult Sprague-Dawley rats were euthanized by deep anesthesia and transcardial perfusion with saline and formaldehyde fixative. The trachea with both RLNs was sectioned transversely at about 50 μ m thickness. Neurons were labeled with anti-neurofilament antibodies, and myelin with a lipophilic fluorophore. Brightfield and fluorescence microscopy were used to image a range of magnifications, from whole sections to individual nerve bundles. Morphological parameters, such as distances and angles between the RLNs, trachea, and esophagus, were measured with image-analysis software.

Our results indicate that the RLNs change their position with respect to the trachea from dorsomedial rostrally to purely medial caudally. The right RLN becomes more accessible on the tracheal surface caudally, whereas the left RLN remains protected in a groove between trachea and esophagus. Along the trachea, both RLNs are associated at different locations with a neurovascular bundle or an overlying fat pad and sprout multiple branches. The RLN bundles contain two classes of neurons that are distinguished by the thickness of their axons and myelin sheaths and are grouped together within the nerve bundle.

We conclude that the structure of the RLN in the rat is more elaborate than previously described. Our result suggests that a reliable procedure for RLN injury requires crushing or bisecting both the neurovascular bundle and the overlying fat pad to ensure that all branches are reliably damaged.

Robert Colbourn

Advisor(s): Sabina Hrabetova

Dynamic Volume Changes Of The Brain's Extracellular Space Underlying Seizures

The brain's extracellular space (ECS) is known to play a critical role in determining the excitability of neurons through multiple mechanisms, and therefore can promote seizure activity. It has already been established that the ECS undergoes a long lasting volume shrinkage of about 30% for the duration of a seizure. It is thought that this enhances excitability through increasing the concentration of local excitatory neurotransmitters or augmenting the effect of ephaptic interactions. However, experiments from our lab that monitored ECS volume changes occurring during seizure activity have shown the presence of a new ECS phenomenon: the brain's ECS undergoes a fast, transient shrinkage, then slow expansion back to a baseline volume during the synchronous neuronal discharges that occur during seizure activity. The goal of this project is to establish these dynamic volume changes (DVCs) as a mechanism that increases excitability during seizure activity. The first aim of this project will quantitatively characterize the DVCs during drug-induced seizures in *in vitro* and *in vivo* models. The experiments performed so far revealed that DVCs lead down to a transient 22% reduction in ECS volume and occur during every synchronous neuronal depolarization during a seizure. The second aim will investigate the mechanisms that allow for DVCs. It is suspected that certain channels present on astrocytes are necessary to allow for the water and ion movement into the intracellular space that is required for DVCs to occur. Channel blockade was performed using the drugs Gliotoxin and Furosemide, which revealed almost complete inhibition of both DVCs and seizure activity during application. Fluorescent imaging will also be utilized to determine if swelling of astrocytes, and not neurons, is responsible for generating DVCs. The significance of this project lies in its potential to find new treatment strategies for epilepsy, such as drugs that abolish these DVCs, and therefore seizures.

Florenal Joseph

Advisor(s): William Chirico

Role of Yeast PARK9 (YPK9) in Membrane Integrity/Repair and Aging.

Cells are constantly exposed to stresses that can damage the plasma membrane. Several models of membrane repair have been proposed. In one model, termed membrane patching, extracellular Ca^{2+} enters cells through damage sites and initiates the fusion of lysosomal vesicles into a patch. Despite active investigation, the mechanism of cell membrane repair remains poorly understood. We have used *Saccharomyces cerevisiae* as model system to identify genes involved in membrane integrity and repair. Preliminary results suggested that yeast PARK9 (YPK9) and SNC2 play a role in membrane repair. YPK9 codes for a divalent cation transporter located on the vacuolar membrane and shares homology with a human gene (PARK9) implicated in Parkinson's disease. SNC2 codes for a v-SNARE involved in vesicular trafficking between the Golgi and plasma membrane. Although YPK9 and SNC2 have a minor role in repair when individually tested in a membrane repair assay, a strain lacking both genes is severely defective in repair. We speculated that during aging cells accumulate damage to their cell membrane and that loss of YPK9 may influence survival. However, a *ypk9Δ* strain grew slightly faster than a wildtype strain suggesting only a minor role in growth. We further probed the hypothesis by treating cells with hydrogen peroxide, a reagent that can damage cell membranes. Under these conditions, the growth of the *ypk9Δ* strain was impaired. Peroxisomes are organelles that detoxify hydrogen peroxide. We monitored peroxisomes using PEX11-GFP and found that they proliferated in the *ypk9Δ* strain treated with peroxide. The growth of strains lacking both YPK9 and genes that regulate peroxisomal proliferation, such as FIS1, DNMI1, and VPS1, was severely impaired suggesting that peroxisomal proliferation is critical for detoxification. Together these results suggest that YPK9 plays a role in membrane integrity/repair and in the cellular response to reactive oxygen species.

Marigdalena Ramirez-Fort

Advisor(s): Christopher Lange

Possible Cancer Stem Cells: Folate Hydrolase-1 Is Expressed In A Subset Of Oct4-Positive Melanoma Cells

Background: Folate hydrolase-1 (FOLH1) is a type II transmembrane protein that binds substrates with terminal glutamates. J591, an established monoclonal antibody (AB) to FOLH1, is specific to and is effectively endocytosed after binding to the extracellular domain of FOLH1. Physiological FOLH1 is expressed in cellular regions that are protected by tight-junctions. Functionally, FOLH1 is responsible for cerebral glutamate production. Oncologically, FOLH1 is upregulated throughout prostate cellular membranes, and by cancer neo-endothelium. Immunohistochemistry of paraffin-embedded MM revealed FOLH1+ expression in the neovessels of 4/11 (36%) primary melanoma (pMM) and 9/14 (64%) metastatic melanoma (mMM) cases; a subset of FOLH1+ MM cells were noted, based on morphology. Given the known physiological expression of FOLH1 in certain NC-derived tissue, suggests that some MM cells may exhibit embryonal dedifferentiation to express cellular FOLH1.

Methods: 3 MM cell lines (3 BRAF+; 3 BRAF-) were evaluated for cellular FOLH1 with J591-based immunofluorescence (IF). Two FOLH1+ cell lines were then evaluated for FOLH1 and Oct4 co-expression with J591 and anti-Oct4 AB co-labeling IF.

Results: Two BRAF- cell lines showed intracellular FOLH1 expression in 10% to 40% of MM cells, with a mostly perinuclear and terminal dendritic distribution (e.g., axonal morphology). IF co-labeling with and AB to Oct4 of these 2 FOLH1+ MM cell lines showed that 100% of FOLH1+ cells were also Oct4+. RT-PCR analysis of the irradiated cell lines demonstrated ~2-fold increased FOLH1 mRNA levels in 5/6 MM cell lines.

Conclusions: Herein is the first demonstration FOLH1+ MM cells. Given that FOLH1 glutamate production is a feature of neural crest (NC)-originating glial cells, we postulate that this newly identified subset of FOLH1+ MM cells have dedifferentiated into NC precursors. Oct4 positivity in 100% of these potentially dedifferentiated FOLH1+ MM cells indicates possible stemness.

Ariel Lederman

Advisor(s): David Schreiber

Patterns Of Stereotactic Radiotherapy Utilization And Fractionation For Acoustic Neuroma In The United States

Purpose: Stereotactic radiosurgery (SRS) is utilized for acoustic neuroma (AN) treatment (tx). Frequency of the utilization of the Gamma Knife (GK) or linear accelerator (LINAC) platforms and the fractionation schemes offered were analyzed in the National Cancer Database (NCDB).

Methods: Those treated for AN between 2004-13 and treated with LINAC or GK SRS in 1-5 fractions were identified. The most common fraction (fx) size and schemes were recorded. We limited single fx SRS to a dose of 1200-1300cGy, 3 fx SRS to a dose of 600-700cGy x 3, and 5 fx SRS to 500cGy x 5. Demographic, clinical, and tx location details were collected to assess for predictors of GK versus LINAC based SRS. GK and LINAC based SRS was analyzed by year of diagnosis to assess for temporal changes. Univariate and multivariate logistic regression were used to assess the impact of covariates on the use of either platform.

Results: 2,705 pts were included; 2,222 received GK and 483 received LINAC SRS. The median AN size was 1.5cm (range 0.1-5.0cm). Single fraction was delivered 98.8% versus 19.5% of the time for GK and LINAC based tx respectively. The most common single fx sizes were 1200cGy (39.2%), 1250cGy (28.5%) and 1300cGy (16.9%). LINAC based SRS increased over time from 3.5-3.7% in 2004-2005 to 15-26% from 2007 and on. LINAC SRS commonly utilized 3-5 fxs, there was no association between increased tumor size and LINAC usage. On multivariable logistic regression the use of 3-5 fxs was a strong predictor for LINAC based SRS (OR 326.70, p<0.001 for 3 fxs; OR 363.01, p<0.001 for 5 fxs). Further distance from the tx facility was associated with a decreased likelihood for LINAC SRS (OR 0.52, p=0.03 for >59.7 miles away from the tx facility).

Conclusion: GK remains the predominant frequent modality for delivering SRS to AN. While the use of LINAC based SRS is increasing, it is generally delivered in 3-5 fxs rather than single fx SRS.

Anna Lee

Advisor(s): David Schreiber

The Utilization Of MGMT Methylation Testing In United States Hospitals For Glioblastoma And Its Impact On Prognosis

Rationale: Multiple studies have identified O6-methylguanine-DNA methyltransferase (MGMT) promoter methylation status to be an important prognostic factor in glioblastoma (GBM, World Health Organization Grade IV). We used the National Cancer Data Base to analyze completeness of coding for MGMT as well as to compare outcomes of GBM patients treated with adjuvant chemoradiation based on MGMT methylation status (positive, negative, unknown).

Methods: Patients diagnosed with GBM from 2010-2012 who received adjuvant chemoradiation were identified. MGMT methylation status was obtained. Univariable and multivariable logistic regression was performed to assess for predictors of MGMT testing. The Kaplan-Meier method was used to assess overall survival (OS) by coding status of MGMT methylation (positive, negative, unknown) and Cox regression analysis was used to assess impact of covariables on OS.

Results: There were 12,725 patients who met the study criteria, of which 626 (4.9%) were MGMT+, 1,037 (8.1%) were MGMT- and 11,062 (86.9%) were coded as unknown/not documented. Treatment at academic centers was strongly associated with MGMT promoter status testing (OR 2.23, $p < 0.001$), as well as hospital facility within the Northeast (OR 1.55, 95% CI 1.27-1.88, $p < 0.001$) while increasing age, no surgical resection or subtotal resection were associated with decreased likelihood of MGMT status testing. The median and 2-year OS was 20 months and 40.2% for MGMT+ compared to 15 months and 24.1% for MGMT-, respectively ($p < 0.001$). For those coded as MGMT unknown, median and 2-year OS was 14.6 months and 27.5%, which was significantly worse compared to MGMT+ ($p < 0.001$) but not compared to MGMT- ($p = 0.78$). On multivariable analysis, MGMT+ was strongly associated with improved OS (HR 0.74, 95% CI 0.67-0.81, $p < 0.001$).

Conclusion: Despite convincing evidence that MGMT methylation status has a strong influence on prognosis; it appears to be a highly underutilized test in United States hospitals.

Virginia Osborn

Advisor(s): David Schreiber

Patterns Of Care And Outcomes Of Adjuvant Therapy For High Risk Head And Neck Cancer After Surgery

Objective: To analyze patterns of care and survival for patients undergoing surgery for head and neck cancer with locally advanced disease, positive margins (+ margins) or extracapsular extension (ECE)

Methods: The National Cancer Database was explored to identify patients diagnosed with squamous cell carcinoma of the oral cavity, oropharynx, hypopharynx or larynx between 2004-2012. Patients were included if they underwent surgery, were staged with III-IVB disease or any stage with + margins and/or ECE, and were treated with postoperative radiation alone (postopRT) or postoperative chemoradiation (postop chemoRT). Univariable and multivariable logistic regression were used to assess for predictors of chemoRT use as well as Cox Regression to assess for covariables impacting overall survival (OS). Propensity matching was performed and multivariable Cox Regression was repeated utilizing the propensity matched sample.

Results: 12,224 patients were included of whom 37.9% received postop RT and 62.1% received postop chemoRT. Those with + margins and/or ECE received chemoRT 67.1% of the time and those with negative margins and no ECE received chemoRT 54.0% of the time. On multivariable logistic regression, the strongest predictors for postop chemoRT were ECE, N2-3 disease and + margins (OR 1.56-2.27, $p < 0.001$). 5 year OS was 61.6% for postop RT vs 67.4% for postop chemoRT ($p < 0.001$). On multivariable Cox Regression using a 1:1 propensity matched cohort (n=5,584) OS benefit persisted with postop chemoRT (HR 0.87). On subset analysis of the matched sample, the survival benefit persisted for those with + margins or ECE ($p = 0.006$) but not for negative margins and no ECE ($p = 0.15$).

Conclusions: In United States hospitals, postop chemoRT appears relatively underutilized for patients with + margins or ECE and over utilized for patients with negative margins and no ECE. However, in the propensity matched cohort, chemoRT was associated with improved OS only for those with + margins or ECE.

Niki Sheth

Advisor(s): David Schreiber

Association Of Nadir Psa ≥ 0.5 Ng/MI After Dose Escalated External Beam Radiation With Prostate Cancer-Specific Endpoints

Purpose: Prior studies have suggested that prostate specific antigen (PSA) nadir of 0.5ng/mL is an important surrogate endpoint for prostate cancer specific and all-cause mortality. This study assesses whether it was associated with prostate-cancer specific survival (PCSS) or other endpoints.

Methods: Patients with intermediate or high risk prostate cancer ($\geq T2b$, or PSA ≥ 10 ng/mL, or Gleason score ≥ 7) who were treated with external beam radiation +/- androgen deprivation therapy (ADT) between 2003-2011 at the Brooklyn VA Medical Center were identified. Biochemical control, distant metastatic-free survival (DMFS), PCSS, and overall survival (OS) were compared via Kaplan Meier analysis using the log-rank test. Univariable and multivariable Cox Regression was performed on all endpoints to assess for their impact on OS.

Results: There were 367 patients identified and 236 patients (64%) still alive at last follow up, with a median follow up of 99.5 months. 205 patients (55.9%) received ADT for a median of 24 months. Most patients (n=308, 83.9%) achieved a nadir PSA ≤ 0.5 ng/mL. The 10 year biochemical control was 68.0% for nadir PSA ≤ 0.5 versus 24.0% for nadir PSA ≥ 0.5 (p ≤ 0.001). The 10 year DMFS was 89.6% for PSA ≤ 0.5 ng/mL versus 80.8% for PSA ≥ 0.5 ng/mL (p=0.019). The 10 year PCSS was 91.1% for nadir ≤ 0.5 ng/mL versus 85.7% for PSA ≥ 0.5 ng/mL (p=0.01), and the 10 year OS was 55.7% for nadir PSA ≤ 0.5 ng/mL versus 45.8% for nadir PSA ≥ 0.5 ng/mL (p=0.048). On multivariable analysis, nadir PSA ≥ 0.5 ng/mL was associated with a higher risk of biochemical failure (HR 7.60, 95% CI 4.92-11.76, p ≤ 0.001), distant metastases (HR 7.17, 95% CI 3.17-16.21, p ≤ 0.001), prostate cancer specific mortality (HR 13.91, 95% CI 4.77-40.60, p ≤ 0.001), and all-cause mortality (HR 2.04, 95% CI 1.39-2.99, p ≤ 0.001).

Conclusion: A nadir PSA ≥ 0.5 ng/mL after completion of ≥ 7560 cGy +/- ADT was associated with a higher risk of biochemical failure, distant meta

Meng Shao

Advisor(s): David Schreiber

The Impact Of Adjuvant Radiation Therapy For Malignant Salivary Gland Tumors

Background: The benefits of postoperative radiation therapy (PORT) for salivary gland tumors is unclear. The objective of this study was to analyze the outcomes and benefits of PORT for salivary gland tumors using the National Cancer Database.

Methods: Patients diagnosed with localized major salivary gland tumors who received partial or total parotidectomy from 2004-2012 were identified in the National Cancer Database. Only patients who had high grade or stage $\geq III$ low grade disease were included. Patients were identified as having no PORT or having received PORT to a dose of 5,000-7000cGy to the head and neck region or the parotid region. Kaplan-Meier and Multivariable Cox regression were performed for the whole cohort and repeated only including those ≥ 65 years old to compare overall survival between those receiving PORT and those that did not.

Results: There were 4,068 patients identified, of whom 2,728 (67.1%) received PORT while 1,340 (32.9%) did not. The 5 year overall survival and median survival was 56% and 73.1 months, respectively for PORT compared to 50.6% and 61 months, respectively for no PORT (p ≤ 0.001). On multivariable analysis, PORT (HR 0.78, 95% CI 0.71-0.86 P ≤ 0.01) was associated with improved survival. Older age, submandibular gland location, squamous cell histology, pT3-4 disease, positive nodal disease, and positive margins were all associated with inferior survival. On repeat multivariable analysis of patients ≥ 65 years old, PORT remained associated with improved survival (HR 0.76, 95% CI 0.64-0.91, p=0.003). Increasing age (HR 1.02), pT3-4 disease (HR 1.80-2.56), submandibular gland location (HR 1.67), high grade (HR 1.46), and positive margins (HR 1.26) were associated with inferior survival.

Conclusion: In this large, database-based study, PORT was associated with improved overall survival. Large prospective studies are needed to confirm these results.

Elizabeth Garay

Advisor(s): David Schreiber

Atypical And Malignant Meningiomas: Patterns Of Care In The Use Of Adjuvant Radiation

Introduction: The National Comprehensive Cancer Network recommends adjuvant radiation therapy (RT) for Grade III meningioma, however, its role in Grade II disease remains unclear. We utilized the National Cancer Data Base (NCDB) to assess patterns of care and survival of patients with Grade II and III meningiomas.

Materials/Methods: The NCDB was queried for patients with Grade II or III meningiomas who had undergone subtotal (STR) or gross total resection (GTR) followed by adjuvant RT between 2010–2012. Demographic, clinical, and treatment details were compared between those who did and did not receive RT. Kaplan-Meier analysis and log-rank test were used to compare overall survival (OS) between these two groups. Logistic regression was used to assess predictors of RT use and Cox regression was used to identify prognostic factors for survival.

Results: A total of 3,271 patients were included; median follow-up was 30.3 months. 2,985 (91.3%) patients had Grade II disease, of which 741 (25%) received RT to a median dose of 54Gy. 286 (9%) with Grade III disease, of which 170 (60%) received RT to a median dose of 60Gy. On logistic regression, the strongest predictor for the receipt of RT was Grade 3 disease (OR 4.30, $p < 0.001$), followed by increasing tumor size (OR 1.44-1.55), while the presence of GTR (OR 0.69, $p < 0.001$) and increasing Charlson/Deyo score (OR 0.61-0.70) were associated with decreased likelihood of RT. There were no significant survival differences based on RT. The 3-year OS was 89% for surgery alone compared to 88% for RT ($p = 0.86$). On Cox regression, female gender (HR 0.60, $p < 0.001$) and treatment at an academic center (HR 0.74, $p = 0.01$) were associated with improved survival. Receipt of RT (HR 0.94, $p = 0.64$) was not associated with an improvement in OS.

Conclusion: Most patients (>70%) in this large hospital-based study of patients with Grade II or III meningioma did not receive RT. There was no survival benefit for those who received RT.

Irimi Youssef

Advisor(s): David Schreiber

Patterns Of Care And Outcomes Of Postoperative Radiation Use For Low Grade Gliomas In United States Hospitals

Background: Prior studies have been suggestive of a progression-free survival benefit and survival benefit associated with postoperative radiation for low grade gliomas deemed to be high risk. However, the patterns of care have not been analyzed in the United States.

Methods: We accessed the National Cancer Database to identify patients with Grade 2 Oligodendroglioma or Astrocytoma between 2010-2012. Multivariable logistic regression was used to identify predictors of radiation usage and multivariable Cox Regression was used to identify covariables associated with differences in survival. **Results:** There were 1,952 patients included in this study, of which 518 (26.5%) received postoperative radiation. Most patients had oligodendroglioma histology ($n = 1,121$, 57.4%) compared to astrocytoma ($n = 831$, 42.6%). There were 1,626 patients who were either ≥ 40 years old or underwent a subtotal resection (“high risk”), and from these 495 (30.4%) received postoperative radiation. The remaining 326 patients were < 40 years old and had a gross total resection, and from these 23 (4.6%) received postoperative radiation. On multivariable logistic regression, only oligodendroglioma histology (OR 0.53) was associated with a lower likelihood of postoperative radiation. Age ≥ 40 years (OR 2.01), tumor size ≥ 6 cm (OR 1.62), subtotal resection (OR 1.65), and chemotherapy use (OR 3.96) were associated with an increased likelihood of postoperative radiation. On multivariable analysis, receipt of radiation was associated with worse overall survival (HR 2.06, 95% CI 1.51-2.80, $p < 0.001$). Oligodendroglioma (HR 0.31, 95% CI 0.22-0.44, $p < 0.001$) and gross total resection (HR 0.51, 95% CI 0.35-0.76, $p = 0.001$) were associated with improved overall survival. **Conclusion:** Patients treated in United States hospitals are not routinely referred for postoperative radiation for high risk low grade gliomas. Counterintuitively, patients who did receive radiation had worse overall survival.

Benjamin Parnes and Gabriel Karkenny

Advisor(s): Srinivas Kolla and Simcha Rimler

Automated Femoral Neck Shaft Angle Measurement Using Neural Networks

A neural network is a processing device modeled after the neuronal structure of the cerebral cortex. A recurrent neural network, a subtype of neural network, allows for the performance of temporal processing and sequence learning. We propose that a recurrent neural network can overcome some of the limitations of modern visual recognition software. We demonstrate this by training a recurrent neural network to correctly measure the femoral neck-shaft angle. This is the first report in the literature of achieving this task. The specific aim of the project was to use supervised learning to train a neural network on a set of 100 x-rays of adult normal right hips with femoral neck-shaft angles measured by the researchers. This trained neural network would then be tested with 100 x-rays of adult normal right hips with unknown femoral neck-shaft angle measurements. The network measurements of the 100 test cases would be compared to the measurements of a radiologist who was blind to the results of the neural network.

A recurrent neural network was coded in C++. 200 anonymized images of right hip x-rays were retrieved from PACS and assessed by the researchers for quality. 100 images were randomly selected to form the training set for the neural network, and the remaining 100 images comprised the testing set. The training set and the radiologist's measurements were entered into the neural network. The trained network was tested with 100 images from the testing set. A radiologist who was blinded to the results of the neural network provided femoral neck-shaft angle measurements for the 100 test images. The results of the neural network and the radiologist were compared using wxMaxima.

We are currently in the process of finishing the data analysis, and will update this section in the coming weeks. We hypothesize that a trained recurrent neural network will measure the femoral neck-shaft angle with a median absolute difference of less than 15 degrees compared to a radiologist.

Justin Levinson

Advisor(s): Ellen Ginzler

Molluscum Contagiosum In An Immunocompetent Systemic Lupus Erythematosus Patient

Molluscum Contagiosum is a poxvirus infection of the skin most commonly seen in children under the age of 11 and immunodeficient patients. We present a case report of an adult patient with Systemic Lupus Erythematosus (SLE) taking azathioprine who developed extensive molluscum contagiosum of the abdomen and genitalia. To our knowledge, this is the 1st report of a immunocompetent patient developing molluscum contagiosum in the setting of SLE and DMARD therapy.

We report a 30 year-old man with 13 year history SLE with class IV lupus nephritis and discoid lesions on face and scalp. The patient was well maintained on azathioprine with occasional prednisone for flares. He initially presented to a planned parenthood center complaining of new papules arising on his penis, mon pubis, and lower abdomen for 2 weeks, (see figure) The patient originally presented to a Planned Parenthood center where he was diagnosed and tested negative for a panel of STDs. He denied any predisposing factors such as swimming in pools, living in close proximity to children, or being sexually promiscuous. The patient was found to be HIV negative and was not on any concurrent immunomodulating medications, except for Azathioprine and prednisone. The patient was not in an active lupus flare with baseline complement and antibody levels, and his DLE was stable. He was treated with topical imiquimod and gradually improved.

Molluscum Contagiosum infection has been reported previously in association to the use of biologic treatments, but not in an immunocompetent patient, as presented here. Charley et al found that skin biopsies of Subacute Cutaneous Lupus Erythematosus (SCLE) directly around molluscum contagiosum lesions showed decreased SLE activity with suppression of clinical, histologic, and immunologic expression. Therefore, we report the first reported case of an immunocompetent patient developing molluscum contagiosum in the setting of SLE and DMARD therapy.

Jacqueline Skelton

Advisor(s): Jacob Aranda

Effects Of Intermittent Hypoxia And Hyperoxia On Tlr Signaling Molecules And Hypoxia Inducible Factors In Neonatal Rat Terminal Ileum

Background: Necrotizing enterocolitis (NEC) affects approximately 10% of premature infants (<1500g), with a 30% mortality rate and substantial morbidity. The pathogenesis of NEC is thought to be multi-factorial including inflammation via toll-like receptor (TLR) signaling molecules and hypoxic injury. Studies have shown that hypoxia inducible factor-1 α (HIF-1 α) plays a role in up regulation of TLR4 under hypoxic stress.

Objective: To test the hypothesis that the number of intermittent hypoxia (IH) episodes correlates with up regulation of TLR signaling molecules in the neonatal rat terminal ileum (TI).

Design/Methods: Neonatal rats at birth (P0) were exposed to either: 1) room air (RA); 2) hyperoxia (50% O₂); or 3) IH (50% O₂ with brief episodes of 12% O₂) at either 2, 4, 6, 8, 10, or 12 cycles/day from day 0 to 7 (P7), day 0 to 14 (P14), or day 0 to 14 with recovery in RA from P14-P21 (P21). TI tissue samples were collected at P7, P14 and P21 for histopathology (H&E), HIF-1 α and IGF-1 levels (ELISA), and localization of various TLR signaling molecules (APG-1, APG-2, MD2, IGF-1, NF κ B, TLR4, TIRAP, EGF, CD14, EPO, HIF-1 α , IRAK-1, IRAK-2 and MyD88) via immunofluorescence (IF).

Results: On P7, HIF-1 α was suppressed in the hyperoxia vs. RA group (p<0.05), and the 2/day (p<0.05), 4/day (p<0.05), 6/day (p<0.05) groups. However, on P7, HIF-1 α was increased in the 8/day (p<0.05) and 12/day (p<0.05) vs RA groups. On P14, HIF-1 α was suppressed in the hyperoxia (p<0.01), 2/day (p<0.01), 4/day (p<0.01), 6/day (p<0.01), 8/day (p<0.01), and 10/day (p<0.01) vs. RA group. On P21, HIF-1 α was increased in the hyperoxia vs RA group (p<0.01).

Conclusion: Data demonstrate that the number of IH episodes that the neonatal gut can sustain before induction of HIF-1 α (hypoxia), is 6. Re-oxygenation following chronic hyperoxia was associated with activation of intestinal inflammatory responses associated with TLR4. HIF-1 α may be an important factor in neonatal hypoxic gut injury.

Peiqi Ou

Advisor(s): Chongmin Huan

Sphingomyelin Synthase 2 Protects Against Lupus Pathogenesis Via Regulating The B Cell Tolerance

Systemic lupus erythematosus is an autoimmune disease characterized by the presence of anti-double stranded DNA antibodies produced by self-reactive B cells. Lupus remains a clinical challenge due to a lack of treatments that specifically target the pathogenic mechanism of the disease. Recent studies indicate that failed clearance of self-reactive B cells generated by somatic hypermutation in the germinal center is the primary source of autoreactivity in lupus. However, the protective mechanism of B cell tolerance in the germinal center is unknown.

Sphingomyelin synthase 2 (SMS2) is a lipid enzyme that catalyzes the synthesis of sphingomyelin and diacylglycerol on the plasma membrane. We found that SMS2 deficient mice had a lupus-like phenotype due to failure of elimination of the self-reactive B cells in the germinal center. SMS2 induced apoptosis in germinal center B cells via the activation of PKC δ , a recognized B cell apoptosis mediator that prevents the pathogenesis of lupus in both humans and mice. Activation of SMS2 inhibited the production of anti-double stranded DNA antibodies in a well-studied lupus animal model. Thus, our findings provide significant insight into the mechanism of B cell tolerance that prevents the pathogenesis of lupus in healthy individuals, and could help the development of a pharmacological approach for the effective treatment of lupus.

Andrew Akcelik

Advisor(s): Gainosuke Sugiyama

Is It Worth The Time And Effort To Make That Flap? Restrospective Comparison Of Standard Laparoscopic Ventral Hernia Vs. Rtapp Ventral Hernia Repair

Background: 100,000 elective ventral hernia repairs are done annually in the US, a quarter of which use minimally invasive surgery (MIS). Laparoscopic methods use an intraperitoneal onlay mesh (IPOM), which can be complicated by adhesions or mesh migration. The use of the robotic assisted laparoscopy has recently expanded to include ventral hernia repair. One advantage is the enhanced ability to perform transabdominal preperitoneal (rTAPP) repairs which reduce complications associated with IPOM method. This study aims to determine the difference in outcomes between IPOM and rTAPP.

Methods: A retrospective review of all MIS ventral hernia repairs at SUNY Downstate was conducted over 3 years. We identified 105 patients that underwent various minimally invasive ventral hernia repairs. We excluded those that underwent hybrid repairs, robotic IPOM and additional procedures. Patient demographics, total operative time and post-op outcomes were compared using T-Test and Chi Square.

Results: 21 patients underwent laparoscopic IPOM, and 32 underwent rTAPP. Average operating room time was 72.0 (SD 24.3) minutes for IPOM vs 161.0 (SD 63.8 $p < 0.0001$) for rTAPP repairs. rTAPP was significantly longer than laparoscopic IPOM ($p < 0.001$). There was no difference in length of stay between two groups. There were no major intraoperative complications or serious post-operative complications in both arms.

Conclusion: There was a significant difference in operative time when compared to laparoscopic IPOM. With more experience, the gap between the operative times may narrow. Prospective randomized controlled studies are needed to determine whether itâ€™s worth the time and effort to perform rTAPP.

Paul Chung

Advisor(s): Gainosuke Sugiyama

Malignant Large Bowel Obstruction: Is Less More?

Introduction: Many of cases of colorectal cancer are identified on screening colonoscopy, yet a subset of patients present with large bowel obstruction (LBO), requiring urgent or emergent operative therapy, for which there are several options of managing this condition.

Methods: Using the Nationwide Inpatient Sample (NIS) from 2010 – 2012, we included patients with LBO (ICD9 560.89, 560.9), with confirmed colorectal cancer (ICD9 153 - 154), excluding familial syndromes, concurrent neoplasms, age ≥ 60 years, and missing race data. Interventions were classified as non-surgical, diversion alone, diversion with open or laparoscopic resection, colonic stenting alone, or stenting with open or laparoscopic resection, and either open or laparoscopic resection alone. Multivariable logistic regression with inpatient mortality as the outcome was performed adjusting for age, gender, race, insurance status, income status, elective procedure status, hospital size, urban vs rural hospital setting, geographic region, type of procedure performed, tumor location, presence of perforation, and Elixhauser-Van Walraven score.

Results: Of 6,308 patients, 473 (7.50%) died, median age was 74.0 years, and 80.23% underwent an emergent procedure. Age (OR 1.67 [1.39 - 2.00], $p < 0.0001$), perforation (OR 2.85 [1.97 - 4.11], $p < 0.0001$), Elixhauser-Van Walraven score (OR 1.97 [1.71 - 2.27], $p < 0.0001$), and non-surgical intervention vs open resection alone (OR 2.06 [1.60 - 2.65], $p < 0.0001$) were predictive of mortality. However laparoscopic vs open resection was associated with decreased risk of mortality (OR 0.33 [0.17 - 0.67], $p < 0.0001$).

Conclusion: In this large observational study, laparoscopic vs open resection was associated with decreased risk of mortality. Further prospective studies are warranted to study longer term outcomes and better inform operative planning, particularly as less invasive options become more widely available.

Yohannes Constable

Advisor(s): Gainosuke Sugiyama

Is It Feasible To Offer Robotic Assisted Transabdominal Pre-Peritoneal Hernia Repair At An Inner City Safety Net Hospital? Early Lessons Learned.

Background: Multiple studies have shown some advantage to minimally invasive inguinal hernia repair compared to open hernia repair. There is scarce data on robotic surgery in high risk populations with advanced disease. We report our initial experience with robotic transabdominal preperitoneal (rTAPP) inguinal hernia repair.

Methods: A retrospective chart review identified cases of rTAPP over 33 months. Demographics, narcotics received in the recovery room or within 24 hours, major intraoperative complications (bleeding, conversion to open) and 30-day morbidity/mortality were reviewed. Primary outcomes included rate of complications: urinary retention, chronic pain, seroma, and recurrence. Patients were stratified by complexity of operation.

Results: 71 patients underwent 101 repairs-- 30 were bilateral. 59 (83.1%) were male. 59 (83.1%) patients were Black. Mean age was 54.9 years. Mean BMI was 26.8kg/m². 17 (23.9%) patients had scrotal hernias, 3 (4.2%) were incarcerated, and 7 (9.8%) were recurrent. 51 (71.8%) patients required no postop narcotics. Patients with bilateral nonscrotal hernias were more likely to require narcotics compared to patients with unilateral hernias (70.9% vs 26.7% p<0.001). 64 (90.1%) patients were same day discharges. There were no major intraoperative complications. Postoperative complications included 5 seromas (7.04%), 3 hematomas (4.2%), 1 superficial surgical site infection (1.4%), 6 urinary retentions (8.4%) and 1 chronic pain (1.4%). No statistical differences existed between complication rate and hernia complexity. Of the 2 hernia recurrences both occurred in patients that underwent repair of bilateral hernias with scrotal involvement.

Conclusion: rTAPP inguinal hernia repairs are feasible and safe with low complication rates. It has application in complex cases including scrotal, recurrent, and incarcerated inguinal hernias. Further studies are needed to compare this technique vs open and standard laparoscopic approach.

Michael Smith

Advisor(s): Gainosuke Sugiyama

It's Never Who You Think: Outcomes Of Self-Inflicted Gunshot Wounds

Introduction: Suicide is a public health crisis in the United States, with over 400,000 people treated in emergency rooms in 2013 with self-inflicted injuries, and over 41,000 deaths. This makes it the 10th leading cause of death in the country and the 2nd leading cause of death in 15 to 35-year-olds. Using a large nationwide database, we sought to examine the outcomes of patients who present with self-inflicted gunshot wounds (GSW) and risk factors for mortality.

Methods: Data was collected from the Nationwide Inpatient Sample (NIS) using ICD9 codes for self-inflicted GSW. Patients age <18 years and with missing gender data were excluded. We then calculated the Trauma Mortality Prediction Model (TMPM) score for each patient to provide an estimate of trauma severity and the Elixhauser-Van Walraven score to assess comorbidity burden. Using inpatient mortality as our primary outcome, we then performed multivariable logistic regression to adjust for age, sex, race, insurance status, income, region, TMPM score, Elixhauser-Van Walraven score, and psychiatric history.

Results: A total of 3,349 patients sustained self-inflicted GSW. The majority of these patients were male (80.6%) and White (80.5%). The mortality rate was 33.2%. Variables associated with mortality on multivariable logistic regression analysis included age (OR 1.93, p<0.0001), lack of medical insurance (OR 1.49, p=0.0185), and TMPM score (OR 6.10, p<0.0001). Variables protective of mortality included female sex (OR 0.63, p=0.0014), history of psychosis (OR 0.09, p<0.0001), and history of depression (OR 0.32, p<0.0001).

Conclusions: In this large, retrospective analysis of the NIS database, we found that among patients with self-inflicted GSW, age, lack of medical insurance, and increased TMPM score were associated with greater risk of mortality. Protective factors were female sex and psychiatric history. Further studies should examine these cases on a prospective basis to help mitigate these risks.

Sean McKee

Advisor(s): Leon Boudourakis

Accuracy Of Physical Examination, Ankle-Brachial Index, And Ultrasonography In The Diagnosis Of Arterial Injury In Patient With Penetrating Extremity Trauma: A Systematic Review And Meta-Analysis

Background: Penetrating Extremity Trauma (PET) may result in arterial injury (AI), a rare but potentially life-threatening surgical emergency. Accurate diagnosis is vital to ensure rapid vascular intervention or operative repair. Methods: Using a systematic review, we determined the utility of Physical Examination (PE), Ankle-Brachial Index (ABI), and Ultrasonography (US) in the diagnosis of AI in ED patients with PET. We searched PUBMED, EMBASE, and SCOPUS for studies of ED patients with PET with the reference standard to include CT angiography (CTA), catheter angiography, or surgical exploration. We calculated positive and negative Likelihood Ratios (LR+ and LR-) of PE signs, US, and ABI. Using established CTA test characteristics and applying Pauker-Kassirer method, we developed a test-treatment threshold model. Results: We included 8 studies (n=2,121, arterial injury prevalence: 15.7%). Due to high heterogeneity ($I^2 > 75\%$) of the results, we could not calculate LR+ or LR- for hard signs or LR+ for ABI. The LR- for ABI was 0.59 resulting in a post-test probability (PTP) of 9% of arterial injury. US had LR+ 35.3 and LR- 0.24; PTP for AI were 89% and 5% after a positive or negative US, respectively. The PTP of AI with positive US exceeded the CTA treatment-threshold (72.9%). The PTP of AI with negative US (5%) and normal ABI (9%) were greater than the CTA testing-threshold (0.14%). Normal PE in sequence with normal ABI had a combined LR- of 0.014 resulting in an AI PTP of 0%. Conclusions: In PET patients, positive US may obviate CTA. In patients with normal PE and normal ABI, AI can be ruled out. However, normal ABI or negative US cannot independently rule out AI. Due to large study heterogeneity, we cannot make management recommendations when hard signs are present or absent or when ABI is abnormal. In these situations, the physician should use clinical judgment to determine need for further observation, CTA or catheter angiography, or surgical exploration.

Zuzanna Niewiadomska and Sarrina Shruga, Kaylene Barrera

Advisor(s): Vittorio Rotella

Near-Simultaneous Three-Limb Compartment Syndrome In The Absence Of Trauma Or Reperfusion: A Case Report And Review Of Literature

Exercise-induced compartment syndrome (CS) is an uncommon medical entity which is usually managed conservatively and resolves spontaneously without the need for surgical intervention in most cases. We present a unique and extreme case of exercise-induced CS in three limbs requiring operative intervention. Our patient is a 28-year old healthy male who presented to the emergency room with bilateral lower extremity pain after running for several minutes on a treadmill with steep incline. The patient was admitted for observation and medical management. However, 18hrs later, the patient's condition worsened. He had worsening pain with weaker pulses and an increasing CK level (5 to 10 to 23K) despite aggressive fluid resuscitation. He was immediately taken to the operating room and underwent bilateral lower extremity 4-compartment fasciotomies. Postoperatively, the patient received aggressive resuscitation to prevent rhabdomyolysis-induced kidney injury. Just 18hrs later, the patient had a mottled, edematous, and numb right hand with no radial pulse and a tense forearm. He was diagnosed with a right forearm CS and a fasciotomy was immediately performed. Three months later he developed CS of the left foot which required fasciotomy. Throughout his prolonged and complicated course he continued to have preserved circulation and was able to ambulate.

Chronic exertional CS is usually a benign entity that manifests as numbness, pain and swelling of the arms or legs. The condition is usually self-limiting and resolves with rest and avoidance of the activity. Those affected are usually runners, bikers, or swimmers. Occasionally this condition can progress to a true CS, causing ischemia and jeopardizing the affected limb. When this occurs, surgical release of the fascia is required. We present this interesting case to highlight the successful management of exercise induced CS; more importantly, to explore the warning signs of impending need for operative intervention in this disease.

Ben Silverstein

Advisor(s): Terri Martin

Elective Cholecystectomy In The Veteran Population: A 14-Year Evaluation Of Trends And Outcomes

Although elective cholecystectomy is a common procedure, postoperative outcomes in the veteran population are not well characterized. Our objective is to examine outpatient elective cholecystectomy trends and outcomes in this frequently overlooked subset of patients.

A retrospective review of outpatients who underwent elective cholecystectomy at the New York Harbor Veterans Administration facilities 2000-2014 was done. Data on patient characteristics, intra-operative findings, and postoperative outcomes was analyzed.

A total of 155 cholecystectomies were performed: 142 laparoscopic and 13 open. The sample consisted of 132 men and 23 women; mean age of 58.6 ± 13.7 years; 22.6% were ≥ 70 years. Symptomatic cholelithiasis/chronic cholecystitis was the most common reason to operate (74.2%). Conversion to open cholecystectomy occurred in 14.8%. Over time rate of planned laparoscopic approach significantly increased ($p=0.033$) and the conversion rate significantly decreased ($p=0.049$) without increase in complications. Median length of stay (LOS) was one day. The 30-day complication rate was 14%; wound infection was most common (6.5%). Two patients expired within 30 days (1.3%). Median postoperative follow-up duration was 16 days (range 4-326d). Factors associated with complications included cardiac disease ($p=0.022$), conversion to open ($p=0.005$), failure to obtain "critical view" ($p=0.011$), and longer operative time (183.7 ± 101 vs 134.7 ± 56.2 min, $p=0.001$). Patients ≥ 70 years had higher rates of cardiopulmonary comorbidities ($p < 0.003$), planned open cholecystectomy ($p=0.034$) and longer LOS ($p=0.015$) and no significant difference in conversion rate, operative time, or complications.

Increasing rates of planned elective laparoscopic cholecystectomy within our VA system mirrors that of the private sector. Although intra-operative factors associated with complications are likely related to severity of disease, surgeons should strive to obtain the critical view.

Daniel Gross

Advisor(s): Tim Schwartz

Enteroatmospheric Fistulas Old Principles New Applications

Enterocutaneous Fistula (the abnormal connection between bowel and skin) has been a well described problem, first reported in modern literature in 1822. Management has been well-described, and patient outcomes have improved. However, with the popularization of damage control surgery in the acute care setting, a new entity of fistula has arisen, the enteroatmospheric fistula (EAF). The enteroatmospheric fistula occurs between the bowel and the atmosphere, without the benefit of a well vascularized tract to isolate bowel contents from the peritoneum. Despite modern advances in understanding nutrition and in controlling intraabdominal sepsis, the morbidity and mortality for patients afflicted remains unacceptably high in literature (44% mortality in some series). Unfortunately due to the relative rarity of this condition, the literature consists nearly entirely of case reports and occasionally small case series. Our retrospective chart review of the clinical course of these patients at Kings County Hospital Center, a level 1 trauma center reveals a mortality rate of 7%. We believe our results are reflective a new multidisciplinary approach as well as adherence to time honored surgical principles in deploying these new techniques and technologies. Nevertheless, despite our improved mortality, the morbidity associated with this condition remains unacceptably high. The limitation of our study are that it is a retrospective chart review, the number of charts is relatively small ($N=14$). In summation, the management of enteroatmospheric fistulas remains a challenge. There is no "one size fits all" solution, with each patient having highly complex and unique pathology. Management must be tailored to their unique physiology.

S M Golam Mohiuddin

Advisor(s): Daniel Beckles and Eduardo Mascareno

Characterizing The Role Of Hexim1 During The Progression Of Heart Failure

Heart failure, a disease of multifactorial origin, is one of the leading causes of death in the USA. Hexim1 is a conserved mammalian transcription factor that plays an important compensatory role during cardiovascular stress. However, little is known of Hexim1 contribution to the progression of heart failure. To this end, we are studying the progression of heart failure due to pressure overload hypertrophy (hypertension model) and Chagas-induced cardiomyopathy (inflammatory model) in Hexim1^{+/-} mice. Proteomic and genomic analysis indicate an increased inflammatory response, M-mode echocardiography revealed enhanced left ventricular remodeling and histopathology showed increased fibrosis in both heart failure models, which suggests that Hexim1 is an inhibitor of the remodeling leading to heart failure disease.

Chen Zhao

Advisor(s): Laura Hemmy

Findings From The Nun Study: Slower Gait Speed Increases Risk For Dementia

Objective: To use commonly measured physical parameters, including gait speed, to predict risk of dementia using data from the Nun study, a longitudinal, epidemiologic study of aging and dementia, ongoing at the University of Minnesota.

Method: Of the 678 Nun Study participants, 307 cognitively intact sisters were included in this study. Cox regression was performed on the 307 cognitively intact sisters, as well as a subgroup of cognitively intact sisters without Lewy bodies in the amygdala (n=132), and an even smaller subgroup of cognitively intact sisters without Lewy bodies who did not use any walking aids at the initial screening (n=114). All cause dementia was the outcome measure. The independent variables were four physical therapy assessment measures, all easily administered in a clinical setting, including: gait speed (m/s), timed up & go test (TUG) (sec), handgrip strength (kg), and hand skills (open/close door) (sec).

Results: Gait speed derived from the 6-foot-walk test significantly predicted dementia onset in the main analysis as well as both subgroup analyses. Increasing gait speed by 1 m/s during a 6-foot-walk reduces risk of dementia onset by 80.6% over the ensuing 9 years. Increasing gait speed by 1 m/s during a 50-foot-walk also reduces risk of dementia onset, but to a lesser extent, by 63%.

Conclusions: Faster gait speed is associated with a significantly reduced risk of dementia onset approximately 9 years later. In our models of multiple physical parameters, gait speed and age repeatedly reached significance ($p < 0.05$), while other parameters including handgrip strength and hand skills did not. This provides further evidence that gait speed has greater predictive value for cognitive decline than other physical therapy measures. Gait assessment may be useful as an early clinical screening tool for individuals at risk for cognitive decline.

Baho Sidiqi

Advisor(s): David Schreiber

Patterns Of Care And Outcomes Of Postoperative Radiation Use For Intracranial Hemangiopericytoma In United States Hospitals.

Background: Several small (~100 patients) studies have been suggestive of a survival benefit associated with postoperative radiation for intracranial hemangiopericytoma. Given the rarity of this disease, we sought to examine the patterns of care and outcomes of this tumor in the National Cancer Database (NCDB).

Methods: We accessed the NCDB to identify patients with intracranial hemangiopericytoma between 2004-2012. Patients were categorized by surgical status, postoperative radiation usage, and location (meningeal or brain parenchyma). Multivariable Cox Regression was used to identify covariables associated with differences in survival.

Results: There were 588 patients included in this study, of which 323 (54.9%) received postoperative radiation. The median age at diagnosis was 51 years and the median follow up was 55.1 months. There were no differences in overall survival between the two groups. The 5 year overall survival was 77.1% for those receiving postoperative radiation and 83.8% for those who did not ($p=0.14$). On subgroup analysis by tumor location there remained no significant differences between groups. For those with tumors in the brain parenchyma, the 5 year overall survival was 77.6% for postoperative radiation compared to 85.8% for no postoperative radiation ($p=0.08$). For those with tumors identified as being meningeal in origin, the 5 year overall survival was 75.7% for those who received postoperative radiation compared to 81.6% for those who did not receive postoperative radiation ($p=0.86$). On multivariable analysis, postoperative radiation was not associated with any differences on survival (HR 1.35, 95% CI 0.90-2.02, $p=0.15$).

Conclusion: This is the largest study to date analyzing intracranial hemangiopericytoma. We found that >50% of patients receive postoperative radiation but there was no survival benefit associated with this treatment. Further studies are necessary to better determine how best to treat this rare disease.

Jennifer Chao

Advisor(s):

The Impact Of Stickers On Family Satisfaction At A Pediatric Emergency Department Visit

Background: In the competitive world of healthcare, identifying cost-effective methods to improve patient satisfaction is advantageous. After a visit to the doctor, children often receive a sticker. This is assumed to improve the experience of the visit.

Objective: We test the null hypothesis that there is no difference in patient satisfaction based on giving a sticker at a visit to the pediatric emergency department.

Methods: This was a prospective randomized cross-sectional study conducted at an urban teaching hospital. Sticker days (SD) and non-sticker days (NSD), were randomly assigned. On SD, physicians gave stickers to patients age 2-12yo with an Emergency Severity Index of 3-5. On NSD, no stickers were available in the emergency department (ED). At the end of the visit, a brief anonymous survey was given to the parent or legal guardian who accompanied the child in the ED. The survey was adapted from the ED Patient Experiences with Care survey and rated family satisfaction on a 0-10 Likert scale. Data were reported as means and inter-quartile ranges (25%-75%). Group comparisons of family satisfaction were made with Mann-Whitney U; $\alpha=0.05$, 2 tails, analysis by intention-to-treat.

Results: There were 65 patients in the SD group (median age 6y IQR 3,9; 64% male) and 56 patients in the NSD group (median age 6y IQR 2.5,9.5; 49% male). The median family satisfaction score in the SD group was 10 (IQR 8,10) which was not statistically significantly different ($p=0.97$) compared to the NSD group 10 (IQR 8,10).

Conclusion: Stickers did not improve family satisfaction at a Pediatric Emergency Department visit.

Alexander Choi

Advisor(s):

Neuropsychiatric Manifestations Of Cerebral Amyloid Angiopathy In The Setting Of PRES

Cerebral amyloid angiopathy (CAA) presenting acutely as lobar hemorrhage (LH) is well established. Less frequently, CAA is known to be associated with neuropsychiatric disturbances including agitation, psychosis (delusions, auditory/visual hallucinations), depression, cognitive dysfunction (perceptual speed, episodic memory). Symptoms range from mild, chronic deficits with moderate association with Alzheimer’s Disease (AD) in neuropathological series to rapidly progressive dementia in case of complications by hemorrhage, PRES, inflammation, and seizure.

A 52-year-old woman with PMH HTN and normal functional status brought by EMS to the ED after walking into the police station nearby her house confused and started vomiting. Clinically, the patient appeared to be manic. Her vital signs in the ER were remarkable for BP of 226/119 mmHg and lack of fever. Her initial CT head w/o contrast showed R parieto-occipital hypoattenuation respecting the gray-white border consistent with vasogenic edema. She was admitted to Neurology inpatient service for further work-up. MRI brain showed T2 hyperintensities of predominantly white matter but also involving the gray matter without mass effect and not within a vascular territory. Gradient echo revealed numerous magnetic susceptibility artifacts pathognomonic for cerebral amyloid angiopathy. Exam was pertinent for inattentiveness, memory deficits, and perseveration. Differential included PRES, glioma, atypical infection. This case displays a less common presentation of cerebral amyloid angiopathy, viz. complicated psychosis and cortical deficits of R-L confusion, visuospatial apraxia, and transcortical sensory aphasia, with partial response to steroid therapy and BP control. Further reporting and characterization of symptoms and complications of CAA are needed to improve the management.

Stacy-Ann Phillip

Advisor(s):

California'S New Amended Canra: Further Erosin Of Psychotherapist-Patient Privilege

California Assembly Bill 1775 is an amendment to the existing Child Abuse and Neglect Reporting Act (CANRA) which mandates certain persons (including psychotherapists and other mental health caregivers) to report suspected cases of child abuse or neglect, including sexual exploitation. This amendment expands the definition of “sexual exploitation” to include downloading, streaming or accessing child pornography via any means, including viewing this material on the Internet. Under the act, failure to report is considered a misdemeanor. This new law has important implications for the performance of mental health assessments and delivery of mental health care in California, and it may serve as a model for other states in the future. This law sets an extremely low bar for mandated reporting of child porn offenses and does not consider whether there is the potential for imminent or direct harm to a child. It will not only unnecessarily flood an already inundated legal system and increase demand of the impoverished correctional mental health services, but further discourage potential patients from seeking help, and may impede the development of the confidential relationship necessary for successful treatment. Unfortunately, psychiatrists and other mental health caregivers did not mount any meaningful opposition to this law. This letter serves as to address these concerns and its potential effects on mental health care.

Navneet Singh

Advisor(s): Hector Ojeda-Martinez

Prevalence Of HIV-Associated Pulmonary Hypertension As Assessed By Transthoracic Echo

Introduction: Pulmonary Hypertension is classified based on etiology, with human immunodeficiency virus (HIV) associated disease falling into Group 1 Pulmonary Arterial Hypertension (PAH). The mortality of PAH is several folds higher in patients with HIV than without, reaching 40% for patients in World Health Organization Functional Class (WHO-FC) III-IV. The clinical problem of whether asymptomatic patients should be screened has not been addressed, which is the aim of this study. While transthoracic echocardiography (ECHO) has not shown ideal correlation with findings on right heart catheterization, use of ECHO is still a well-accepted noninvasive screening tool to assess for suggestion of PAH. Several studies have used transthoracic echocardiogram (ECHO) to look at the prevalence of PAH in the HIV population with some studies estimating prevalence between 0.5 and 2%, however this has only been investigated in symptomatic patients.

Methods: This was a retrospective review of HIV-infected patients at the Brooklyn VA. All HIV-positive patients seen in the HIV clinic between January 2015 to September 2016 were assessed for prevalence of pulmonary arterial systolic pressure (PASP) greater than 35mmHg as assessed by transthoracic ECHO to be suggestive of PAH. Other variables including age, gender, CD4 count, viral load, anti-retroviral therapy, cardiopulmonary comorbidities and hepatitis C co-infection were also collected.

Results: Of 100 HIV-positive patients who received a transthoracic ECHO from January 2015 to September 2016, 24 had a PASP greater than 35mmHg. This suggests a prevalence of PAH of 24% in this population. Out of these patients, only 12.5% were noted to have uncontrolled viral load, the remainder had suppressed viral loads and absolute CD4 $>$ 200.

Conclusion: There is a higher prevalence of PAH found amongst the HIV-infected population at our institution than would be expected based on prior data. Given the high mortality of this disease, fut

Advisor(s):