

Nneoma Obiejemba

Advisor(s): Rauno Jok

Asthma as a comorbidity in adult patients receiving treatment for back pain in an emergency department, ambulatory surgery and inpatient setting at a large, inner city, municipal New York hospital.

Rationale: As pain can exacerbate asthma, we hypothesize that people with back pain and asthma experience exacerbation of asthma during flare of back pain. Men and women equally suffer from back pain. Whether sex and age influence the co-occurrence of asthma and back pain has not been determined.

Method: This was a cross sectional study using secondary data. Adults who presented to Kings County Hospital from October 1st 2015 to March 17th 2017 with ICD-10 codes for the diagnosis of low back pain, cervicgia, lumbago with sciatica, radiculopathy, sciatica, dorsalgia and asthma were included in the analysis. Patients were categorized by location of treatment: Inpatient (IP), Emergency Department (ER), and Ambulatory Surgery (AS).

Analysis of data using Stata Version 14. Univariate, bivariate, and multivariate analyses were conducted.

Results: The mean age of the study population was 46 yrs +/-5, while the median was 47 years. The occurrence of asthma with back pain was 2% (404). Of this, 274 (68%) were females and 130 (32%) were males (P <0.001). Age was not significantly associated with the co-occurrence of asthma and back pain. After adjusting for sex, age, medical condition, and location of treatment. Males were 36% less likely to present with asthma and back pain when compared to females (OR 0.64 (95% CI: 0.51 to 0.79), P<0.001. There was no association between asthma and back pain. Patients were 20% less likely to be treated for asthma and back pain in the ER compared to AS. Patients were 4 times more likely to be treated for asthma and back pain in IP compared to AS.

Discussion: Our study showed that females were more likely to present with a co-occurrence of asthma and back pain than males in acute care hospital settings. A better understanding of the characteristics of pain and its influence on co-existing conditions such as asthma and back pain will help inform approaches for managing persons presenting to the hospital.

Shumaila Khan

Advisor(s): Rauno Jok

Association of global trends of national tobacco smoking rates with prevalence of pediatric asthma and allergy.

Rationale: As there is a global decline in tobacco smoke prevalence, the rates of allergic diseases are increasing. Interestingly, tobacco exposure increases T-regulatory activity in murine models, which may suppress allergic responses. We determined whether there is an association between change in national tobacco smoking prevalence and change in childhood asthma and allergy throughout the world.

Methods: We compared the prevalence of asthma, allergic rhino-conjunctivitis and eczema results from phase I and phase III of the ISAAC study in children ages 6-7 and 13-14 with concurrent WHO tobacco prevalence for each ISAAC nation (n= 55), with an average of 7.2-year interval between ISAAC phase study. Change in raw prevalence's were determined. Statistical analysis was done using the Spearman correlation coefficients.

Results: Tobacco rates between year1 (Phase I) and year2 (Phase III) were 2% (SD=2.6) lower on average.

There was a significant positive correlation between the change in tobacco rate and asthma prevalence in the 13-14-year group (p=0.02) but not the 6-7-year group (p=0.6).

There was a significant negative correlation between change tobacco rate and change in eczema 6-7-year group (p=0.047) but not 13-14-year group (p=0.41).

There was no correlation between the change in tobacco rate with change in allergic rhino-conjunctivitis in either 6-7 or 13-14-year group (p=0.23 and 0.62, respectively).

Conclusion: While decrease in tobacco smoking may decrease airway asthma responses, it may also increase eczema, possibly due to decrease in tobacco-mediated immune suppression.

Akeem Lewis

Advisor(s): Scott Mcgarvey

Discordant Perspectives: Barriers to End of Life discussions in urban underserved populations

Advance Directives (AD) and Health Care Proxies (HCP) enable physicians to provide treatment concordant with patients' wishes. A retrospective chart review of patients aged 65 years and older at a primary care clinic in Central Brooklyn showed a discussion rate of 37.5% for either AD or HCP. We sought to understand barriers to advance care planning in our practice.

We distributed a survey assessing awareness and interest in advance care planning in 266 patients. Of these, 30% completed the survey. 41 physicians received an electronic survey and 63% responded. Respondents used a Likert scale to rate the following for end-of-life (EOL) care: family input, independence, dignity, freedom from or reduction of pain and suffering, living as long as possible and cost of health care.

Patients and providers thought it was important to have EOL wishes in writing (86% and 96% respectively), yet only 24% of patients had heard of "Advance Directives". 83% of patients were interested in discussing EOL care while 42% of physicians weren't. More than 70% of patients selected "living as long as possible", "cost of healthcare" and "family input" as very important. Adversely, 4% of physicians considered "living as long as possible", and less than 25% of physicians considered "cost of healthcare" and "family input" as very important. More than 70% of physicians rated dignity, independence, and freedom from suffering as very important.

Despite not knowing the term, most patients want AD. Physicians' values contrast markedly with patients' about EOL care. Physician disinterest in having their own EOL conversations imply bias against conversations with patients. Accepting different perspectives is paramount when addressing EOL wishes with patients. Emphasis on freedom from suffering may not resonate with our patients. Physicians should consider including family members, understand how cost of medical care affects patient decisions, and explore what living as long as possible means.

Christon Grant

Advisor(s): Melissa Lee

The Power to Choose: Prostate Cancer Screening and Shared Decision-Making in African-American and Afro-Caribbean Men

Goals and Objectives: To increase documentation of shared decision-making (SDM) for prostate cancer screening to 25% in 2 months in males of African descent aged 45-69 years in the resident-run primary care practice at Kings County Hospital (KCH).
Background: In 2018, the US Preventive Services Task Force (USPSTF) recommended that men engage in SDM with their clinicians regarding the use of Prostate-Specific Antigen (PSA) in prostate cancer screening. The lack of generalizability of this guideline to our high-risk population may reflect a broader healthcare disparity in our urban community.

Design/Methods: An educational intervention directed at resident physicians highlighted the gap in documentation, the 2018 USPSTF guidelines and population specific recommendations from our Department of Urology. A patient friendly fact-sheet emphasizing risks and benefits of PSA screening was developed for use during patient encounters. A post-intervention prospective chart review of SDM documentation was then performed.

Results: At baseline, 83 charts were reviewed and only one provider documented a PSA discussion. There was no documentation of SDM in any other chart, yet 37% of patients had a PSA ordered. In the post-intervention group, SDM was documented in 13 out of 54 encounters (24%). Of the 13, 7 agreed to testing and 6 declined. 16% of patients had PSA ordered without documentation of SDM. Two providers deferred the discussion until a future visit.

Conclusions/Limitations/Next Steps: Current USPSTF guidelines for prostate cancer screening are not population specific. Physicians should tailor screening and SDM to the population that they serve, especially in communities at higher risk. Increased SDM and screening in our high risk population will support future research around the epidemiology of prostate cancer in males of African descent, allowing future guidelines to address the health care disparities in our primary care community.

Kenneth Ng

Advisor(s): Ming Zhang

Racial Disparities in Preeclampsia and Preterm Birth

Racial disparities exist in both preeclampsia and preterm birth. According to one study, preeclampsia in women aged 20-34 years occurred in African American women at a 3.2% rate compared to a 1.8% rate in Caucasian women¹. According to another 2014 study, African American infants were approximately 50% more likely to be born preterm than Caucasian, Hispanic, and Asian infants². SUNY Downstate Medical Center serves socioeconomically disadvantaged populations. Approximately 1400 infants are delivered annually, 90% of whom are African American. This study examined records of 9373 deliveries from 2010 to 2015 for preeclampsia, preterm labor, and preterm birth. Data was analyzed using Chi-square and Mann-Whitney U tests. It was found African American women were diagnosed with preeclampsia at a rate of 6.68% (95% CI 6.15-7.21%), whereas non-African American women were diagnosed at a rate of 3.26% (95% CI 1.92-4.60%). African American women delivered preterm 26.96% (95% CI 26.02-27.85%) of the time, whereas women of other races delivered preterm 22.67% (95% CI 19.51-25.82%) of the time. African American patients with preeclampsia gave birth at lower gestational ages, on average, than African American patients without preeclampsia (35.67+/- 3.845 versus 36.40+/- 5.017, P<0.001), while non-African American patients with preeclampsia did not give birth at lower gestational ages, on average, than non-African American patients without preeclampsia (36.71+/- 3.989 versus 36.89+/-4.383, P=0.311), suggesting preeclampsia has a more severe effect on preterm birth among African American than non-African American women. The data compiled may raise awareness among clinicians of racial disparities present in pregnancy.

Mohammad Khan

Advisor(s): Aditya Maheshawari

Evaluation of the Content and Accessibility of Web-Based Content for Orthopaedic Adult Reconstruction Fellowship Applicants

Introduction: Orthopaedic surgery residents seeking fellowship training in adult reconstruction (AR) often use the Internet to research programs and manage applications. This study evaluated accessibility of information from commonly used databases/search engines and assessed AR fellowship websites' content.

Methods: Programs were compiled using SF Match, AAHKS, Hip Society, Knee Society, MSTs, and ACGME. They were assessed for accessibility via viable links to fellowship-specific websites and Google searches using program names and keywords "adult reconstruction orthopaedic fellowship" and "hip knee tumor orthopaedic fellowship". These websites were judged on two categories: program information and recruitment content.

Results: Of the 85 programs identified, 82 were listed by AAHKS, and 84 were listed by SF Match. Of the 85 total programs, 11 (13%) were in SF Match, 4 (5%) had viable program-specific links listed in AAHKS, and 68 (80%) programs had fellowship-specific websites. Of the 68 programs, 96% had program descriptions, 71% discussed the application process, 26% discussed current fellows, and 17.9% discussed fellowship graduates. 59% of programs had information on didactics, 81% highlighted commonly-performed cases, and 11 (16%) had on-call schedules. Program websites differed from self-reported information on SF Match (i.e. case volume and anticipated research production were reported at 70% and 45% lower rates, respectively). Google searches using common key words found websites for 78% and 74% of programs, respectively, though this rose to 97% and 93% when excluding programs without websites. 18 of the 22 current ACGME accredited programs were listed through SF Match and AAHKS

Conclusions: This study shows the lack of websites with complete information for orthopaedic residents applying for AR fellowship from the SF Match and AAHKS databases. Improvement in accessibility and quality of information on these websites can help applicants obtain information.

Daniel Suarez

Advisor(s): Aditya Maheshwari

Does Surgical Approach for Total Hip Arthroplasty Impact Infection Risk in the Obese Patient: A Systematic Review

Introduction: Surgical approach may be a modifiable risk factor for surgical site infection (SSI) following total hip arthroplasty (THA). This study sought to systematically review the combined effects of surgical approach and obesity, an additional risk factor, on the rate of THA SSIs.

Methods: We reviewed three literature databases to identify studies that reported on THA SSI rates by surgical approach. The following inclusion criteria were implemented: (1) underwent primary unilateral THA; (2) SSIs were reported, with stratification by pt body mass index (BMI, kg/m²); and (3) SSI rates were reported, with stratification by surgical approach.

Results: Five studies reported on the direct anterior approach (DAA) alone. One study (n=1,621) found that the SSI rate was significantly higher in pts with a BMI>35. A second study (n=611) reported that wound complication rate correlated with increasing obesity class. A third study (n=210) found that BMI>30 had a significantly higher superficial wound complication rate. The fourth study (n=136) found a non-significant increase in SSIs in BMI>35 vs. BMI<25, but a significantly higher rate of reoperations.

Two studies compared DAA and posterior approach (PA). One study (n=3,759) found BMI>30 in DAA group had an increased SSI risk and BMI>40 with even higher risk. BMI>30 with PA group did not carry increased risk, but BMI>40 did. The second (n=4,651) found BMI>35 was an independent risk factor for both wound dehiscence and periprosthetic joint infections (PJI). One study (n=1,207) compared Hardinge approach and PA, reporting that increasing BMI had an increased PJI risk for PA only.

Conclusion: The literature suggests that obesity modulates SSI risk differently based on THA approach. With DAA, increasing BMI had a greater impact on SSI risk. It remains unclear whether PA carries the same SSI risk as DAA for obese pts. BMI>40 may be the threshold at which SSI risk increases for PA. Further comparative studies are warranted

Jason Rahimzadeh

Advisor(s): Aditya Maheshwari

Single-Stage Multiple versus Multi-Stage Single Intramedullary Nailing for Synchronous Multiple Long Bone Involvement in Metastatic Bone Disease

Introduction- Intramedullary nailing for pathologic fractures is a common treatment for metastatic bone disease. Given the theoretical higher risk of complication, it has been recommended to perform single stage nailing of the long bones. This study investigated whether single-staged, multiple long bone (SSMB) intramedullary nailing is as safe as multi-stage nailing of one or multiple bone (MSMB) procedures or single-stage single long bone (SSSB, controls) intramedullary nailing.

Methods- This study is a retrospective review of impending or pathologic fractures in long bones in the setting of metastatic bone disease from 2011 to 2018. All patients with >1 intramedullary nails placed were grouped by single-staged, multiple long bone (SSMB), multi-staged, multiple long bone (MSMB) and single-staged, single long bone (SSSB).

Results- There were 15 patients in the SSMB cohort and 23 patients in the MSMB cohort and 54 in control. SSMB patients had higher BMI than MSMB and SSSB. Among the 150 intramedullary nails, 85 were placed for impending fracture and 65 for pathologic fracture, in femur (n=89), humerus (n=51), and radius (n=5). In single-staged the most common combinations were femur-humerus and in multi-staged was femoral. SSMB had lower blood loss, complications and transfusion than MSMB, though both were higher than SSSB. There were two deaths in SSMB, six in MSMB, and three in SSSB.

Discussion- This study has shown patients can undergo intramedullary nailing of multiple long bones in a single procedure without higher risk for adverse outcomes when compared to placing one or more intramedullary nails across multiple surgeries.

Alexander Rompala

Advisor(s): Bassel Diebo

A Call to "Own the Bone": Osteoporosis is a Predictor for Two-Year Adverse Outcomes in the Adult Population Undergoing Short Fusion for Degenerative Lumbar Disease

Introduction: Osteoporosis (OP) affects nearly 200 million ppl globally. Though spinal fusion is considered for pts with degenerative disc disease (DDD), there is little data regarding long-term outcomes in OP pts undergoing lumbar fusion for DDD. This study investigated whether a dx of OP increases the risk of adverse 2-yr outcomes in DDD pts undergoing short lumbar fusion.

Methods: Utilizing the NYS Statewide Planning and Research Coop. System (SPARCS), all pts from 2009-11 with ICD-9 dx codes corresponding to DDD who underwent 2-3-level lumbar fusion were identified. Any pts with other bone mineralization disorders and systemic endocrine disorders affecting bone quality or production were excluded. Pts with trauma, systemic disease(s) and infxns were also excluded. Pts were stratified by presence or absence of OP and were compared for demographics, hospital-related parameters, 2-yr complics and reops. Multivariate binary logistic regression models were used to ID significant predictors of complics.

Results: Included: 29,028 pts (OP=1,353 (4.7%), No-OP=27,675). OP pts were older (66.9 vs 52.6 yrs), more often female (85.1% vs 48.4%) and white (82.8% vs 73.5%), $p<0.001$. Length of stay and total surgical charges were higher for OP pts (4.9 vs 4.1 days; \$74,484 vs \$73,724), $p<0.001$. Rates of med complics were higher for OP pts: acute renal failure (8.9% vs 4.7%), and DVTs (3.4% vs 1.6%), all $p<0.01$. OP pts also had higher rates of implant-related (3.4% vs 1.9%) and wound complics (9.8% vs 5.9%), $p<0.01$. Baseline OP was a strongly associated with 2-yr med and surg complics (OR=1.62, 1.66), $p<0.001$. Pts with OP were at significantly greater odds of reoperations (OR=1.34).

Conclusions: Pts with OP undergoing 2-3-level lumbar fusion for DDD were at higher risk of 2-yr med and surgical complics, and OP pts experienced higher rates of wound and implant-related complics. These findings highlight the importance of rigorous preop metabolic workup prior to spinal surgery.

Jacob Gaines

Advisor(s): Bassel Diebo

The Five-Year Baseline Prevalence of Metabolic and Endocrine Bone Disorders in Patients Undergoing Short Spinal Fusion for Degenerative Disc Disease

Introduction: This study investigated the prevalence and etiology of mineral bone diseases (MBDs) in patients with degenerative disc disease (DDD). Negative outcomes in spinal fusion (SF) secondary to low bone density are well described, but the prevalence of mineral bone diseases (MBDs) in this population is underreported.

Methods: The New York Statewide Planning and Research Cooperative System database was queried to identify all DDD patients from 2009 to 2013. Patients were compared by age, gender, and race. MBD diagnoses were recorded for each group, including: osteoporosis (OP), vitamin D deficiency (VDD), postsurgical hypothyroidism (PHT), glucocorticoid deficiency (GD), nontoxic uninodular goiter (NUG), and sickle cell trait (SCT). Prevalence was calculated.

Results: 21,069 patients were identified. The most prevalent MBDs in the DDD population were: (1) OP 5.3% (2) VDD 1.6% (3) PHT 0.8% (4) NUG 0.4% (5) GD 0.3%. Each age range varied in the prevalence order of MBDs. The most common for the <45yo group were VDD 0.8% and OP 0.4%, while OP was the most common etiology among 45-64yo (OP 3.4%, VDD 1.6%) and >65yo (OP 13.5%, VDD 2.4%). The OP rate in each age range significantly differed from the other two (0.4 vs 3.4 vs 13.5%; all $p<0.05$). Females experienced higher rates of the 5 most common MBDs compared to males (OP 8.7 vs 1.4%; VDD 2.1 vs 0.9%; PHT 1.2 vs 0.3%; GD 0.4 vs 0.2%; NUG 0.5 vs 0.2%), all $p\leq 0.01$. OP was the most common MBD across all races (W 6.0%, B 2.2%, H 3.2%, O 4.2%). White pts had significantly higher OP rate than Black or Hispanic pts, $p<0.05$. VDD was the second most prevalent in all races (W 1.6%, B 2.9%, H 0.8%, O 1.4%), with Hispanics having lower rates of VDD than Whites and Blacks, $p<0.05$.

Conclusion: The most common MBDs in the general population were OP and VDD. Older pts had higher MBD rates. OP is the most prevalent MBD for DDD pts. Females exhibited higher MBD rates than males, and White pts had the highest OP prevalence.

Adam Wolfert

Advisor(s): Carl Paulino

The Impact of Comorbid Mental Health Disorders on Two-Year Adverse Outcomes Following Posterior Spinal Fusion for Adolescent Idiopathic Scoliosis

Introduction: It is not well defined whether the diagnosis of a mental health disorder (MHD) affects the outcomes of posterior spinal fusion (PSF) of adolescent idiopathic scoliosis (AIS) patients aged 10-25 years. This study aimed to compare 2 year complication and revision rates of 10-25 year-old AIS patients with a diagnosis of a MHD and non-MHD undergoing a minimum 4-level SF.

Methods: The NYS Statewide Planning and Research Cooperative System was queried for all 10-25 year old MHD patients who underwent ≥4 levels of PSF from 2009-11 with ≥2 year follow-up. MHDs included: depressive, anxiety, sleep, stress, substance/polysubstance abuse, attention deficit/hyperactivity, eating, and poly-MHDs. Patients excluded for trauma, systemic disease, or infection. The group was 1:1 matched to No-MHD patients by age, gender, race, and Charlson/Deyo index. The groups were compared for differences in 2 year complication and revision rates. Multivariate binary stepwise logistic regression identified predictors of these outcomes.

Results: 308 patients (n=154 each). Anxiety (18.8%), ADHD (16.6%), depressive (12.3%), and poly-MHD (9.4%) were the most frequent MHDs. MHD patients had significantly worse Charlson/Deyo scores at time of index surgery (0.18 vs 0.19; p=0.776). MHD and non-MHD patients had similar rates of wound complications, renal failure, sepsis, implant related complications, and blood transfusions. Both cohorts had similar rates of revision surgery within 2 years.

Conclusion: In this study, MHD in AIS was not associated with poor outcomes after PSF. This data may provide spine surgeons with increased clarity in counseling patients prior to PSF on AIS patients with MHDs.

Alfonso Caetta

Advisor(s): Carl Paulino

A Decade of Adolescent Idiopathic Scoliosis Care Adhering to SRS Guidelines in an Underserved Population: A Single-Surgeon Registry

Intro: The SRS has established guidelines to manage AIS. We evaluated a single spine surgeon's experience treating primary AIS over >10 years in an underserved community. Data revealed that SRS guideline adherence led to low rates of curve progression, w/ only 0.7-1.5% progresses into worse SRS categories between 1Y & 2Y FU. Over the years, Risser grades of presenting pts were lower for the same curves indicating improved AIS community awareness & early detection.

Methods: Retrospective review of primary pts presenting from 2006-18 for evaluation of AIS. Inclusion criteria: 10-25 y/o, available clinical & radiographic (36-inch full-spine xrays). Risser grade, full coronal & sagittal radiographic analysis were obtained. Pts were categorized & treated via known guidelines: SRS-Observation, SRS-Bracing & SRS-Surgical candidates. Pts w/ 2 data points of 1Y & 2Y FU were sub-analyzed to investigate disease progression.

Results: 552 pts, mean age 14.3±2.6 & 67% Female. Risser grades: R0, n=85 (15.4%), R1, n=32 (5.8%), R2, n=85 (15.4%), R3, n=147 (24.8%), R4, n=122 (22.1%), R5; n=87 (15.8%). At BL, SRS-O (n=326, 59.1%, 21.9°), SRS-B (n=128, 23.2%, 33.5°), SRS-S (n=98, 17.8%, 59°). 325 (58.8%) met AIS SRS criteria. Curve breakdown: Lumbar (n=52, 16%), Thoracic (n=196, 60.3%) & Thoracolumbar (n=77, 23.7%). Analyzing pts w/ 2Y FU revealed that among pts w/ BL curves (<25°), only 10.8% progressed into [25-45°] at 1Y, & 11.5% total progressed at 2Y FU. Among pts w/ 25-45° BL curves, 22% corrected into [<25°] & 3.8% progressed into [>45°] at 1Y & 5.2% progressed at 2Y. Pts presenting w/ Risser (0-2) significantly increased from 8.5% in 2008 to 25% in 2018 despite comparable mean annual curve magnitude (33.9 to 30.3°). Conversely, pts presenting w/ Risser 5 decreased from 49.2% to 26.8% from 2008-18.

Conclusion: SRS management guideline adherence & AIS pt education over a decade of practice lowered rate of curves progression and improved AIS education in our underserved community.

Cameron Moattari

Advisor(s): Carl Paulino

Does Baseline Substance Use Predict Subsequent Development of Mental Health Disorders in Adolescent Idiopathic Scoliosis Patients?

Introduction: Little is known as to whether the association btw MHD and substance abuse history exists among adolescent idiopathic scoliosis (AIS) pts. We compared the 2-year incidence of mental health disorders (MHDs) in AIS pts with and without baseline (BL) substance abuse to identify if it was a predictor for new-onset MHD development. Baseline substance abuse is defined by current or prior substance abuse.

Methods: The NYS Statewide Planning and Research Cooperative System was reviewed to identify all 10-25 y/o AIS pts with prior or concurrent substance abuse (AIS-Sub: alcohol, tobacco, cannabis, amphetamine, opioid, or polysubstance) from 2009-11 to ensure 2Y FU. Pts with prior or concurrent MHD(s) were excluded. AIS-Sub were 1:1 propensity score-matched by age, sex, race, and DEYO index to AIS pts without substance abuse (AIS-NoSub). Cohorts were compared for subsequent incidence/development of individual and overall MHDs (depressive, anxiety, stress, sleep, and/or eating disorder). Binary stepwise logistic regressions calculated odds ratios (OR) of developing individual or any MHDs based on baseline substance abuse.

Results: Included: 386 AIS pts (n=193 each). AIS-Sub and AIS-NoSub pts had similar age (20.8), sex (62.2 vs 62.7% male), race (54.9 vs 52.8% white), insurance (55.4 v 45.6% Medicaid), and DEYO. AIS-Sub pts had higher rates of new-onset subsequent overall MHDs (16.1 v 3.6%), with only depressive d/os higher among individual MHDs (10.9 v 0.5%), both p<0.001. BL substance abuse independently predicted subsequent diagnosis of overall MHD (OR=6.8). Among individual MHDs, BL substance abuse predicted development of new-onset depressive d/os (OR=47.0), all p \leq 0.002; it did not predict development of anxiety, stress, sleep, or eating disorders.

Conclusion: AIS pts positive for substance abuse were at increased risk of developing any new-onset MHD, specifically depressive d/os.

Dan Monessa

Advisor(s): Carl Paulino

The Impact of Preoperative Cannabis Use on Outcomes Following Thoracolumbar Spinal Fusion: A Propensity Score-Matched Analysis

Introduction: There is limited literature evaluating outcomes following spinal surgery patients who use cannabis despite the increasing acceptance and use of cannabis. This study sought to compare the 90 day outcomes, complication rates and 2 year revision rates between cannabis users and non-users following thoracolumbar spinal fusion.

Methods: The Statewide Planning and Research Cooperative System database was queried to identify all patients older than 18 who underwent thoracolumbar spinal fusion from 2009-13. Patients were included if they had 90 day follow up for complications and readmissions or 2 year revisions. Patients with preoperative cannabis use were identified. Patients were excluded for systemic disease, osteomyelitis, cancer, trauma, or concomitant substance or polysubstance abuse/dependence.

Cannabis patients were 1:1 propensity score-matched by age, gender, race, Deyo score, fusion levels and approach, and tobacco use to non-cannabis users and compared for hospital-related parameters, rates of 90 day complications and readmissions and 2 year revisions. Multivariate binary step-wise logistic regression models identified independent predictors of outcomes.

Results: 628 patients (n=314 each) were identified, with a comparable age, gender, and fusion approach and levels distribution. More cannabis patients were African American and utilized Medicaid. Regression revealed baseline cannabis use as a negative independent predictor of 90 day complications (OR=0.43). Cannabis use was not associated with increased surgical or overall 90 day complications, 90 day readmissions, or 2 year revisions.

Conclusion: Though cannabis was protective against postoperative anemia and complication, use resulted in no difference in readmission or revisions. These findings indicate that cannabis use may not require delay in preoperative clearance.

Davena Zhang

Advisor(s): Carl Paulino

Comparing 30-Day Outcomes after Anterior Cervical Discectomy and Fusion between Orthopaedic Surgeons and Neurosurgeons: An 8-Year Analysis

Introduction: This study evaluated 30-day postoperative outcomes following anterior cervical discectomy and fusions (ACDF) for differences between those performed by orthopaedic surgeons and neurosurgeons. The demographics, complications, operative time, length of stay, reoperation and readmission rate over an 8-year period were compared.

Methods: ACDF surgeries eligible for at least 30-day follow-up between 2008-2016 were identified from The National Surgical Quality Improvement Program (NSQIP) database and classified under orthopaedic versus neurosurgery. Patient demographics, comorbidities, preoperative labs, perioperative factors, 30-day postoperative complication, reoperation and readmission rates were compared using univariate analysis. Potential predictive factors for 30-day postoperative outcomes were identified using regression models.

Results: 77,071 ACDF cases, 33.1% orthopaedic and 66.9% neurosurgery, were included. Orthopaedic ACDF had comparable 30-day overall (4.2 vs 3.9%, $p=0.051$), major (1.7 vs 1.5%, $p=0.153$), and minor (3.2 vs 3.1%, $p=0.308$) complication rates, and 30-day reoperation (2.2 vs 2.2%, $p=0.570$) and readmission (4.2 vs 4.2%, $p=0.754$) rates. Orthopaedic patients had slightly longer operative time (170.3 vs 159.3 min, $p<0.001$), longer length of stay (2.7 vs 2.4 days, $p=0.048$) and higher postoperative blood transfusion rates (7.5 vs 4.4%, $p<0.001$). Surgeon specialty was not a predictor for increased overall short-term complications (OR 1.068, $p=0.094$) or reoperations (OR 0.985, $p=0.863$), Orthopaedic ACDF was a predictor for reduced odds of 30-day readmission (OR 0.766, $p=0.032$). Patient age was a significant predictor for 30-day overall complication (OR 1.037, $p<0.010$), reoperation (OR 1.021, $p<0.010$) and readmission (OR 1.018, $p<0.010$) rates.

Conclusion: Orthopaedic surgeons may be under-performing ACDF procedures despite similar 30-day complications, reoperations and readmissions compared to neurosurgeons.

Ishaan Jain

Advisor(s): Carl Paulino

Comparing Neurological Complications across Anterior, Posterior and Combined Approaches in the Setting of Cervical Spinal Fusion

Introduction: Anterior (ACDF), posterior (PCF) or combined surgical approach are commonly employed for cervical fusion, yet comparative rates of postop neurological complications are not well delineated. We compared and identified predictors of 90-day neuro and other complications between ACDF, PCF, and combined.

Methods: The NYS SPARCS database was used to identify patients who underwent 2-3-level ACDF, PCF, or ACDF-PCF with 90-day follow up from 2009-13. Demographics, hospital-related parameters, and 90-day neuro and med/surg complications, readmissions and revisions were compared across cohorts. Multivariate logistic regression was used to identify independent predictors.

Results: Included: 40035 pts (ACDF=35355, PCF=2964; combined=1716). PCF vs. combined approach and ACDF had highest overall neurological complications rates (2.3 vs 2.02, 0.77%), rates of implant-related complications (5.48 vs 2.68, 0.7%; $p<0.005$), overall surgical complications (6.7 vs 5.6, 1.41%), rate of total complications (20.3 vs 20.0, 6.697%), readmissions (23.12 vs 23.0, 7.62%), and revisions (25.8 vs 12.8, 5.57%), all $p<0.001$, unless otherwise noted. Combined vs PCF and ACDF had the highest rate of medical complications (15.8 vs 13.8, 5.61%; $p<0.001$).

With ACDF as a reference, PCF and combined approach were associated with increased odds of 90-day neurological complications (OR=2.0 vs 1.9) and revisions (OR=4.2 vs 2.3), while combined was more strongly associated with surgical complications (OR=3.9 vs 3.5), total complications (OR=2.6 vs 2.5), med complications (OR=2.341 vs 2.346), and readmissions (OR=2.0 vs 3.0), all $p<0.001$.

Conclusion: PCF had increased, individual neurological complication rates, and was more strongly associated with incidence of overall neuro complications in the 90-day postop period when compared to combined approach and ACDF. These data may raise cognizance of variation in neurological risks by approach in cervical spine surgery.

Mahee Islam

Advisor(s): Carl Paulino

Scoliosis and Social Media: Comparing the Quality of Available Information across the Top Social Media Platforms

Introduction: The growth of social media in recent years as a means of dissemination of health-related information has created new challenges for physicians. There are few studies that evaluated social media information quality on for adolescent idiopathic scoliosis (AIS). This study aimed to compare the quality of scoliosis-related information across four common social media platforms.

Methods: The top four popular social media platforms, Facebook, Twitter, Instagram, and LinkedIn, were queried in November 2018 using unfiltered keyword search: "scoliosis." The top 100 unique, most recent search responses were extracted and assessed for content by two independent examiners. Following exclusion, the top 50 results were analyzed. The scoliosis-specific content quality (SSCQ) score and DISCERN instrument were used. Analysis of variance was employed to compare mean scores across platforms.

Results: 200 results were identified, all posts from Instagram were not suitable to SSCQ and DISCERN assessment. Of the 150 left, 70 contained sufficient information for analysis: 34 on Facebook, 19 on LinkedIn, 17 on Twitter, and 0 on Instagram. Mean SSCQ score across all platforms was found to be $7.7 \hat{\pm} 5$, with no difference in SSCQ score across platforms (Facebook $8.3 \hat{\pm} 6.0$; LinkedIn $7.8 \hat{\pm} 4.1$; Twitter $6.5 \hat{\pm} 3.9$; $p=0.498$). Mean DISCERN score across all three platforms was $44.7 \hat{\pm} 11.9$, with no differences across groups (Facebook $43.3 \hat{\pm} 13.0$; LinkedIn $48.8 \hat{\pm} 10.9$; Twitter $43.6 \hat{\pm} 11.3$; $p=0.246$).

Conclusion: Lower quality information was found across Facebook, LinkedIn, and Twitter. Moreover, no difference was appreciated in content quality across platforms when comparing SSCQ and DISCERN scores.

Take home message: Available scoliosis-related information was of low-quality across analyzable social media platforms, with no differences in content-quality across Facebook, LinkedIn, and Twitter. Instagram was unamenable to quality assessment with established metrics.

Michael Dubner

Advisor(s): Carl Paulino

First Application of Dubousset Functional Test in Patients with Spinal Pathologies: The Future of Objective Clinical Outcomes is now.

Introduction: Our understanding of pts' function is lacking a more objective and quantified mechanism of assessment. We sought employ the recently proposed Dubousset Functional Test (DFT) to identify correlations between pt-reported outcome measures (PROs) and objective functional performance metrics.

Methods: Prospective study w/ consecutive primary pt enrollment of those presenting to spine service for evaluation of spinal deformity or degenerative lumbar disease. Included were pts who completed DFT tests and PROs (ODI, NDI, SF-12 mental and physical component scores [MCS, PCS]), and a lifestyle/functionality survey. Montreal Cognitive Assessment (MoCA) was used to evaluate cognitive functioning. DFT is a functional test described by Dr. Jean Dubousset. Tests were timed and pt performance was scored by seconds required to finish the test. DFT reference/normative values were UWT: 14.8s, ST: 6.3s, DST: 6.0s, and DTT: 12.8s. Descriptive analysis evaluated global performance of DFT in our population. Correlation analyses investigated the DFT vs PROs relationship.

Results: Included: 35 pts, mean age: $47.7 \hat{\pm} 16.6$ y; 68% Female, mean BMI $28.7 \hat{\pm} 5.9$ kg/m²). Mean DFT test durations: UWT, $31.2 \hat{\pm} 23.5$ s; DTT, $25.2 \hat{\pm} 16.8$ s; DST, $11.7 \hat{\pm} 7.9$ s (7 pts unable to complete); and ST, $11.1 \hat{\pm} 6.1$ s (3 pts unable to complete). Significant correlations were observed between DFT components and PROs, including UWT vs. ODI ($r=0.675$), DTT vs. SF12 MCS ($r=0.307$), DST vs. ODI ($r=0.614$), DST vs. SF12 PCS ($r=-0.445$), ST vs. ODI ($r=0.675$). The DTT significantly correlated with MoCA scores of cognitive ability ($r=-0.309$), all $p<0.05$.

Conclusion: We propose the DFT as a method to assess functionality of spinal pathology pts. Time spent performing DFT tests correlated with established PROs utilized in the spine literature. Correlation between the Dual Tasking test and cognitive functionality may reveal the relationship between alignment, balance and coordination when adding radiographic alignment to the equation.

Nathan Kim

Advisor(s): Carl Paulino

Predictors of ICU LOS in AIS

Introduction: Studies have examined procedures after posterior spinal fusion (PSF) for adolescent idiopathic scoliosis (AIS) to improve outcomes & reduce complications/readmissions. Little predictive data exists for ICU length of stay (ICU LOS) for AIS pts following PSF. Thus, we sought to identify baseline (BL) factors associated with increased postop ICU LOS.

Methods: All AIS pts undergoing elective PSF (CPT-22800-4) by ortho/neurosurgeons in 2016 were identified in the ACS NSQIP-Pediatric Procedure Targeted database & grouped pts by ICU LOS (days): G1,0-1; G2,2-3; & G3,>3 days. BL demographics, comorbidities & periop factors were compared via univariate analysis with post-hoc Bonferroni. Multivariate regression identified predictors of G2 & G3.

Results: Included: 2346 AIS pts undergoing PSF (G1: 81.8%; G2: 16.5%, G3: 1.7%). Age, sex, or race were comparable across cohorts. G3 & G2 had higher asthma rates than G1: (19.5, 10.1 vs 5.5%). G3 vs G2 & G1 had higher structural airway abnormalities (19.5 vs 1.6, 1.1%) & hematologic disorders (9.8 vs 1.0, 0.8%), all $p < 0.05$. Cognitive impairment/developmental delay rates were highest for G3 (26.8 vs 10.9, 6.2%), all $p \leq 0.032$. OR time was highest for G3 vs G2 & G1 (346.1 vs 292.6 vs 259.5mins). G3 had the highest % of pts with ≥ 13 -level fused (51.2%) vs G2 & G1 (20.7, 26.5%), all $p < 0.05$. Groups had comparable % pts with ≥ 6 -level PSF. BL hematologic disorders & structural airway abnorms increased odds of >3d ICU LOS (OR=9.0, 6.5; $p < 0.005$). Asthma & cognitive impairment increased odds of >3 & 2-3d ICU LOS (OR=2.7, 1.7; OR=2.7, 1.9), respectively, all $p < 0.05$.

Conclusion: Increased OR time & BL comorbidities correlated with increased ICU LOS in AIS pts. Hematologic disorders, structural airway abnormalities, asthma & cognitive impairment increased the odds of >3d ICU LOS by 9.0, 6.5, 2.7 & 2.7-fold, respectively. The results may improve preop optimization & postop risk-stratification, curbing costs & postop complications.

Nicole Vingan

Advisor(s): Carl Paulino

Bridging the Pay Gap: An Assessment of Medicare Procedure Volume and Reimbursement among Spine Surgeons

Introduction: Few studies have compared salary and procedure volume of male and female orthopedic spine surgeons in the United States. Particularly, the pay gap has not been analyzed for spinal fusions. This study sought to calculate the number of female and male surgeons who performed fusion procedures, assess the number of claims submitted per surgeon and evaluate how reimbursements varied between cohorts.

Methods: Surgeons who performed spinal fusions in 2016 were identified from the Medicare Provider Utilization and Payment Public Use File database and divided into gender cohorts. For each cohort, mean total fusion procedures, anterior lower, anterior upper and posterior/posterolateral fusions were obtained. Total claims (hospital stay, office visits), total surgical claims, and reimbursements for each were calculated. Cohorts were compared using two-tailed t-tests. Results: 2,035 spine surgeons were identified, 23 were females (1.1%). Both male and female surgeons performed similar mean anterior lower (23 vs. 14) and posterior/posterolateral fusions (23 vs. 21), all $p > 0.05$. However, male surgeons performed fewer anterior upper fusions (18 vs. 27; $p = 0.03$). Both cohorts performed similar numbers of total fusions (55.9 vs. 49.0) and both submitted comparable numbers of claims per surgeon, all $p > 0.05$. Males received higher total claim reimbursements (\$87,779 vs. \$50,439; $p = 0.04$), but total surgical reimbursements (\$77,052 vs. \$54,240) and reimbursement rates for fusion at any site did not vary significantly between genders, all $p > 0.05$.

Discussion: When analyzing the gender gap in physician salary for spinal fusions, male and female surgeons performed similar numbers of fusions in 2016. Although the difference in mean total claims between genders was not significant, male surgeons submitted more total claims than female surgeons, and males had significantly greater total reimbursements. Reimbursements for specific procedures did not differ significantly across genders.

Pelın Celiker

Advisor(s): Carl Paulino

Does Structural Compromise of the Aorta in Patients with Aortic Pathologies Predict Increased Spinal and Vascular Complications and Reoperations in Patients Undergoing Anterior Approach to the Spine?

Introduction: Anterior spinal fusion (ASF) presents unique challenges, but it is not documented whether structural aortic deterioration or compromise of the aorta (AComp) impacts postoperative outcomes following ASF. We evaluated adverse outcomes following ASF in the setting of AComp.

Methods: Using SPARCS, we identified thoracolumbar ASF patients with baseline AComp (aneurysm, dissection, atherosclerosis, aortitis, aortic tumors) and 1:1 propensity score-matched them to No-AComp patients by age, sex, race, and Charlson/Deyo index. Patients were compared at 90-Day and 2-Year follow-up for vascular/medical/surgical complications, readmissions, and revisions (i.e. subsequent ASF or major vessel repair/revision). Multivariate binary stepwise logistic regression identified independent outcome predictors.

Results: 90 patients reached 90-Day follow-up (45 each); 64 patients reached 2-Year follow-up (32 each). AComp and No-AComp had comparable demographic data: age (63.6 vs 65.4 Years), sex (57.8 vs 53.5% male), and LOS (5.3 vs 8 Days), $p>0.05$. Through 90-Day follow-up, AComp had similar individual vascular complications, including iatrogenic puncture (6.7 vs 0%), hemorrhage (0 vs 2.2%), and hematoma (2.2% each), and overall vascular complications (8.9 vs 4.4%). Overall complications (33.3 vs 31.1%) were comparable, though No-AComp patients had higher surgical complications (11.1 vs 0%, $p=0.021$). Through 2-Year follow-up, AComp vs No-AComp had comparable vascular (9.4 vs 0%), overall complications (34.4 vs 40.6%), and other outcomes, all $p>0.05$. Neither group reported revisions through 2-Year follow-up. AComp did not increase odds of adverse outcomes through 2-Year follow-up.

Conclusion: Aortic compromise in the setting of thoracolumbar ASF did not predispose cohort patients to vascular complications or anterior spinal/vascular revision/repair through 2-Year follow-up.

Sirish Khanal

Advisor(s): Carl Paulino

Impact of Prematurity on Immediate Postoperative Outcomes Following Posterior Spinal Fusion for Adolescent Idiopathic Scoliosis

Introduction: Patients born prematurely are at an increased likelihood of cardiopulmonary complications when undergoing general anesthesia. However, little is known about post-surgical outcomes of premature patients that have adolescent idiopathic scoliosis (AIS). The study sought to elucidate 30-day surgical outcomes of premature patients that underwent posterior spinal fusion (PSF) for AIS.

Methods: Utilizing the ACS NSQIP-Pediatric database, all AIS patients that underwent PSF between 2012 and 2016 were identified. Patients were grouped by prematurity at birth (<37 weeks) and were 1:1 propensity score-matched for age, sex, and number of spinal levels fused. Patient demographics, hospital parameters, and 30-day postoperative outcomes were measured.

Results: 958 patients (479 in each group) were assessed and groups had comparable demographics. Premature patients had higher baseline cognitive impairment (37.2 v 11.7%), cerebral palsy (22.6 v 4.0%), GI disease (16.5 v 8.4%), and asthma (12.5 v 6.3%), all $p\leq 0.001$. Overall and individual complications, including superficial and deep infections and revisions were comparable between groups. However, premature patients had higher readmission rates within 30 days of surgery (11.6 vs 2.7%, $p<0.01$). Regression analysis revealed that prematurity at birth predicted 30-day readmission (OR=3.0, 95%CI, 1.1-8.3), deep space/organ infection (OR=4.4, 95%CI, 1.2-15.5), and overall infection (OR=2.3, 95%CI, 1.1-4.8) following PSF ($p\leq 0.035$). Baseline cognitive impairment among AIS patients predicted 30-day postoperative complications (OR=4.3, 95%CI, 1.9-9.7), and revisions (OR=4.6, 95%CI, 1.6-13.3) following PSF (both $p\leq 0.006$).

Conclusion: Overall, premature patients with AIS are at an increased risk of readmission, deep space/organ infection, and overall infection following PSF. These data will be valuable for surgeons to consider during preoperative risk stratification and post-operative management.

Tiffany Huang

Advisor(s): Carl Paulino

The Impact of Degree of Prematurity at Birth on Short-Term Postoperative Outcomes Following 7-Level Posterior Spinal Fusion for Adolescent Idiopathic Scoliosis

Introduction: Premature pts are at increased risk for complications under general anesthesia, yet this risk is not well delineated for AIS pts undergoing PSF.

Methods: AIS pts who underwent 7lvl PSF in ACS NSQIP-Pediatric database (2012-16) were stratified by WHO preterm groups: extremely (EP;<28wks), very (VP;28wks<32wks), moderate-to-late (MLP;32wks<37wks), and term (>37wks).

Univariate analysis w/posthoc Bonferroni compared demos, hospital parameters, and 30D outcomes. Multivariate logistic regression identified independent outcome predictors (covariates: prematurity group, age, sex, race, and BL comorbidities).

Results: Included: 5531 pts (Term=5099, MLP=250, VP=101, EP=81). VP & EP had more males than MLP and Term (36.6, 30.9 vs 31.2, 23.2%, p<0.001). EP had higher BL rates of the following than VP, MLP, and Term: cognitive impairment (58 v 41.6 v 27.2 v 11%) and neuromuscular diseases (44.4 vs 35.6 vs 23.2 vs 14.5%), all p=0.001. OR time and % 13-fusions progressively increased across prematurity groups (30.2, 40, 43.6, 53.1%), p<0.001. Compared to term, EP had higher rates of organ space infection (1.2 v 0.1%, p=0.021), VP had highest rates of wound dehiscence, UTI, & overall complications (3, 3, 9.9%), and MLP had highest rate of deep SSI (2.4%). 30D readmission increased w/ prematurity. EP predicted deep SSI/organ space infection (OR=4), VP predicted UTI, superficial SSI/wound dehiscence, & any infection (OR=9.8, 4.4, 4.4), and MLP predicted renal insufficiency, deep SSI/organ space infection & any infections (OR=9.7, 5.2, 3.2), all p<0.05. BL cognitive impairment (OR=3.5, 3, 2.6) and neuromuscular (OR=2.0, 2.3, 1.6) were predictors for total complications, readmissions, & reoperations, all p<0.05.

Conclusion: Degree of prematurity differentially impacted rates of 30D adverse outcomes following 7-lvl PSF in AIS pts. These results can guide preop optimization and support surgeons for postop risk-stratification and counseling patients & their families.

Richard Gold

Advisor(s): Jaime Uribe

Reduced Wound Breakdown Rates with the Sinus Tarsi Approach to Surgical Fixation of Calcaneus Fractures Compared to an Extensile Lateral Approach

Purpose: Calcaneus fractures are traditionally approached for open reduction and internal fixation (ORIF) via the extensile lateral approach (ELA). Wound complications and nerve injury have led to the development of less invasive techniques such as the sinus tarsi approach (STA). The purpose of this study was to examine the postoperative wound-related complications following ORIF for calcaneus fractures between STA and ELA.

Methods: This was a retrospective review of all calcaneus fractures treated with ORIF at a single surgical center. Procedures performed, age, sex, date of injury, date of procedure, wound breakdown, wound infection rate, wound drainage, and time to weight-bearing were collected.

Results: 29 total procedures were identified: 18 ELA procedures and 11 STA procedures. There were non-significant differences in patient age (p=0.06), sex (p=0.61), and BMI (p=0.40) between groups. Time from injury to surgery was also statistically non-significant between ELA and STA approaches (p=0.54). No postoperative wound complications were observed in the STA cohort; there were also no readmissions or reoperations. The ELA cohort experienced a significantly higher rate of postoperative wound complications (50.0% vs. 0%, p=0.004). A total of 11.1% cases, all in the ELA cohort, required reoperation.

Conclusion: Comparison of postoperative wound complications following ORIF for calcaneus fractures between extensile lateral and sinus tarsi approaches demonstrated significantly lower rates of wound drainage, breakdown, and infection requiring reoperation for the STA cohort than the ELA cohort. These findings suggest that the STA approach may reduce postoperative wound complications and the need for reoperation.

David Kim

Advisor(s): Neil Shah

The 5-Factor Modified Frailty Index (mFI-5) is Predictive of 30-Day Postoperative Complications and Readmission in Patients with Adult Spinal Deformity (ASD)

Introduction: This study investigated whether mFI-5 scores can help predict 30-day postop complications, reoperations, or readmissions to identify at-risk ASD pts prior to spinal fusion.

METHODS: Using the American College of Surgeons' National Surgical Quality Improvement Project (NSQIP), pts with CPT codes for ≥ 7 -level fusion and pts with < 7 level fusion with concomitant ICD-9 for spinal deformity were selected from 2008-2016. mFI-5 uses five variables in the NSQIP: CHF, insulin/non-insulin dependent diabetes mellitus, totally or partially dependent preop functional status, COPD history, and HTN requiring medication. mFI-5 groups (score 1-5) were determined, excluding groups with < 20 pts. Univariate analysis assessed differences in demographics and preop factors with post-hoc analysis using Bonferroni correction. Logistic regression (LR) was used to assess the correlation of mFI-5 scores with 30-day postop outcomes.

RESULTS: 2,120 pts were included, a majority with a score of 1 or 2 (1: 1058; 2: 949; 3: 113 pts). Most were White (78.8%) and mean age varied across the mFI-5 score groups (1: 45.82 yrs; 2: 62.59 yrs; 3: 65.33 yrs; $p = 0.004$). Postop pneumonia rates increased with mFI score (1: 1.5%; 2: 3.4%; 3: 8.0%; $p < 0.05$). Pts with an mFI score of 3 had increased 30-day rates of superficial incisional SSI (3.5% vs. 0.8%), stroke (1.8% vs. 0.2%), and shock (1.8% vs. 0.2%) than pts with an mFI score of 1 ($p < 0.05$), but were comparable to pts with an mFI score of 2 (1.9%, 0.7%, 0.6%, $p > 0.05$). Pts with mFI score > 1 had increased rates of UTIs (1: 2.0%; 2: 4.7%; 3: 8.8%; $p < 0.05$) and unplanned postop ventilation for > 48 hours (1: 0.9%; 2: 3.4%; 3: 3.5%; $p < 0.05$). LR showed an mFI-score of 3 predicted increased 30-day mortality (OR=6.1, $p = 0.008$) and readmiss (OR=2.4; $p = 0.022$).

CONCLUSIONS: This study revealed mFI scores increased with postop individual complication rates and may be a useful tool for preop risk stratification and planning for the short-term postop course.

Matthew Lettieri

Advisor(s): Neil Shah

Asymptomatic HIV vs DDD

Introduction: Spinal fusion (SF) is increasingly used for management of degenerative disc disease (DDD). While the impact of symptomatic HIV disease on postop outcomes is well-reported, showing an increased risk of postop wound and neurologic complications and inpatient mortality following SF, no study until now has evaluated the impact of asymptomatic, well-controlled HIV (AHIV) status on postop outcomes.

Methods: The National Inpatient Sample (NIS) was reviewed from 2005-13 to identify all ≥ 18 y patients who underwent 2-3lvl spinal fusion for the treatment of DDD. Subsequently, those diagnosed with AHIV (ICD V08) were identified and 1:1 propensity score-matched to patients without any HIV disease by age, sex, race, and insurance status. All other HIV diagnoses were excluded, as were surgical indications for other reasons. Univariate comparison of postop medical/surgical/total complications & revisions was performed. Multivariate binary logistic regressions identified independent predictors of these outcomes.

Results: Included: 570 patients ($n = 285$ each). Age, sex, race and insurance status were comparable between AHIV and no-HIV cohorts, as were length of stay (4vs3.8days), total charges (\$97,194vs\$89,877), and in-hospital mortality (0.4vs0%), $p > 0.05$. AHIV cohort experienced higher postop respiratory complications (4.3vs0.4%) $p < 0.05$. Yet AHIV and no-HIV cohorts experienced similar overall medical complications (15.8vs13.7%), implant-related complications (0.4vs2.5%), overall surgical complications (3.2vs3.2%), total complications (18.6vs16.1%), all $p > 0.05$. Regression revealed that AHIV status was not an independent predictor for postop respiratory, medical, surgical, or total complications, all $p > 0.05$.

Discussion: Aside from respiratory complications, AHIV status did not adversely impact the overall perioperative course of DDD patients undergoing SF. This data highlights that patients with adequately-controlled HIV infection may be protected from adverse outcomes.

Suriya Baskar

Advisor(s): Niladri Basu

Comparing Neurovascular Presentation and Outcomes Between Gunshot Wound-Induced Humerus Fractures Managed Operatively and Nonoperatively

Introduction: Gunshot wounds (GSWs) to the extremities are commonly managed at trauma centers, yet outcomes are unclear. This study sought to examine patients with GSW-induced humerus fractures to report on injuries, treatment, and complication rates between operative and nonoperative management.

Methods: We retrospectively reviewed all GSW-induced humerus fractures at a level 1 trauma center from 2008 to 2016. 57 patients were identified. Patient demographics, fracture location and AO/OTA classification, operative (n=31) vs. nonoperative (n=26) management, surgical procedures, and pre- and postop complications were collected.

Results: 98.2% of subjects were male and African American. Only AO/OTA C fractures significantly predicted surgical management (p=0.04). Of patients treated surgically, 15 were treated with ORIF (Open Reduction and Internal Fixation), 12 with I&D (Incision & Drainage), 6 with External Fixation, 6 with IMN (Intramedullary Nailing), 1 with osteotomy, and 1 with allograft. 24.6% of patients had nerve deficit of which 84.6% were treated operatively. One operative patient incurred a postoperative nerve complication. 6/11 operative patients were treated for nerve repair. 14% patients with nerve deficit exhibited full recovery and 14% showed partial recovery. Of patients with no recovery, 3 underwent tendon transfer to restore function. 5% of operative had vascular injury to arm vessels. Other complications included DVT (n=1), hardware failure (n=2), and non-surgical-site infections (n=4).

Discussion: In GSW-induced humerus fractures, AO/OTA Type C is a significant predictor of surgical management. Nerve deficits and vascular injury rates at presentation were higher among surgical patients. Only operative patients incurred nerve damage after treatment. Rates of vascular injury and nerve injury were similar to previous studies.

Hanbin Wang, Jr

Advisor(s): Steven Koehler

Thirty-Day Outcomes of Upper Extremity Replantation and Revascularization Procedures: An Analysis of the National Surgical Quality Improvement Program Database

Introduction: Improvements in instrumentation and microsurgical techniques have advanced upper extremity replantation and revascularization (UER&R), with high survival rates and excellent functional and aesthetic results. We hypothesized that UER&R procedures may be performed safely with acceptable low rates of 30-day adverse outcomes.

Methods: Utilizing the American College of Surgeons National Surgical Quality Improvement Program database, patients who underwent an UER&R procedure between 2008 and 2016 were identified. Rates of 30-day post-operative complications, reoperations, and related unplanned readmissions were queried from the database and identified.

Results: This study included a total of 326 patients undergoing UER&R. Patients had a mean age of 51 years (18-89 years), were 61.7% male and 38.3% female, and 65.1% white, 16.0% black, and 18.8% other race. Replantation procedures included digit (non-thumb) replantation (3.7%), thumb replantation (3.1%), and hand replantation (0.3%). Revascularization procedures included upper extremity blood vessel repair with vein graft (65.5%) and direct blood vessel repair of the hand and fingers (27.4%). The 30-day complications included intraoperative transfusions (8.0%), failure to wean off the ventilator for greater than 48 hours (2.1%), deep vein thrombosis (1.5%), pulmonary embolism (PE) (1.2%), and pneumonia (1.2%). Reoperation rate was 5.5%, with incision and drainage occurring most frequently (0.6%). Readmission rate was 3.7%, most commonly for PE (0.6%).

Conclusion & Discussion: Our results show that UER&R can be performed with acceptable complication rates in the 30-day post-operative period, which are consistent with studies from single-center series or reports from several centers. Further, the most common complication for UER&R is intraoperative transfusions, which is expected given the 52% rate of transfusions during leech therapy for replantation reported by Rizis et al., PRS 2011.

Hassan Eldib

Advisor(s): Steven Koehler

The Impact of Previous Hand/Upper Extremity Surgery on Patient-Reported Outcome Measures: Initial Reporting from the HAND-Q Multicenter Trial

Hypothesis: We hypothesize that a history of prior surgery would not impact patient-reported measures of hand functionality, treatment satisfaction, symptom severity, and hand appearance.

Methods: 100 patients were prospectively and consecutively enrolled in the HAND-Q at a single-surgeon's clinic. The HAND-Q, a novel patient-reported outcome measure (PRO) currently in Phase II of a global multicenter validity study, considers factors including functionality, treatment satisfaction, symptom severity, and hand appearance. Composite scores (CS), ranging from 0-100, were collected to measure outcome. Intergroup analysis of outcomes was compared with Pearson's χ^2 test and two-sample student's t-test.

Results: A total of 100 patients were enrolled (n=60 women; n=40 men). Mean age 50 [15-88 yrs]. 37 patients had prior hand surgery and 58 did not. The most common diagnoses were carpal tunnel syndrome (n=28) and fractures (n=28). Overall difference in hand functionality between surgical (CS=68) and nonsurgical (CS=60) patients was not significant (p=0.212), however statistical significance was observed in a subset of questions with surgical patients reporting "severe impairment" at higher percentages. Surgical patients were more satisfied vs non-surgical (p=0.03) patients. The CS for overall satisfaction was significantly higher in surgical (CS=94) vs non-surgical (CS=84) groups (p=0.039). CS for symptom severity (p=0.121), emotional impact (p=0.322), and hand appearance (p=0.471) showed no statistical significance between the surgical vs nonsurgical groups.

Discussion: Statistical significance was higher in the surgical group vs non-surgical groups in reported satisfaction. Although no statistical significance was observed for overall functionality, two vital functions- wiping and shaking hands "are negatively impacted by a history of prior surgery. Moving forward, the HAND-Q should be administered to analyze surgical vs non-surgical management for specific diagnose

Lana Kass-Gergi

Advisor(s): Steven Koehler

Gender Disparities in Patient-Reported Measures of the Impact of Hand/Upper Extremity Disease: Initial Reporting from the HAND-Q Trial

Intro: This study investigated gender disparities in self-reported view regarding the biopsychosocial impact of disease and treatment among hand/upper extremity pts. It was hypothesized there would be no differences b/w genders. The study reports our institution's data from the Phase II Hand Questionnaire (HAND-Q) Pilot Multicenter International Validation Study.

Methods: All pts. evaluated by the hand/upper extremity service were prospectively enrolled at a single-surgeon's clinic for participation in the HAND-Q (9/18-1/19).

All pts. w/ valid responses to the following were included: symptom severity, hand appearance, txt satisfaction, and emotional impact. Composite scores (CS) were generated via grp. totals on a 0-100-pt scale (symp. severity: 0=none, 100=most severe; appearance: 0=very dissatisfied, 100=very satisfied; emotional impact: 0=never affects emo., 100=always affects emo.; txt satisfaction: 0=def. disagree, 100=def. agree). Bivariate comparison of outcome responses was performed b/w males (M) and females (F).

Results: Individual questions (IQs) of hand symp. severity showed significant differences w/ M vs. F, while the composite score (CS) showed no diff. b/w grps. (M: n=31, CS=47 vs. F: n=46, CS=53; p=0.16). No diffs. were appreciated b/w M & F respondents for any IQ's or overall CS pertaining to hand appearance (M: n=29, CS=77 vs. F: n=41, CS=74; p=0.60) and emotional impact of their hand problems (M: n=29, CS=57 vs. F: n=40, CS=59; p=0.86).

However, satisfaction CS b/w grps. differed significantly (M: n=14, CS=97 vs. F: n=37, CS=83; p=0.017).

Discussion: Statistically sig. diffs. found b/w the M & F grps. for specific symp. severity q's and txt satisfaction CS may indicate diffs. in txt expectation b/w genders. Gender disparities were not found in other domains of the HAND-Q.

The HAND-Q appears to be a powerful pt-reported outcome measure instrument, as seen in this study on biopsychosocial impact of disease and txt among hand/upper extr. pts.

Olachi Oleru

Advisor(s): Steven Koehler

Recent Smoking History is not Associated with Adverse 30-Day Outcomes Following Replantation or Revascularization Procedures of the Upper Extremity

Background: Cigarette smoking has been associated with complications in wound healing. Upper extremity replantation/revascularization is a complex procedure which requires proper wound healing. This study examines the effects of smoking on 30-day postoperative outcomes following upper extremity replantation/revascularization.

Methods: The American College of Surgeons National Surgical Quality Improvement Program database was queried to identify all patients who underwent replantation procedures of the digit, thumb, hand, forearm, and arm or blood vessel repair of the finger, hand, or upper extremity from 2008-2016. Patients with a history of cigarette smoking within one year prior to surgery (n=89) were compared to those without (n=237). Univariate and multivariate analysis identified risk factors and evaluated their impact on outcomes.

Results: Smokers were younger (45 vs. 53 years, $p=0.003$), with no differences in sex, race, or BMI. Non-smokers had a higher prevalence of diabetes mellitus (27.4% vs. 16.9%, $p=0.048$) and were more often on dialysis (32.1% vs. 19.1%, $p=0.020$).

Preoperative lab values were comparable, as were wound class, American Society of Anesthesiologists (ASA) score, operative time, reoperations, readmissions, major and total complications, and length of stay. Smokers required intraoperative transfusions more frequently (14.6% vs. 5.5%, $p=0.006$). Among all patients, preoperative diabetes was a strong predictor for 30-day reoperations (OR=5.8, 95% Confidence Interval [CI], 1.1-30.4) and Caucasian race was a significant predictor of 30-day major complications (OR=3.3, 95% CI, 1.1-10.2), all $p \leq 0.038$.

Conclusions: Smoking history was not associated with increased major or minor complications, readmission, or reoperation rates in the 30-day postoperative period. Among replantation/revascularization patients, diabetes was a strong predictor for 30-day reoperations. The impact of diabetic control on outcomes in this population is worth further study.

Qurratul-Ain Dar

Advisor(s): Steven Koehler

Impact of Disease Severity on Patient-Reported Measures of Symptom Severity and Treatment Satisfaction: Initial Reports from the HAND-Q Study

Introduction: This study analyzed self-reported hand appearance, hand symptom severity, and hand treatment satisfaction among patients treated for hand/upper extremity conditions. We hypothesized that these measures would not differ between patients with mild vs. moderate/severe (M/S) disease.

Methods: All patients evaluated by the hand/upper extremity service were prospectively/consecutively enrolled at a single-surgeon's clinic for participation in HAND-Q. All patients with valid responses to the following were included: hand appearance, problem severity, treatment satisfaction. Composite scores (CS) were generated via group totals on a 0-100-point scale. Bivariate comparisons of responses were performed between disease severity cohorts.

Results: Significant differences between mild vs. M/S disease groups were seen in individual questions regarding hand appearance ($p=0.03$, 0.03, 0.14) and specific symptom severity related to neuropathy ($p=0.03$, 0.02). However, no differences were observed between groups in CS for hand appearance ($p=0.367$) or symptom severity ($p=0.714$). Significant differences were found between mild and M/S disease groups in individual questions regarding treatment satisfaction ($p=0.04$, 0.06).

Interestingly, CS comparisons did show significant differences between groups for overall treatment satisfaction ($p=0.04$). Conclusion: Differences in responses to hand appearance questions in patients with mild vs. M/S disease indicate the potential impact of disease severity on patient self-perception. Significant differences between the mild and M/S disease groups for neurological symptom severity may indicate that patients perceive these symptoms as M/S disease states. The observed difference in treatment satisfaction CS between mild and M/S disease may confirm the need to account disease severity into treatment-planning and counseling to potentially improve treatment satisfaction.

Steven Morrin

Advisor(s): Steven Koehler

Increases in Fireworks-Related Upper Extremity Injuries Correspond to Increasing Fireworks Sales: An Analysis of 41,195 Injuries Across 10 Years

In 2017, \$885 million in consumer fireworks were sold in the United States; this was a 41% increase in firework sales from 2008. In response, the American Society for Surgery of the Hand issued a bulletin urging the public to avoid amateur fireworks. We hypothesized that hand/upper extremity injuries from fireworks were increasing in the United States.

We queried the National Electronic Injury Surveillance System, a nationwide probability sample of injuries related to consumer products, for firework-related upper extremity injuries from 2008-2017. Temporal trends were determined and demographics, injury location, and injury type were collected.

We found 1,079 patients saw 41,195 firework-related upper extremity injuries from 2008-2017. Injuries increased significantly from 2,576 in 2008 to 5,101 in 2017. There was a strong, positive correlation between firework sales and injuries. The majority of injuries were in males (77%). The 11-20 age group represents the highest proportion (27%) injuries followed by the 21-30 age group. Most injuries occurred in summer months. The most common race of injured patients was Caucasian (59%) followed by African-American (7.4%) and Hispanic (5.5%). The most commonly injured body parts were the hand (52.7%) and digits (33.1%). Among finger injuries, the thumb was most commonly injured (31.3%), followed by the index finger (9.7%). Burns were the most common injury across all sites except the wrist where fractures were more common. The other common injuries were laceration (9.3%), fracture (6.5%) and amputation (5%).

In summary, 10-year firework-related upper extremity injuries increased along with increased consumer sales across the same period; most injuries were in young male patients; the hand was most commonly injured, with the thumb as the most injured digit; and combined thumb-index finger injuries were common. These data demonstrate the need to advocate safe firework practices to reduce future injury.

Ariana Moreno

Advisor(s): William Urban

Epidemiology of Female Youth Ice Hockey Injuries Presenting to United States Emergency Departments from 2007 to 2016

Introduction: This study aimed to establish injury incidence rates (IR) by body site, diagnosis, and mechanism using a USA Hockey membership-adjusted population.

Methods: The National Electronic Injury Surveillance System (NEISS) was queried for ice hockey injuries from January 1, 2007 to December 31, 2016. Patients over the age of 18 years (Y) and males were excluded. Comparisons of IR by age were made using a two sample t-test with a 95% confidence interval. Trends were analyzed using linear regression. USA Hockey membership statistics helped establish the population at risk and calculate IR (reported per 10,000 person-years).

Results: A total of 370 patients, representing 9,784 ice hockey-related injuries, presented to NEISS-participating emergency departments. The number of female youth ice hockey players increased significantly from 44,678 in 2007 to 57,792 in 2016 ($R^2=0.89$, $\Delta Y=0.94$, $p<0.001$). The IR of injuries fell from 222.1 to 177.4 ($p=0.30$). Commonly injured body parts were the head ($n=2,807$, $IR=56.4$), trunk ($n=1,399$, $IR=28.1$), knee ($n=1,110$, $IR=22.3$), shoulder ($n=704$, $IR=14.1$) and ankle ($n=591$, $IR=11.9$). Common diagnoses included strain/sprain ($n=1,843$, $IR=40.2$), contusion ($n=1,709$, $IR=34.3$), internal organ injury ($n=1,699$, $IR=34.1$), concussion ($n=1,035$, $IR=20.8$) and fracture ($n=1,240$, $IR=24.9$). The top mechanisms of injury were player-to-player contact ($n=3,103$, $IR=62.3$), falls ($n=2,188$, $IR=43.9$), and contact with boards ($n=810$, $IR=16.3$). The player-to-player mechanism of injury increased with age: 0-8Y ($IR=2$), 9-10Y ($IR=32.1$), 11-12Y ($IR=53$), 13-14Y ($IR=120$), 15-16Y ($IR=138.3$) and 17-18Y ($IR=204.6$). Head injuries increased with age: 0-8Y ($n=15$, $IR=1$), 9-10Y ($n=153$, $IR=17.4$), 11-12Y ($n=598$, $IR=67.2$), 13-14Y ($n=885$, $IR=115.1$), 15-16Y ($n=650$, $IR=121.6$) and 17-18Y ($n=506$, $IR=157.5$).

Conclusions: Player-to-player contact was the leading mechanism of injury in all but the 0-8Y age division. Body checking is a major contributor to the game's injury burden.

Ryne Veenema

Advisor(s): William Urban

The Impact of Baseline Patient Factors on Complication Rates Following Three Surgical Options for Management of Proximal Humerus Fractures in Elderly Patients

Introduction: This study aimed to compare non-operative, shoulder arthroplasty (SA), hemiarthroplasty (HA), or open reduction and internal fixation (ORIF) treatments for proximal humerus fractures in patients over the age of 65.

Methods: The American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database identified all patients who underwent SA, HA, or ORIF for proximal humerus fractures between 2011 and 2016. Patients 65 years or older were grouped into SA, HA, and ORIF cohorts. Demographics, comorbidities, preop laboratory values, and 30-day major, minor, and total postop complication, readmission and reoperation rates were compared.

Results: 1,257 patients were identified: SA, n=259; HA, n=238; and ORIF, n=760. The mean patient age who underwent SA (77.4) was significantly higher than of HA (76.14) or ORIF (75.23). The SA cohort had a higher proportion of Caucasians than HA or ORIF (p=0.009); the distribution of African Americans also differed significantly. Patients undergoing SA had significantly higher rates of diabetes (p=0.035) as well as higher BMI than either HA or ORIF cohort (p=0.001). There was no significant difference in rates of procedures (p>0.05), reoperation (p=0.184) or readmission (p=0.933). Preoperative albumin levels below 3.5g/dL was a significant predictor of major (OR=4.6, p=0.007) and minor (OR=2.5, p=0.017) 30-day postoperative complications, and rate of readmission (OR=2.19, p=0.037).

Discussion: In elderly patients with proximal humerus fractures, ORIF was the most common procedure. SA patients were older, more medically complicated, and obese compared to those undergoing ORIF or HA. Low preoperative albumin was a significant predictor of 30-day postoperative complications and 30-day readmissions.

Valeria Farias

Advisor(s): William Urban

The New 5-Factor Modified Frailty Index (mFI-5) is Predictive of 30-Day Postoperative Complications and Readmission in Patients Undergoing Shoulder Arthroplasty

Introduction: Given the lack of literature concerning the association of the modified 5-item frailty index (mFI-5) with outcomes in the shoulder arthroplasty (SA), we sought to: (1) characterize the population undergoing SA and the rate of 30-day complications; and (2) determine whether the mFI-5 was a predictor of 30-day complications, readmissions, and reoperation in order to provide a pre-operative risk stratification index.

Methodology: The National Surgical Quality Improvement Project (NSQIP) was queried from the years 2008 to 2016 for patients who underwent SA. The mFI-5 utilizes congestive heart failure, diabetes mellitus, functional status, COPD, and hypertension. Demographics were collected, and univariate analysis with chi-square and ANOVA were conducted. Multivariate analysis with binary logistic regression was used to calculate odds ratios and assess the correlation of the mFI-5 with 30-day outcomes.

Results: 14,526 patients met inclusion criteria. The mean age was 69.01 years and the majority of patients (85.3%) identifying as White. The majority of patients (51.0%) received an mFI-5 score of 2. Complications were infrequent following SA; urinary tract infections were the most common complication (0.8%), with pneumonia as the second most (0.5%). 30-day mortality occurred in 0.2% of the population.

mFI-5 score was associated with increased complications, with mFI-5 scores of 2, 3, and 4 resulting in 1.8, 2.4, and 4.8-times the odds respectively (p<0.001) and readmissions related to SA, with mFI-5 scores of 2, 3, and 4 with 2.0, 3.2, and 9.7-times the odds respectively (p<0.001).

Discussion: mFI-5 demonstrated a strong association for readmission as well as complications in the 30-day postoperative period following shoulder arthroplasty.

Neil Patel

Advisor(s): Carl Paulino

The Dubouset Functional Test: A Baseline Analysis of a Novel, Multi-Domain Assessment of Physical Function and Balance

Introduction: Our ability to assess a pts' spinal function and maintenance of body balance is lacking an objective and quantified mechanism of assessment. Therefore, this study sought to assess the feasibility and establish baseline values for the Dubouset Functional Test (DFT), a simple multi-domain functional and balance assessment tool, in an asymptomatic population.

Methods: Asymptomatic volunteers were screened and recruited to participate in the 4 DFT components. These include: (1) UWT (Up-and-Walking Test): unassisted sit-to-stand, walk forward/backward 5m (no turn), unassisted sit; (2) ST (Steps Test): ascend 3 steps, turn, descend 3 steps; (3) DST (Down-and-Sitting Test): stand-to-ground sit-to-stand, assistance as needed; (4) DTT (Dual-Tasking Test): walk 5m forth and back while counting down from 50 by 2. All subjects were given standardized verbal instructions and demo prior to each DFT test. Trials were video recorded and timed. Univariate and multivariate analysis were utilized to analyze durations of test components against demographics.

Results: Included: 65 asymptomatic volunteers (mean age: 42.4 ± 15.4 yrs; 42% female, mean BMI 26 ± 4.8 kg/m²). Mean duration of each DFT test: UWT: 14.8s, ST: 6.3s, DST: 6.0s, and DTT: 12.8s. Significant correlations were observed between age and duration of DST ($r=0.53$), UWT ($r=0.43$) and ST ($r=0.36$). A similar trend was observed for DST, UWT, and ST correlation with BMI ($r=0.37$, $r=0.29$, $r=0.37$), all $p<0.05$. No correlations were found for DTT. 32.3% of subjects exhibited verbal pausing/mistakes in counting during the DTT; 62% occurred while turning.

Discussion: The DFT was feasible, safe to perform and could be completed in normal volunteers in about a minute, though it took longer in older patients and patients with higher BMI. Normative reference ranges were established and may assist surgeons in determining deviations in functional status and understanding the impact of preop DFT performance on postop outcomes.

Neil Shah

Advisor(s): Steven Koehler

Validation of a Novel Rabbit Model of Compression Neuropathy in the Setting of Perineural Adhesion

Introduction: Nerve injury initiates inflammation that can lead to compression neuropathy and nerve stretching, causing pain and nerve dysfunction. Rabbit models closely mimic human biology, yet no validated rabbit model exists for study of compression neuropathy. This study sought to develop a novel, rabbit model to simulate compression neuropathy secondary to perineural adhesion.

Methods: Sciatic nerves of five, 3-4kg New Zealand White Rabbits were surgically-exposed via longitudinal incision at the posterolateral thigh. Control hindlimbs underwent sham surgery. Perineural adhesions were generated, and the epineurium was fixed with microsuture to the wound bed. Exposure of the sciatic nerve was performed bilaterally, with proximal and distal nerve transection, at which point peak pull-out force (Newtons) required to break adhesions was measured and compared using unpaired Wilcoxon's rank sum test. Tibialis anterior (TA) muscles were harvested bilaterally, and muscle mass was compared. **Results:** When nerves were pulled at a rate of 29 mm/min with 0.005 N pre-loading, scarred nerves required greater peak pull-out force than control (2.51 N vs. 0.50 N, $p=0.021$). TA muscle mass was significantly lower in the setting of induced neuropathy when compared to control (6.56 g vs. 8.52 g, $p<0.001$).

Conclusion: Given the close mimicry of human neuroregenerative and immunological biology in rabbits, we developed and validated a model to simulate compression neuropathy, demonstrated by the significant reduction in TA mass in experimental hindlimbs and formation of significant perineural scar. Additionally, we created a novel means to measure peak pull-force required to break perineural adhesions.

Aija Jones, Brianna Alleyne

Advisor(s): Mary Valmont

The Efficiency of Global Longitudinal Strain and Ejection Fraction in Measuring Left Ventricular Mass

Background: Congestive Heart Failure (CHF) is a condition that occurs when the heart is unable to pump blood efficiently. Left Ventricular Mass (LVM) is the primary indication of CHF. Global Longitudinal Strain (GLS) measures the change in distance between the speckles of the heart. Ejection Fraction (EF) measures the input and output of blood. EF is the “gold standard” used to measure CHF, while GLS is a new measurement that can be used to better the outcome of patients.

Objective: To detect which method, (GLS) or (EF), is more effective in recognizing left ventricular mass.

Methods: The sample consisted of 38 Black patients recruited from Dr. Lazar’s clinic. While patients completed a stress test, the performance of the heart was recorded. LVM was calculated by finding the distance between the lengths of the cavity size (LVEDD), interventricular septum distance (IVSD), and the posterior wall thickness (PWI). EF percentage was calculated from EF pre and EF post. A Spearman’s correlation coefficient was used to evaluate (1) GLS vs. LV mass and (2) EF vs. LV mass. A Fisher’s r to Z transformation was then done to compare the correlation between GLS and LV mass to the correlation between EF and LV mass, to evaluate whether GLS or EF is a better predictor of LV mass.

Major Results: Spearman's correlation coefficient for GLS vs. LV mass was -0.139 (p-value = 0.405). Spearman’s correlation coefficient for EF percentage vs. LV mass was 0.159 (p-value = 0.341). Both correlations were not statistically..

Observed=0.086, (p-value=0.93) indicated no significant difference between GLS and EF in predicting LV mass.

Conclusion: Based on our results, the data showed that neither EF, nor GLS were significantly better at predicting LV mass, because the p-value is greater than 0.05. The limitations of the study included small sample size and was only restricted to one location.

Genesis Smith, Azamat Davlyatov

Advisor(s): Mary Valmont

The Association between Gender, Diet and Physical Activity in Central Brooklyn Adolescents with Obesity

Background: Obesity among children, ages 12-18, is an epidemic in the United States and is a critical problem. Obesity is a general term for a person with excess body fat in comparison to height and weight. It can lead to diseases such as diabetes, chronic kidney diseases, high blood pressure and high cholesterol. Factors such as diet and physical activity play a major role in obesity prevention.

Objective: To analyze the association between gender, diet and physical activity in obese Central Brooklyn adolescents

Methods: Participants were adolescent patients (12-18 years old) accompanied by a parent or guardian, recruited from Downstate Pediatric Associates and related sites in Central Brooklyn. Surveys were administered anonymously via iPad and participants received two \$11 metrocards as an incentive for survey completion. Patients with mental disorders and non-English speakers were excluded from the study. The sample population (n=73) consisted of majority Black-African Americans (86.1%) and females (60.3%). The average age was 14.31 years. Chi-square analysis using SPSS 24 software was done to evaluate the association between gender, diet, and physical activity.

Major Results: There was no significant association found between gender and the consumption of fruits, vegetables, and sweetened beverages. There was a statistically significant difference between females and males with obesity in regards to days spent per week exercising for 1 hour ($p < 0.05$). Specifically, more males (72%) exercised 3 or more days per week compared to females (49%).

Conclusion: The results partially supported the hypothesis. Due to a small sample size, mostly female, results cannot be generalized. While the published literature supports a significant difference between the general female and male adolescent population in dietary practices, we found no difference between genders in regard to dietary practices in our sample population.

Roudjessie Charles, Zoe Montgomery

Advisor(s): Mary Valmont

The Relationship between Fractal Dimension Complexity and Rate of Blood Flow

Background: Congestive Heart Failure (CHF) is a disease that affects the heart's ability to efficiently pump oxygen rich blood through the body. If blood is pumping insufficiently, fluids build up in the heart causing "heart failure" even though the heart is still beating. Structurally, blood vessels and trees are similar, they have a mother branch that breaks off into smaller and smaller branches called "daughter branches."

Objective: Examine if there is an association between fractal dimension complexity (FDC) and Thrombolysis in Myocardial Infarction (TIMI) flow rate. Being able to predict the pressure and rate of blood flow at any point of the artery will better help physicians to understand arterial structure.

Methods: An angiogram was conducted on 37 patients who had symptoms of CHF. A catheter was inserted into the femoral artery up to the aorta where dye was injected. ImageJ software (a platform for scientific image analysis developed by the National Institute of Health) was used to count the total number of frames taken to fill up the blood vessel. With each frame corresponding to 1/15th of a second, total fill time was then calculated. The TIMI Score is used to determine the likelihood of ischemic events, or mortality in patients with unstable angina. A linear regression test was used to evaluate the correlation between FDC and blood flow rate.

Major Results: Spearman's correlation is equal to -0.8, indicating a strong negative correlation. With a p-value of 2.0910-9 the correlation is statistically significant. With an r2 value equal to 0.769, 76.9% of variability in rate of blood flow is attributable to FDC.

Conclusion: There is a statistically significant relationship between fractal dimension and flow time, (p-value<0.001). Our results indicate a strong negative correlation between FDC and the rate of blood flow. FDC can possibly be used to help analyze rate of blood flow. This would provide less intrusive ways of measuring heart health.

Tyra Andrus, Cassandra St. Louis

Advisor(s): Mary Valmont

The Relationship between Socioeconomic Status and Change in PrEP Knowledge among Customers of Barbershops & Salons

Background: Over time the human immunodeficiency virus (HIV) weakens the immune system's white blood CD4-T. Central Brooklyn's Bedford, Stuyvesant and Crown Heights neighborhoods have some of the highest HIV mortality rates indicating a great need for intervention. Gilead's Ready, Set, PrEPare project uses an unconventional method to train hair stylists and barbers to deliver information on Pre-Exposure Prophylaxis (PrEP). PrEP is a medication for HIV negative individuals who are considered at high risk for HIV infection.

Objective: To examine the relationship between PrEP knowledge and socioeconomic status (SES) variables: health insurance, education, income, employment.

Methods: Trained advocates (barbers and hair stylists) administered pre-assessment surveys to customers. Three months later, customers were called and given post-surveys to evaluate change in PrEP knowledge. A McNemar's test was used to compare customers' PrEP knowledge before and after intervention. Chi Square analysis was used to evaluate the association between socioeconomic status and customers' accurate knowledge of PrEP.

Major Results: Our results demonstrated a significant change in pre-to-post knowledge on PrEP in four of the six variables, suggesting that Ready, Set, PrEPare, is effective in educating the community. Of the four SES variables, only employment was associated with a significant difference in number of questions answered correctly.

Conclusion: The data partially supports our hypothesis. Four of the six variables evaluating PrEP knowledge were significant. Three of the six show a positive change in knowledge; one of the six shows a decrease in knowledge. Future research should find the association between SES and PrEP knowledge across varying socioeconomic levels.

Jennifer Mack

Advisor(s): Veronica Arikian

Vaping in the Pre-adolescent and Adolescent Population

Since the introduction of Electronic Nicotine Device Systems (ENDS) in the early 2000s, there has been a decline in cigarette smokers from “1.14 billion then to about 1.1 billion” (Jones, 2018). However, there has been an increase in vape users from “about seven million in 2011 to 35 million in 2016” (Jones, 2018). The recent dramatic increase in the use of Electronic Nicotine Devices (ENDS) in the pre-adolescent and adolescent population is well-documented by the Surgeon General of the U.S. and the Centers for Disease Control (CDC). The Surgeon General (2016) reports that E-cigarettes are now the most commonly used tobacco product among youth in the United States. In terms of nicotine, ENDS are equivalent to, if not just as harmful as, conventional cigarettes. Although nurses may be well prepared to assist with smoking cessation, they may not be well prepared to address vaping especially among adolescents. This study will help determine whether health care providers are well informed and knowledgeable about vaping, the effects on respiratory health, respiratory-related illness and quality of life with respect to addictive behaviors in pre-adolescents and adolescents. The proposed pre-test-post-test, quasi-experimental study will use a convenience sample of 50 nurse practitioner students currently enrolled in a master’s program at an urban university. An investigator designed pretest will assess knowledge, skills and attitudes about vaping and interventions and prevention. After the pretest, the students receive a one-hour class about vaping. A post-test will be administered three months later to determine care providers’ knowledge of vaping and its effects on pre-adolescents and adolescents, and appropriate interventions. It is anticipated that, with education, health care providers will be better equipped to screen and provide information regarding vaping and smoking, resulting in a decrease in vape usage.

Violeta Capric

Advisor(s):

Argatroban Refractory, Heparin Induced Thrombocytopenia After Coronary Intervention with Radial Artery Occlusion

Heparin induced thrombocytopenia (HIT) is threatening disorder that occurs in a small percentage of patients following exposure to heparin. HIT can further be classified into two types: HIT type 1 and type 2. Type 2 HIT is a life threatening and clinically significant outcome, which presents with thrombocytopenia and evidence of thrombus formation in the presence of antibody formation. Additionally, severe variations of HIT exist, including delayed onset HIT and refractory HIT, known collectively as autoimmune HIT (aHIT). Here we discuss a case of delayed onset and refractory HIT in a patient with little heparin exposure, discovered only after cardiac intervention for suspected STEMI. Significant thrombotic events occurred thereafter, including radial artery stenosis and intracardiac thrombus. Treatment with argatroban was insignificant. Significant resolution of thrombocytopenia was seen several weeks after infusion with IVIG, thus depicting further suspicion for refractory HIT. IVIG for aHIT treatment is traditionally chosen only if the disease process is refractory to other anticoagulation efforts due to the potential risk for increasing thrombotic risk with IVIG infusion. Here we discuss further the rare presentation of aHIT and the use of IVIG to successfully treat thrombocytopenia in refractory HIT.

Muzammil Rehman

Advisor(s): Jason Lazar

Effects of Lower Body Positive Pressure Ambulation on Functional Capacity in Patients With Severe Congestive Heart Failure

Congestive heart failure (CHF) with reduced ejection fraction is a progressive disorder that poses significant morbidity and mortality. In addition to advances in medical and device therapy leading to improved outcomes, exercise remains an overlooked but effective treatment modality in such patients as aerobic activity has consistently shown to reduce the risk of hospital admissions and to improve health-related quality of life. However, the dilemma is that patients who could potentially derive the most benefit are the least able to exercise. NASA developed a lower body positive pressure (LBPP) treadmill that offloads up to 80% of wt. allowing comfortable walking for disabled people. We prospectively studied 8 subjects with severe CHF (New York Heart Association Class (NYHA) 3-4 symptoms) and reduced ejection fraction on optimal medical therapy, walking <300 meters on a 6 minute walk test (6MWT) as part of their clinical workup. Repeat 6MWT was performed after 3 and 6 weeks. There were 6 men and 2 women, age 64+12years, mean ejection fraction 26+5%. Subjects underwent 2-3 low amount, low intensity 30-min. weekly sessions at 40% unloading (to 60% of body weight) for 6 weeks. Sessions were well tolerated and resulted in a significant increase in 6 minute walk distance from 166+66 to 208+92 to 288+153, $p<0.01$) over the 6 week period. In conclusion, this pilot study demonstrated that repeated sessions of LBPP treadmill ambulation significantly improved functional capacity in patients with severe CHF.

Tejen Shah

Advisor(s): Jason Lazar

Is Spinal Cord Area Related to Cardiovascular Risk?

Aging is associated with declining brain, which may be accelerated in individuals with cardiovascular (CV) risk factors such as hypertension. Lower brain volume is in turn associated with cognitive impairment. Since cognitive impairment and frailty often coexist, brain and spinal cord (SC) atrophy might be related and share a common underlying pathophysiology. Although few studies have found brain atrophy associated with frailty, little is known about the impact of aging and CV risk factors on the SC. Therefore, the objectives of this study were to determine the relations of SC size to age and overall CV risk. We retrospectively chart reviewed 122 patients, age 61+9 years, 77.5% female who were referred to our institution for Magnetic resonance imaging (MRI) of the cervical SC from June 1, 2017 to March 1, 2018. CV risk factors were obtained from an electronic medical record and the pooled cohort risk (PCR) score, which predicts the 10-year risk of first atherosclerotic cardiovascular event, was assessed using the American College of Cardiology PCR calculator. Patients with degenerative neurological disease were excluded from the study. The SC area were traced with electronic calipers and averaged. Among the 71 patients who had complete data on cardiovascular risk factors, age ($\beta=0.24$) and the PCR score ($\beta=0.45$) were each significantly correlated inversely with mean spinal cord area (SCA) (both $p<.05$). On multivariate analysis, only PCR score was independently associated with SCA. The relation between PCR score and SCA appears to be mediated by age ($B=0.28$, $p=0.018$) and diabetes ($B=0.44$, $p=0.000$). In conclusion, SCA is related to cardiovascular risk with age and the presence of diabetes accounting for the relation. These data suggest a vascular etiology for sc atrophy.

Ganesh Keshav Thirunavukkarasu

Advisor(s): Louis Saliccioli

Cardiac amyloid presenting as Recurrent Syncope

Introduction: Transthyretin amyloid cardiomyopathy (TTR-ACM) is the most commonly described infiltrative heart disease that mimics hypertensive or hypertrophic heart disease and often goes undiagnosed, especially in Black patients.

Case: A 79 year old AA male with hypertension presented after witnessed recurrent syncopal episodes without evidence of seizure. Physical exam was unremarkable. ECG showed sinus bradycardia 50 bpm, with nonspecific ST-T abnormality, normal voltage. CT head was normal. Chemistries and renal function were normal. Troponin I and BNP were elevated. Urine-protein electrophoresis (PEP) was normal, but serum-PEP had a monoclonal IgG lambda gammopathy(0.3g/dL). 2D-echo demonstrated LVEF of 40-45%, diastolic (grade 1) dysfunction, dilated atria and speckled pattern of the myocardium. CT coronary angiogram was normal. Tc-99m pyrophosphate (PYP) scan revealed intense bi-ventricular uptake. Fat pad biopsy-negative for amyloid. Loop recorder revealed intermittent atrial fibrillation. Patient was referred to Weill-Cornell hospital for follow up.

Discussion: Amyloid deposition can affect the myocardium, atria, pericardium, endocardium, and vasculature leading to heart failure and arrhythmias. Three types of cardiac amyloidosis are recognized: light chain (AL), hereditary (ATTRm) and wild-type (ATTRwt). Intense uptake in Tc-99m PYP scintigraphy in the absence of serum or urine monoclonal protein can provide a diagnosis of cardiac ATTR amyloidosis with 100% specificity precluding a need for biopsy. In our case, given both monoclonal gammopathy and intense Tc-99m PYP uptake, endomyocardial biopsy is necessary for guiding therapy.

Conclusion: Given disproportionately increased prevalence of ACM in Black patients, hypertrophic heart disease after 6th decade should include amyloid work up. Clinicians need to be aware of the utility and easy availability of Tc-99m PYP cardiac scintigraphy to help diagnose cardiac amyloid, especially in view of emerging therapies.

Tobin Mathew

Advisor(s): Louis Saliccioli

Relation Between Dynamic Nailfold Capillaroscopy And Digital Thermal Reactivity Testing To Assess Microvascular Function In Diabetic And Nondiabetic Patients

Although microvascular disease has been increasingly implicated in the pathogenesis of cardiovascular disease, there remains no gold standard test to assess its extent. Currently, several methods exist to measure including digital thermal monitoring (DTM), providing a vascular reactivity index. Nailfold capillaroscopy (NFC) is a non-invasive imaging technique long used in the clinical rheumatology arena, that has recently been advocated for use in non-rheumatology conditions. These two tests provide subclinical measures of structure and function at the microvascular level but have not been compared. Accordingly, the objective of this study was to directly compare values obtained by NFC with DTM. We studied 17 non-diabetic subjects and 11 diabetic subjects, five of whom had known microvascular complications (retinopathy, neuropathy, or nephropathy) and assessed capillary number via NFC and vascular reactivity (Vendys). Vascular reactivity was significantly correlated with mean capillary number ($r=.40$, $p=0.036$). Mean vascular reactivity was lower in the diabetic group ($.37 \hat{A} \pm 0.36$ and $0.90 \hat{A} \pm 0.61$; $p=0.008$) and there was a trend towards lower mean capillary number in the diabetic group ($7.13 \hat{A} \pm 1.21$ and $8.04 \hat{A} \pm 1.01$, $p=0.04$). In conclusion, preliminary findings from this ongoing study suggest that capillary structure assessed by NFC and microvascular reserve assessed by DTM appear to be related. Diabetic patients appear to exhibit both structural and functional abnormalities, even in patients without known microvascular complications.

Christian Abraham

Advisor(s): Ronald Pedalino

The Dynamic Nature of CHA2DS2VAS Score in Minority Patients with Atrial Fibrillation.

Introduction: Atrial Fibrillation is the most common sustained arrhythmia and is a well-established risk factor for strokes and transient ischemic attacks (TIAs). The CHADS and CHA2DS2VASc scores have been validated to predict stroke risk and thus indication for anticoagulation in these patients.

A recent study expressed that there is evidence to suggest that stroke risk in atrial fibrillation is dynamic. In addition to increasing their age on follow up, patients are likely to accumulate other risk factors that increase their stroke risk.

Goals: We seek to determine the dynamism of stroke risk in a US minority population.

Methods: We conducted a single-center, retrospective chart review of the hospitals electronic medical records (EMR) for all patients admitted to the telemetry service with Atrial Fibrillation between the months of October and December 2018. We assessed the CHA2DS2VASc score at visit as well as 1, 3 and 5 years prior. Patterns of anticoagulation prescriptions by inpatient providers were also noted in addition to the incidence of strokes in the five year follow up period.

Results: Of 218 patients admitted to the telemetry service in the 3 month period, 69 had Atrial fibrillation, 11 of which were new-onset (15.9%). 62 patients (89.9%) of patients were of African ancestry.

52, 43 and 38 patients had documentation in the electronic medical record, going back 1, 3 and 5 years respectively. On comparing CHA2DS2VASc scores at the time of admission to 1, 3 and 5 years prior we noted that there was a change in risk in 11 (21.2%), 20 (46.5%) and 25 (65.7%) patients respectively.

5 years prior, there were 4 patients with a score of 0-1, three of which accumulated a new risk factor during follow up. Of all patients followed, 4 (5.8%) had a stroke during the follow up period.

Conclusion: In our predominantly African American cohort of patients, we noted that stroke risk is very dynamic and thus should be assessed at least annually given our findings.

Kurnvir Singh

Advisor(s): Inna Bukharovich

Improving Compliance and Follow-Up for Chemotherapy-Induced Heart Failure in an Urban Underserved Tertiary Hospital

Chemotherapy-induced cardiomyopathy and heart failure are major complications of cancer therapy and can result in significant morbidity and mortality. Underserved areas have been found to have higher incidences of poor compliance and follow-up. At Kings County Hospital Center, a major academic cancer treatment center in Brooklyn, NY, our findings indicate that over the past five years, many patients with chemotherapy-induced cardiomyopathy were lost to follow-up with outpatient cardiology services. This led us to develop and apply a new collaborative protocol focused on detecting and managing type I or type II chemotherapy-induced cardiotoxicity. The first step of the protocol involves obtaining a multigated acquisition (MUGA) scan of the patient, prior to beginning chemotherapy and during every three months of chemotherapy treatment. If a 10% or more reduction in ejection fraction is found between MUGA scans, the reading physician is to notify the Heart Health Center at Kings County Hospital to contact the patient for an appointment. At the Heart Health Center, the patient is to receive guideline-recommended treatment for heart failure; follow up with the nurse practitioner for medication reconciliation, counseling on activity, weight monitoring, dietary intake, and warning symptoms for heart failure exacerbations; follow-up with a nutritionist for guideline directed dietary recommendations for heart failure; and follow-up with social work services to ensure appropriate social conditions and support. The oncology service would also assist by checking for cardiology follow-up, before continuing chemotherapy. If the patient has not, or was lost to follow-up, the oncology service would notify the Heart Health Center that would also attempt to reach the patient for further appointments. We aim to improve compliance for follow up and guideline directed management for chemotherapy-induced heart failure in an urban underserved tertiary hospital.

Rishard Abdul

Advisor(s): Adam Budzikowski

Right Ventricular Infarction Complicated with Pulmonary embolism

Introduction: Since the introduction of heparin as part of the management of acute coronary syndrome, the occurrence of pulmonary embolism (PE) as a complication of myocardial infarction (MI) has somewhat been unheard of. Given this rarity, its recognition is now a formidable challenge.

Case Description: We highlight a case of a previously well 56-year-old male who presented with typical chest pain radiating to the left arm and dizziness. Initial vital signs revealed a blood pressure of 95/65 mmHg and his heart rate was 42 bpm. Physical examination revealed a middle-aged male in no acute distress with cool extremities, normal heart sounds, no murmurs and flat neck veins. His chest was clear to auscultation, abdomen benign and clinically, he was euvoletic. His first electrocardiogram (EKG) was significant for bradycardia with heart block and junctional escape rhythm with ST depressions in the anteroseptal leads. Subsequent right sided EKG showed sinus bradycardia with ST segment elevations in leads II, III and aVF. Troponin I was 0.95 ng/L [normal <0.04 ng/L] and initial transthoracic echo (TTE) was unremarkable with an ejection fraction (EF) of 55-60%. He was given loading doses of aspirin and clopidogrel, heparin drip initiated, and he proceeded to cardiac catheterization which revealed a 60 % stenotic lesion of the mid LAD and a large filling defect with 100% stenosis of the mid RCA consistent with thrombus. Post procedure TTE revealed an EF of 40%, septal and posterior hypokinesis, right ventricular regional wall motion abnormality of the basal and mid free wall with apical hypercontractility (McConnell's sign) suggestive of PE. CT pulmonary angiography revealed bilateral pulmonary emboli and anticoagulation therapy was initiated.

Conclusion: This case illustrates that pulmonary emboli is a potential complication of RV infarction and its identification critical, as anticoagulation therapy becomes a requirement.

Mohammed Elshorafa

Advisor(s): Geetha Chari

Psychogenic Non-Epileptic Seizures: The Mistaken Diagnosis

Objective: To report a case of frontal lobe epilepsy that was previously attributed to psychogenic non-epileptic seizures (PNES) and evaluate the disparity between these two diagnosis.

Background: The line between epileptic and PNES can be very thin due to similar presentations. In practice, seizures are widely accepted to be a clinical diagnosis and although a number of features have been reported to help distinguish these two entities, it is difficult without the use of video-EEG monitoring. Even then, the semiology of said events share features with frontal lobe seizures, which at times can also pose a diagnostic challenge given the difficulty with identifying focal discharges on EEG due to their deep cortical origin. In addition, epileptic seizures and PNES are not mutually exclusive diagnosis as they can often occur together.

Design/Method: We present a case of a 14 year old girl with events that are clinically consistent with frontal lobe seizures in both sleep and awake state. These episodes were attributed to PNES without medical treatment for almost two years prior to our initial evaluation.

Results: Workup included a prolonged video EEG study which was completed in our Epilepsy Monitoring Unit for five days. The ictal onset was a brief burst of rhythmic beta activity over the right parasagittal region, that was quickly followed by diffuse EMG artifact obscuring the EEG and this was consistent with all the recorded events. Once identified, she was started on Tegretol which reduced the number of episodes. At her subsequent follow up appointment one month later she endorsed not having any further events.

Conclusion: We described a young lady with clinical frontal lobe seizures that were previously attributed to PNES. This case represents the variable presentations of frontal lobe seizures, the difficulty with which to identify definitive ictal patterns on EEG and the importance of a comprehensive overview to evaluate patients with suspected PNES.

Starlyn Adames

Advisor(s): Jasmin Thomas

Developing the pilot program: Emotional Intelligence: Soft Skills Training Curriculum, an educational training for students during Fieldwork Level I and Fieldwork Level II

Emotional intelligence (EI), or soft skills, is a set of skills such as professionalism, effective communication skills, organizational skills, and responsiveness to feedback. Research indicates that occupational therapy students entering their Level I and II Fieldwork experiences may lack these sets of skills. The lack of these soft skills during fieldwork experience can strain the fieldwork student's professional relationship with their clinical educators (supervisors) and result in fieldwork failure. After a review of the literature, the purpose of this research project is to augment the evidence-based, soft skills training curriculum being developed at SUNY Downstate Medical Center through the production of three educational videos that incorporate the perspectives of fieldwork students, alumni, and clinical educators. The goal of the project is to teach current students soft skills and inspire self-awareness and reflection on their own professionalism. The curriculum would ideally function to increase students' success in fieldwork and develop more competent clinicians.

Theresa Sexton

Advisor(s): Ian deSouza

Pharmacologic Cardioversion of Recent-Onset Atrial Fibrillation and Atrial Flutter: A Systematic Review and Network Meta-analysis

Background: Atrial Fibrillation (AF) is the most common clinically significant dysrhythmia worldwide and is associated with increased risk of thromboembolism and cardiovascular death. In patients with recent-onset AF, early cardioversion may reduce these risks.

Objectives: We conducted a systematic review and Bayesian network meta-analysis of randomized controlled trials to indirectly compare and rank antidysrhythmic drugs for pharmacologic cardioversion of recent-onset AF and atrial flutter (AFL) in adults.

Methods: We searched PubMed, Embase, and Web of Science from inception to November 2018 and appraised selected trials for risk of bias using the Cochrane review handbook. We extracted data and calculated odds ratios for the outcomes of conversion within 24 hours. We qualitatively assessed rate of significant adverse events, time to cardioversion, and rate of thromboembolism.

Results: We selected 29 studies comprising 3,478 patients across 18 treatment groups. There was unclear risk of bias across the studies. Networks were limited by number of trials and available direct evidence. Probabilistic analysis ranked ranolazine PO plus amiodarone IV highest for conversion within 24 hours.

Conclusions: For pharmacologic cardioversion of AF within 24 hours, ranolazine PO plus amiodarone IV may be the superior drug regimen. Flecainide IV/PO and vernakalant IV may be effective alternative agents. Propafenone IV/PO and amiodarone IV may be relatively less effective. Due to limited evidence, we cannot offer any recommendations for pharmacologic cardioversion of recent-onset AFL. Additional high-quality, placebo-controlled, and head-to-head studies are necessary in order to make definitive recommendations for the pharmacologic cardioversion of recent-onset AF and AFL.

Calvin Tan

Advisor(s): Lorenzo Paladino

BRASH Syndrome case Report

Introduction: BRASH syndrome (Bradycardia, renal failure, AV node block, shock, hyperkalemia) is a newly described entity. It presents with profound bradycardia and AV block that is not proportional to the rate controlling medication use or their hyperkalemia alone. EKG findings are not typical of hyperkalemia and symptoms are refractory to positive chronotropic medications.

Case: An 89 year old female with hypertension and chronic kidney disease presented with bradycardia of 17 bpm and decreased responsiveness. Medication history included Metoprolol and a diuretic. EKG showed 3rd degree heart block without characteristic QRS widening or T-wave changes. First line treatment with atropine and then glucagon failed to correct the heart rate. An external pacer improved the patient's hemodynamics and mental status. Labs revealed a creatinine 4, and potassium 6.6. Intravenous fluid and calcium increased her heart rate to 105, enabling removal of pacer.

Discussion: The bradycardia is multifactorial, caused by cardiac and kidney disease and beta blocker. Hypovolemia potentiates the hyperkalemia. The low volume state cannot be compensated with an increase in heart rate due to medication induced AV-blockade leading to bradycardic cardiogenic shock. This decreases kidney perfusion and worsens the hyperkalemia, which synergizes with AV-blocking agents causing increasing nodal blockade even at relatively low potassium levels, explaining why typical EKG findings associated with hyperkalemia (tall peaked T-waves, widening QRS, etc.) are often absent in BRASH syndrome.

Conclusion: The symptoms are caused by a correctable electrolyte derangement and because the etiology of the bradycardia is metabolic rather than cardiac, following the ACLS bradycardia algorithm will not correct the cause of the bradycardia. Treating the electrolyte abnormality, even in the absence of characteristic hyperkalemic EKG findings, with fluid replacement can lead to dramatic improvement in the patient.

Taylor Conrad – moved to B117.

Tian Liang

Advisor(s): Richard Sinert

The Utility of the Focused Assessment with Sonography in Trauma (FAST) Exam in Pediatric Blunt Abdominal Trauma: A Systematic Review and Meta-Analysis

Background: Computerized tomography (CT) has become the test of choice for diagnosing intra-abdominal injury (IAI) in pediatric blunt abdominal trauma, but also carries the risk of malignancy from radiation exposure. The Point of Care Ultrasound (POCUS) Focused Assessment with Sonography for Trauma (FAST) is radiation free and may obviate the need for CT in some adult patients. We conducted a systematic review and meta-analysis to evaluate the utility of POCUS FAST in the diagnosis of IAI in pediatric blunt abdominal trauma.

Methods: We searched medical literature from January 1966 to March 2018 in PUBMED, EMBASE, and Web of Science. Prospective studies of POCUS FAST exams in diagnosing IAI in pediatric trauma were included in our final analysis. Sensitivity, specificity, and likelihood ratios (LR) were calculated using a random-effects model. Study quality and bias risk were assessed, and test-treatment threshold estimates were performed.

Results: Eight studies were included encompassing 2,135 patients with a weighted prevalence of IAI of 13.5%. Studies had variable quality with most at risk for partial and differential verification bias. POCUS FAST exams for IAI had a pooled sensitivity of 35%, specificity 96%, LR+ 10.84, and LR- 0.64. A positive POCUS FAST post-test probability for IAI (63%) exceeds the upper limit (57%) of our test-treatment threshold model for CT abdomen with contrast. A negative POCUS FAST post-test probability for IAI (9%) does not cross the lower limit (0.23%) of our test treatment threshold model.

Conclusions: In a hemodynamically stable child presenting with blunt abdominal trauma, a positive POCUS FAST exam means IAI is likely, but a negative POCUS FAST exam alone cannot preclude further diagnostic workup for IAI. The need for a CT scan may be obviated in a subset of low-risk pediatric blunt abdominal trauma patients presenting with a Glasgow Coma Scale of 14-15, normal abdominal exam, and negative POCUS FAST.

Isaac Gordon

Advisor(s): Richard Sinert

The Utility of Ultrasound in Detecting Skull Fractures after Pediatric Blunt Head Trauma: Systematic Review and Meta-Analysis

Background: Head trauma is a common reason for evaluation in the Emergency Department (ED). The evaluation for traumatic brain injury, involves Computed Tomography, exposing children to ionizing radiation. Skull fractures are associated with intracranial bleed. Point of Care Ultrasounds (POCUS) can diagnose skull fractures.

Objectives: We performed a systematic review / meta-analysis to determine operating characteristics of POCUS skull studies in the diagnosis of fractures in pediatric head trauma patients.

Methods: We searched PubMed, EMBASE, and Web of Science for studies of ED pediatric head trauma patients. Quality Assessment Tool for Diagnostic Accuracy Studies (QUADAS-2) was used to evaluate risk of bias. POCUS skull study operating characteristics were calculated and pooled using Meta-DiSc.

Results: Six studies of 393 patients with a weighted prevalence of skull fractures of 30.84%. Most studies were at low risk for bias. The pooled sensitivity (91%) and specificity (96%) resulted in pooled LR+ (14.4) and LR- (0.14). Using the weighted prevalence of skull fractures across the studies as a pre-test probability (31%), a positive skull ultrasound would increase the probability to 87%, but a negative test would result in the probability of a skull fracture to 7%. To achieve a post-test probability a skull fracture of ~2%, would require a negative skull ultrasound in a patient with only a pre-test probability of ~15%.

Conclusions: A POCUS skull study significantly increases the probability of skull fracture, while a negative study markedly decreases the probability if the pre-test probability is very low.

Roshanak Benabbas

Advisor(s): Richard Sinert

Utility of Carotid Artery Point-of-Care Ultrasound in Assessing Fluid Responsiveness: A Systematic Review and Meta-analysis

Objective: To evaluate the utility of carotid point-of-care ultrasound (POCUS) to predict fluid responsiveness in volume depleted patients. Design: We conducted a systematic review and meta-analysis searching pubmed, embase, and web of science up to Nov 2018. Patients: We included adult volume depleted patients. Intervention: Carotid POCUS measurements predicting fluid responsiveness. Measurements and Main Results: Five studies were included. Studies measured Carotid Doppler Peak Flow Velocity Variation (\hat{I}° CDPV), Carotid Blood Flow variation (\hat{I}° CBF), and Corrected Flow Time variation (\hat{I}° CFTc). All three measurements (\hat{I}° CBF, \hat{I}° CDPV, \hat{I}° CFTc) were good predictors of fluid responsiveness (LR+ 4.66-15). Conclusions: Carotid point-of-care ultrasound is a promising modality for predicting volume responsiveness in volume depleted patients.

Marc Christopher Emos

Advisor(s): Reuben Ingber

Conservative Treatment of First Carpometacarpal Joint Osteoarthritis Utilizing Adductor Pollicis Myofascial Trigger Point Therapy: A Case Report

We are introducing a new conservative approach to the treatment of first carpometacarpal joint osteoarthritis that can be utilized before the consideration of surgery.

We present a 75-year-old right-handed female who presented to an outpatient PM&R practice with right thumb pain of several months' duration. The patient complained of sharp right basal thumb joint pain especially when working in the kitchen or on forced abduction of the thumb. When doing a "high-five", she would have sharp pain at the radio-lateral base of the thumb. She denied weakness, paresthesias, or dropping objects. On physical exam, wrist ROM was preserved but. The right web space on thumb abduction was decreased by 50% as compared to the left web space. Right Finkelstein's sign was negative. There was no tenderness at the base of the lateral thumb, but there was crepitus of the thumb with movement and pain with thumb circumduction. There was right adductor pollicis trigger point tenderness with pain recognition. Over 5.5 months, she was treated with a series of seven dry-needling trigger point treatments to the right adductor pollicis muscle and instruction on a 2-position adductor pollicis stretch. She noted marked improvement in the right thumb pain. She was able to abduct her thumb with improvement in thumb excursion and full movement of the right web space as compared to the left. There was no thumb pain when working in the kitchen or giving "high-fives." There was still mild pain when fully abducting and extending her thumb but there was no sharp pain. In a follow-up exam 12 months later, there was no longer any thumb pain with activities of daily living and she was able to "high five" without pain or hesitation.

Adductor pollicis myofascial treatments with trigger point dry needling and home therapeutic stretching can serve as a cost saving approach to the treatment of non-traumatic thumb pain.

Chanee Massiah

Advisor(s): Tonya Taylor

Coping Strategies for Older Women Living with HIV in Brooklyn, NY

Advances in HIV treatment have extended the life expectancy of people living with HIV; however, quality of life for many is compromised by aging-related challenges. We conducted ten individual interviews among women 50 and older living with HIV, who were randomly selected from the Brooklyn Women's Interagency HIV Study site. Using qualitative and participant observation methods, we explored psychosocial factors associated with successful aging. Each interview lasted 90 minutes and was conducted by a trained qualitative researcher, accompanied by a note taker. Questions asked in the interview explored definitions of successful aging with HIV and obstacles that impede successful aging across various socioeconomic and cultural groups. We analyzed the field notes, audio files and developed matrices to identify recurrent themes and sociodemographic patterns. Two participants in the sample (n=10), self-identified as Latina from Puerto Rico, two as Afro-Caribbean and eight as African American. We found coping and isolation as themes were prevalent; although much of the coping was attributed to life stressors rather than aging with HIV. Seven participants reported some level of isolation. Few isolated themselves entirely from the community, while others engaged in community events, but still felt the impact of isolation when home. A second emergent theme identified, was the use of binge behavior to cope with isolation and stress. Four women reported eating excessive sweets, while one reported excessive drinking. Apart from the woman who binged alcohol, the binge eaters were aware that the behavior was negative. A third theme was the reliance on spirituality. Whether participants attended church or not, nine of the ten women believed that a higher power helps them to cope with life's adversities. Further research is needed to evaluate the protective or harmful impact of isolation and coping strategies among older women with HIV.

Rhonda Hewitt

Advisor(s): Kathleen Bratby

Timely 911 calls for older adult stroke victims: An evidence-based practice proposal

In US, 800,000 strokes occur annually; stroke is 5th leading cause of death & 3rd leading cause of disability. Only 25% of stroke patients arrive in the hospital within recommended 3 hours for optimal treatment. Research demonstrates that immediate calls to 911 can reduce negative outcomes by 24%. Attempts to educate communities about stroke & the need for timely intervention have not been routinely successful because of: poor penetration into ethnic minority groups; education not culturally & ethnically sensitive; costs of mass media; & lack of sustainability. In addition, clinical observations suggest that education that is not personalized does not engage the individual. The proposed educational intervention will build upon content utilized in successful programs. The investigator's observations suggest the need for a more personalized, meaningful approach to stroke prevention education. Thus, the educational program will include providing participants an opportunity to explore how they might experience negative stroke outcomes. The proposed EBP project will evaluate the impact of an enhanced educational program on knowledge, skills & attitudes about stroke & need for early intervention among older adults. Methods: A pre-post test quasi-experimental design will be used with a convenience sample of older adults in a community center in Brooklyn. The educational intervention is a 1-hour class-using power point & videos. Content includes: stroke prevention & treatment emphasizing the need for early intervention & the impact stroke might have on them & their families. Data will be collected immediately before and after the class using an investigator designed survey & analyzed using descriptive & comparative statistics. Research suggests the importance of education to improve stroke outcomes by reducing care delays. If the proposed personalized educational intervention is successful, this approach can be imbedded into community-based stroke educational programs.

Miyaseki Paragas

Advisor(s): Maria Rosario-Sim

A Proposed Study to Evaluate the Short-term Effectiveness of Ketogenic Diet in Reducing HgA1c Levels and Weights in Patients with type 2 Diabetes

Rationale: Several studies have been done on the effectiveness of ketogenic diet in decreasing the HemoglobinA1c (HgbA1c) in adult patients who have type 2 DM. Evidence suggests that low-carbohydrate ketogenic diets are safe and effective in reducing glycemia in diabetic patients. The purpose of this proposed study is to evaluate the effects of the ketogenic diet in lowering the body mass index (BMI) of 25-30 and HgbA1c of 7.5-9.0 % of patients with type 2 DM over 12-week period.

Methods: Design/Sample: Quasi-experimental, one-group pre-posttest design to investigate the effect of ketogenic diet in reducing HbA1c levels, BMI and diet side effects. Thirty 45-65-year-olds at primary and endocrine care centers, diagnosed with type 2 DM with 25-30 BMI, 7.5-9.0% HgbA1c, taking only Metformin for DM since diagnosed without evidence of renal insufficiency, liver disease, cancer and cardiovascular disease. Measures: Demographic survey, hypoglycemic episodes assessment, vital signs, body weight, BMI and waist circumference including lab work. Measures assessed at week 0, week 2, 4, 8 and 12 after the ketogenic diet intervention. Intervention: Layman-diet books and handouts distributed to participants, introduce to a diet diary and keeping daily diet reports. A registered dietitian will instruct participants about the specific diet at week 0, reinforced at week 2, 4 and 8. Record of daily morning 30-minute exercise of brisk walking and body stretching. Data analysis: Chi square test or Fisher's exact test for categorical variables, t-test or ANOVA for continuous variables will be used as appropriate.

Implication: Results may provide important information on the management of type 2 DM and may assist in addressing problems especially in determining optimal medication adjustments. This diet may help assist primary care providers by incorporating diet as one aspect of the Therapeutic Lifestyle Changes recommendation in lowering weight, BMI and hemoglobinA1c.

Agatha Muire

Advisor(s): Shirley Girouard

Building an evidence-based model to integrate ACEs in baccalaureate nursing education: A proposed literature review

Exposure to adverse childhood experiences (ACEs), which are defined to encompass abuse and household dysfunction, has been shown to have a strong relationship to detrimental health consequences. Adults with two or more ACEs are at increased risk for chronic disease, risk-taking behaviors, unhealthy lifestyles, addiction, social dysfunction, poor educational and economic attainment in adulthood, and early death. Negative health outcomes include top risk factors and diseases, such as smoking, obesity, and drug abuse, and chronic lung disease, cancer, and ischemic heart disease. Exposure to ACEs is common and prevalent across race, gender and income.

As nurses provide patient-centered care it is essential that they are aware of and address ACEs and their sequeli in their assessments, interventions and evaluations of care. Nurses need education and training to be able to meet these expectations. However, baccalaureate nursing education does not address the role ACEs play in patient lives. Instead, nursing education surrounding ACEs has been topic specific.

The proposed literature review aims to identify KSAs about ACEs for nurses to effectively integrate prevention and mitigation into their practice. Relative key words and standardized search questions were used. Additional terms resulting from these searches “trauma-informed care”; “sexual abuse”; and, “childhood adversity and toxic stress” were identified.

Despite calls for ACEs education for all health professional students, discussion of the systematic integration of ACEs knowledge remains absent in the literature. As a result, and to build upon the work that has been completed, this project will assess curriculum and conduct an in-depth literature review to identify best practices and develop an evidence-based proposal for a curriculum that will equip graduates with the KSAs they need to prevent and care for patients who have had exposure to ACEs and are living with the long-term consequences of those event(s).

Carinna Emilio

Advisor(s): Shirley Girouard

Implicit Biases in the Case of Women with Cardiac Conditions; a Review of the Literature

Implicit bias in healthcare, specifically women's cardiac care, continues to be an issue in the United States. Heart disease is the leading cause of death in the United States for both men and women, making cardiac conditions a top priority for healthcare providers. By the age of 40, 1 in 3 women will develop heart disease and 1 in 5 will develop heart failure. Between the ages of 65 to 84 years old, the incidence rate of heart failure triples for women. Despite these high incidence rates, when compared to men, women are less likely to be referred for specialty care, receive diagnostic testing, and undergo lifesaving procedures such as revascularization or heart transplant. In addition, women comprise less than 25% of participants in cardiovascular studies. In this literature review, peer reviewed literature published between 2012 and 2018 listed in PubMed and CINNAHL databases was analyzed. The search terms "Implicit bias", "Heart disease", and "Women" as along with Boolean operators such as "AND" and "OR" were used. One of the major factors that affected the care women received was healthcare provider implicit gender bias. A preliminary review of the literature revealed that providers often displayed gender bias in the diagnosis and treatment of women with cardiovascular diseases. A better understanding of the impact of implicit bias on healthcare treatment, as well as ways to reduce bias in healthcare, will improve the treatment of women with cardiovascular diseases.

Chaya Fastow

Advisor(s): Shirley Girouard

Anti-Vaccination Amongst the Hasidic Population: A Review of the Literature

With the introduction of vaccines, beginning with small pox in the 18th century, there has been a significant decrease in childhood mortality & morbidity associated with vaccine preventable diseases & a reduction in the number of outbreaks annually. In Hasidic communities, rabbis & local doctors encourage vaccines, yet there are still those that do not vaccinate their children. Although it is most Yeshivas' policy to not admit non-vaccinated children, "anti-vaccination" parents are pushing the Yeshivas to admit their children. They argue that the Yeshivas are denying their children a Jewish education and argue for religious exemption. The underlying distrust of vaccines of these individuals are unknown. The main concern is that the rise of "anti-vaccinators" & the pressure on Yeshivas will allow the viruses to become immune to the vaccine & affect vaccinated children, eventually growing out of the Hasidic community. It is imperative to determine the rationale behind anti-vaccination sentiment in order to implement solutions.

An anti-vaccination movement has found a home in the Hasidic & orthodox communities of New Jersey & New York. Its effects are being seen in the current outbreak of measles in Rockland County, Brooklyn & in Ocean County, New Jersey. This review looks at Hasidic communities at large as opposed to individual communities. Literature on why some Hasidim are not vaccinating is sparse. The aim of this review is to gain a better understanding of the underlying reasons for low vaccination rates among Hasidic Jews. It will then be possible to identify, implement & evaluate strategies to enhance vaccination rates in this community. After a comprehensive literature review about vaccine hesitancy, additional research or an evidence-based practice project will be proposed.

Chelsea Daniels

Advisor(s): Shirley Girouard

Food Insecurity among Older Adults: Developing a Sensitive, Practical Screening Tool

Food insecurity, defined as experiencing food shortages, disturbed eating, and reduced food intake, affects an estimated 50 million Americans. One in eleven seniors experiences food insecurity, representing the fastest growing population impacted by this issue. As research unequivocally correlates food insecurity with negative health outcomes, healthcare providers must be able to identify those affected and establish a point of intervention. SUNY Downstate, led by the College of Nursing, is collaborating with the New York State Department of Agriculture and Markets to develop and implement a screening tool to evaluate food insecurity among older adults, refer those identified to nutritional consultation and education, provide workshops and education about food resources and nutrition, and distribute food and food preparation items. The goals of this project are to partner with primary care practices and community organizations to increase food insecurity screening of and referrals for older adults, improve access to education and resources, and reduce health risks related to food insecurity among seniors. Providers and the community need practical, sensitive, implementable food insecurity assessment tools to achieve these goals and thus, the first step is to develop and test such a tool. A literature review and comparative analysis of screening methods revealed that a two-question tool, used in Vermont, Wisconsin, and the Indian Health Service, had both high sensitivity and specificity in the study populations. The SUNY Downstate project will develop and test a tool for central Brooklyn, a population that is 80% black, with 31% living below the poverty line and 29% without a primary care doctor. Such patient characteristics are underrepresented in the literature, an issue that must be addressed, as screening is the first step to meeting project goals and reducing food insecurity and its associated negative health outcomes among older adults in the community.

Emilie Lico

Advisor(s): Shirley Girouard

Non-pharmacological interventions for the treatment of behavioral and psychological symptoms of dementia: A review of the literature

Most patients diagnosed with dementia experience behavioral and psychiatric symptoms (BPSD) including agitation, delusions, paranoia, wandering, apathy, and sleep disturbances. These BPSDs are often associated with poor patient and caregiver outcomes. Antipsychotics are utilized to treat these symptoms however antipsychotics may have adverse effects when used in patients with dementia. In addition, these medications may lack significant efficacy. Despite their risk and lack of efficacy, the use of antipsychotics for the treatment of BPSD remains prevalent. The aim of this work is to review the non-pharmacological interventions that have been tested in controlled studies.

A comprehensive review of the literature published between 2010 and 2018 was conducted. Search terms included "non-pharmacological", "interventions" "behavioral and psychological symptoms", "BPSD", and "dementia". Three databases were searched including CINAHL, Pubmed, and EMBASE. Studies published in languages other than English were excluded. Lateral search strategies were also employed. These included using reference lists from relevant papers returned in the database search and the 'cited by' and 'similar articles' features on PubMed.

Preliminary review of the literature suggests that non-pharmacological interventions are a potentially efficacious alternative to pharmacological treatments for BPSDs. We identified 12 papers which utilized various non-pharmacological interventions in controlled trials. Multiple studies looked at exercise, aroma therapy, and music therapy. There's potential for more research in other areas such as art therapy, doll therapy, ECT, massage therapy, meaningful activity, pet therapy, reminiscence.

A better understanding of problems associated with BPSDs and their treatment will provide a base for determining the efficacy of non-pharmacological treatment options which could improve patient/caregiver outcomes. A significant number of people living with dementia have comor

Sara Corderman

Advisor(s): Shreya Trivedi

Direct Observation of Patient Education by the Healthcare Team on the Day of Discharge

Background: The transition of care from hospital to home is a vulnerable time for patients. Though suboptimal discharge education can lead to post-hospitalization morbidity and readmissions, implementation of recommended high-value discharge practices remains scarce. Bedside observations are critical to inform gaps in care delivery. This study is the first to capture the discharge process by the entire healthcare team from the patient perspective.

Methods: Patients designated for “discharge by noon” at a tertiary care teaching hospital were selected with purposeful sampling. A researcher sat with a single consented patient from 6:00am until discharge and recorded all discharge communication. Field notes were analyzed for education on key domains: medications, appointments, illness self-management, symptom expectations, red flags, teach-back and patient activation.

Results: To date, 22 field notes with 110 observation hours have been conducted. On average, interns spent less than 2 minutes on discharge education and attendings just over 2 minutes. Nurse discharge practices varied. While most patients were told about medication changes, the majority were not told their purpose. Most patients were not told the purpose of appointments. There was minimal education on disease self-management, symptom expectations or red flags. Education was one-sided - use of the teach-back method was only observed once. Only four patients were asked about potential barriers. The majority of communication on the day of discharge concerned the logistics of leaving the hospital.

Conclusions: There is significant opportunity for improved discharge techniques to enhance patient activation after hospitalization. Interventions must be implemented to increase patient education and clarify interprofessional roles. Further studies on systems redesign that foster patient-centered discharge education are imperative.

Kyle Cobb

Advisor(s): Shirley Girouard

Overcoming barriers to nursing-initiated ambulation: A review of the literature

Barriers to nurse-initiated ambulation includes lack of time because of large workload, hospital policies that overemphasize “no fall” campaigns, lack of knowledge about the significant improvement in patient outcome due to frequent ambulation and lack of proper training on how to safely ambulate patients. As the population grows older and continues to live at higher ages, the incidence rate of loss of independent ambulation can also increase in the healthcare field. This could increase demands on health care resources. Nurses will play a pivotal role in ensuring that these patients are ambulated. Results have shown that those nurses who take responsibility for ambulating their patients are also those that collaborate with physical therapy to promote progression of patient mobility, communicate with physicians to ensure the adequate movement of patients, and actively engage in ambulation assistance with patients. Those that do not claim responsibility for ambulation are more likely to wait and delay ambulation based off the actions of other professionals like physical therapists and doctors. These nurses typically do not engage patients in ambulation unless directed. Lack of ambulation usually results in more negative outcomes such as functional decline, prolonged periods of hospital stay, and higher incidence of readmission. A more comprehensive literature review will be conducted to identify the scope of the problem and the obstacles and barriers contributing to it. In addition, best practices will be identified and used to develop an evidence-based practice project that can be implemented and tested.

Jian Wang

Advisor(s): Shirley Girouard

Does preoperative cranial hair removal reduce the incidence of infections? A review of the literature

Body hair has been considered a potential risk factor for acquiring surgical site infections (SSIs) following an operation. It is of particular concern in neurosurgery involving cranial incisions. The objective of this literature review is to understand the significance of scalp hair in relation to surgical site infections. This will allow us to compare the incidence of SSIs in cranial surgeries completed with and without scalp hair removal to identify the best practice for preoperative preparation of the scalp. Peer-reviewed journals from the American Association of Neuroscience Nurses, British Journal of Neurosurgery, American Academy of Otolaryngology-Head and Neck Surgery Foundation, Journal of Cranio-Maxillofacial Surgery, WHO, and Acta Neurochirurgica, were searched from databases "Google Scholar", "Clinical Key," and "PubMed." Search words used for this study include "hair", "neurosurgery", "hair removal", "craniotomy", and "surgical site infections" from 2001 to 2016. Both randomized clinical trials and systematic literature reviews were selected which pertain to the question of whether or not preoperative hair removal for cranial surgeries contributes to SSIs. The studies reviewed suggest that there is no significant difference in the rate of postoperative surgical site infections in patients who have or have not had hair removal prior to surgery. Therefore, it is recommended that hair be left alone during pre-procedure care. While hair removal at the site of surgery may be beneficial in visualizing the incision line or removing potential microorganisms that are on the hair, avoiding this preoperative preparation can boost patient confidence and make the transition after surgery easier for patients.

Tisha Thomas

Advisor(s): Shirley Girouard

Impact of Parental Culture on the Care of Children with Special Healthcare Needs: A Review of the Literature

The purpose of this project is to bring awareness to and to understand how parental culture can affect the access to resources for children with special needs, as well as to highlight the disparities that may arise from it. Parents are often their child's first advocate and this is even truer for parents whose children have special needs. However, being an ethnic minority and an immigrant poses its own challenges and obstacles. Being an ethnic minority and an immigrant often times means having to navigate a whole new world along with having to advocate for their child. Also, often times cultural perceptions can skew the way in which a person views people with special needs. This can deter the families affected from seeking the care that is imperative for optimal quality of life for their child. These combined factors, can have a detrimental effect on the child. Children with special needs who do not have access to, or receive necessary resources will unfortunately later become adults with special healthcare needs that are unable to have optimal quality of life. A preliminary review of the literature was done. A preliminary literature review showed racial disparities in access to resources. In addition, the research suggests additional problems for racial and ethnic minority youth transitioning from pediatric to adult care. Hispanic and non-Hispanic Black children with special needs have a 1.6 the odds of not receiving adequate healthcare. Continuity of care is a factor that can determine the overall quality of life especially someone with special needs.. Nurses are at the "frontlines" of care, so need to be aware of these disparities so they can be attentive to the need s of children with special health care needs who are also racial and ethnic minorities. This literature review will be shared with student and practicing nurses who care for children with special healthcare needs

Rene Klein

Advisor(s): Veronica Arikian

Social Media, Smartphones and Anxiety

The relationship between intensive use of social media and smartphones has been well established, however, more research is needed to understand how social media and smartphones can positively and negatively affect certain age groups of the population. It has been proposed that anxiety may be linked to the excessive use of smartphones and social media. To date, several studies have focused on adolescents as an age group with specific vulnerabilities to the outcomes of social media and smartphone use and overuse. The aim of this study is to determine if increased use of smartphones and social media is related to the development and increase of anxiety in young adults who are attending a baccalaureate nursing program. This study will use a quantitative, descriptive, cross-sectional design to investigate the relationship between reported screen and smartphone time and anxiety in young adults. A total of 50 baccalaureate nursing students between the ages of 23-40 will be included in the study. Using the Smartphone Technology Use Questionnaire, participants will report intensity and frequency of social media and smartphone use. Additionally, they will be asked to rate their level of anxiety using the Beck Anxiety Inventory. The data will be analyzed using Pearson's correlation coefficient to determine if there is an association between intensity and frequency of smartphone and social media use and anxiety. The data on this topic is limited and more research must be conducted to establish a relationship. Smartphones and social media have become central to the lives of young adults, and therefore, it is essential to explore how they influence the development and increase of anxiety in this age group. This will allow clinicians to develop appropriate recommendations and treatments for young adults in an intensive degree program who struggle with anxiety related to smartphone and social media use.

Rachel Radigan

Advisor(s): Tracey Wilson

Discrimination, Resilience, and HIV Medication Adherence.

Introduction: Stigma and discrimination are associated with reduced medication adherence and HIV viral control, as well as reduced access and quality of care for HIV. One approach to this issue is to identify pathways to resilience, to minimize the impact of discrimination. We analyzed data from the Women's Interagency HIV Study, a longitudinal cohort study of HIV infection, to assess whether positive affect, a documented source of psychological resilience, buffers the impact of discrimination on HIV medication adherence.

Methods: Women living with HIV completed a measure of perceived discrimination at a single study visit between 10/1/13 to 3/31/15. Self-reported adherence of 95% or greater was assessed at the six-month study visit subsequent to the discrimination assessment. Multiple logistic regression was used to analyze the relationship between discrimination and adherence, controlling for age, negative affect, recent substance use, and positive affect. An interaction term between discrimination and positive affect was added to the model to examine the buffering hypothesis.

Results: Among 1,710 women, 38.1% reported lifetime discrimination, and 10.4% reported discrimination within the past year. Those that did not experience recent discrimination were more likely to be adherent compared to those who did not experience (84.4% vs. 73.7%, $p=0.001$). In the covariate adjusted model, better adherence was associated with higher positive affect, lower negative affect, older age, and no substance use. The adjusted association with recent discrimination was not significant ($p=0.06$), nor was the interaction of positive affect and recent discrimination ($p=0.80$).

Conclusions: Positive affect is shown to be associated with better medication adherence; however, it does not appear to influence the relationship between discrimination and adherence.

Rachel Radigan

Advisor(s): Laura Geer

Development of a Community Survey to Address Planetary Health and Neighborhood Quality of Life

The SUNY Downstate student-led Planetary Health Club, housed in the School of Public Health, was formed in 2017 in response to the Lancet Commission Report on Planetary Health (2015). Club members developed a community environmental quality survey to address planetary and public health issues in the community. Planetary health refers to "the interconnections between the health of person and place at all scales."¹ Human health and wellbeing is impacted by the changes that have been occurring to our natural systems as a result of human behavior, also termed anthropogenic threats.^{1,2} Understanding planetary health can help in preventing health issues, risk reduction, and health promotion. Wellness of both individuals and communities are dependent on the environment, and to achieve high-level wellness, the environmental and planetary health must be taken into consideration.¹

Our 45-item survey addresses demographics, indoor environment, neighborhood or outdoor environment, climate change preparedness, and global environment, and will be collected by zip code. Questions were developed from previous neighborhood environmental quality surveys, as well as items representing planetary health priorities. The survey consists of varying questions types, including Likert scale, and are meant to help understand attitudes and perceptions about planetary health issues that exist in the community. The survey will be pilot tested for content validity and comprehension in a small subset of the target population and administered through Qualtrics as well as in paper form for those who do not have online access. The data will be used to inform local policy on climate change preparedness and environmental quality in our communities.

Oksana Ozhekhovskyy

Advisor(s): Douglas Dunstatter

Various Ejection Fraction Measurements Utilizing Echocardiography Simulation in an Educational Setting

Background & Purpose: The purpose of this study is to identify ejection fraction (EF) measurement methods that are more reliable and have less variability compared to those that require a higher degree of experience to accurately measure. EF is a measurement used to assess systolic function of the heart. EF is the percentage of blood leaving the heart. Different methods to measure EF using echocardiography are 2D, m-mode, Simpsons, & visual estimation. Echocardiography uses ultrasound to image the heart and its structures. Sonographers are trained to perform echocardiograms and acquire these measurements. However, accurately measuring EF via echocardiography is difficult for sonography students to master. To proficiently obtain EF measurements, proper training and experience is required; the learning curve is improved by practice in an educational setting. HeartWorks is a cardiac simulator where educational experience can be acquired. HeartWorks encompasses realistic views of the heart in addition to fifteen simulated pathologies to train novice sonographers. HeartWorks gained wide acceptance in training programs, exposing learners to a variety of scenarios to help build their confidence to acquire EF measurements on a live patient.

Methods: In this study, we focused on assessing left ventricular EF using different methods by three novice student sonographers and one experienced sonographer. **Results:** A one-way ANOVA showed significant difference between groups utilizing different methods to measure EF ($p = .036$). Further analysis using a paired t-test demonstrated significant difference between left ventricular end-diastolic and end-systolic measurements via the 2D method ($p = 0.0221$).

Conclusion: Students frequently underestimate cardiac measurements. A cardiac simulator is a useful tool to identify systematic errors in students' measurements. These errors can be used to challenge, educate and train students how to perform proper cardiac measurements.

Asiana Gordon

Advisor(s): Iryna Struk

The Effects of Caffeine on Cerebral Circulation: A Transcranial Ultrasound Study

Abstract: Background: Caffeine is consumed by many students in large amounts because of its neurostimulating effects. It has been concluded in past research that caffeine is a vasoconstrictor and decreases cerebral blood flow. However, there has been little research on the impact of caffeine on cerebral blood flow in healthy young adults.

Objective: The aim of the study was to assess the effect of caffeine on cerebral blood flow in a healthy young adult population after caffeine consumption.

Methods: The study employed transcranial Doppler ultrasound to evaluate the middle cerebral artery of 30 SUNY Downstate students, age 20-35 (15 low caffeine consumers and 15 high caffeine consumers). Participants consumed caffeinated coffee on one day and decaffeinated coffee on another day. Baseline peak systolic velocity, end diastolic velocity, mean flow velocity, pulsatility index, resistive index of the middle cerebral artery, blood pressure and heart rate were measured. Measurements were repeated after intervention in 15-minute intervals for one hour.

Results: Measurements at 15-minute intervals were compared to baseline measurements and low caffeine consumers were compared to high caffeine consumers.

Conclusion: The data has been collected from 11 low-caffeine consumers. Researchers expect that additional participants will join and contribute sufficient, meaningful results to test out the original research question.

Sarah Rothstein

Advisor(s): Yosefa Pessin

Sonographers' Scope of Practice: A Phenomenological Approach

The field of sonography is always changing with new innovations and emerging specialties. With all these changes, the workload for sonographers is increasing and with that so are their roles and responsibilities. There is a lack of research and reporting done on sonographers' roles in the United States.

While the American Institute of Ultrasound in Medicine (AIUM) and Society of Diagnostic Medical Sonography (SDMS) have come out with general guidelines for sonographers, these do not encompass all that is expected of a sonographer¹. They do not address sonographers' ongoing communication with the patient regarding results and aspects of their work environment. The purpose of our research was to identify and distinguish similarities and differences amongst the participants and further define the role of a sonographer. The study used a phenomenological approach, interviews and observation, to determine a sonographer's daily scope of practice.

When interviewed 60% of participants answered that complete and thorough examinations were the most important part of their job. The other 40% thought that patient care was the most important. When participants were asked, "What skills does a sonographer need to have?", 13 out of the 15 answers revolved around emotional intelligence. Stressing the importance of communication, empathy, and being a people person.

Future studies could collect the official job descriptions from sonographers and review with them all that their role encompasses or what they feel is lacking from the description. This study only had one male participant. Future studies could look at the demographics of the profession. They could answer the question of if this is a female dominated profession. This study is a start for future studies on the sonography profession.

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Amy Zhan

Advisor(s): Yosefa Pessin

The Use of Ultrasound for Detecting Median Nerve Size Differences in Asymptomatic Adult Musicians vs Non-Musicians

Carpal tunnel syndrome (CTS) is the most common nerve entrapment neuropathy affecting the upper limb occurring in 2.7% of the general population. The carpal tunnel is a narrow passageway bound by carpal bones and ligaments that run down the forearm to the base of the palmar wrist. CTS occurs when the median nerve is compressed in the carpal tunnel. Symptoms present as pain, numbness, or tingling in the hands and wrist. CTS afflict professionals employed in vocations that involve repetitive hand motions and vibrations. It is prevalent in people who suffer from wrist trauma, causing swelling of the median nerve. Instrumental musicians can develop CTS from repetitive gripping, delicate hand movements, vibrations from the instrument, and poor posture. Severe CTS can deteriorate the quality of life of musicians because it affects their livelihood. Diagnostic tools such as ultrasound can be used to detect signs of CTS. Ultrasound is an efficient, cost effective, dynamic, noninvasive test, less painful alternative to the gold standard of an electrodiagnostic test. Measuring the cross-sectional area (CSA) of the median nerve with sonography, at the inlet and outlet of the carpal tunnel appears to have a high sensitivity and specificity for detecting CTS. 33 participants were recruited to participate in this single blind study. Wrist measurements, gender, age, hand dominance, primary instrument, and inlet and outlet CSA measurements were recorded and analyzed. Results of sonographic findings determine the need to promote early ultrasound screenings in asymptomatic musicians urging clinicians to take preventative measures to mitigate CTS development. The intent of this research study was to determine whether there is a significant difference in median nerve size between asymptomatic musicians and non-musicians using ultrasound.

Yamelia Rodriguez

Advisor(s): Rivka Hellmann

Pump Up the Volume: Assessing Inter-rater Reliability When Measuring Sonographic Liver Volume by Novice Sonographers

The liver is a vital organ responsible for over 500 functions including toxin metabolism, protein production, digestion, and immunity. Liver size is important to evaluate as an enlarged liver has been shown to be present in states of pathology such as hepatitis. Ultrasound is a commonly used imaging modality to assess internal organs and is preferred in some instances over other modalities such as CT. Aim: Current standards in most health care facilities for assessing liver size in ultrasound is to use a single linear measurement, whereas a volumetric measurement (typically performed in CT and considered the gold standard) has been demonstrated to more accurately depict true liver size. Furthermore, the single linear measurement obtained for the liver in ultrasound can vary from lab to lab. This research aims to assess how easily achievable, consistent, and timely is obtaining liver volume measurements on an abdominal ultrasound for the novice student sonographer. Materials and Methods: With a sample size of 15 participants in a blinded study, liver volume was obtained on ultrasound by taking three linear liver measurements and calculating the volume. Time for acquisition and measurements (linear and volumetric) were compared between three novice student sonographers. Results: Modest variability was demonstrated between the three novice student sonographers. The average time for a single linear measurement was 47.14 seconds, while average time for liver volume was 111.32 seconds, with 64.18 seconds taken on average to obtain two more linear measurements to calculate liver volume. Plotted graphs between three novice student sonographer show consistency in both simple linear and liver volume measurements. Conclusion: This limited study has proven that novice student sonographers are able to consistently measure liver volume with limited training. With more experience, liver volume can be obtained more consistently in terms of timing between sonographers.

Rebecca Larian

Advisor(s): Daniella Yeganeh

The measurement of strain of sonographers' muscle using an ergometer

Knowledge about taking proper ergonomic precautions are necessary to reduce work related musculoskeletal disorders. For sonographers, this encompasses evaluating work practices and positions throughout the scan to determine methods to reduce the risk of injury amongst sonographers in different ultrasound modalities. An ultrasound machine, electrodes and a pocket ergometer were used in the study to determine the most optimal position for different ultrasound modalities. The Pocket Ergometer measured the amount of strain placed on the trapezius muscle, its surface electromyographic sensors provided audible tones as biofeedback to the individual who is attached to the electrodes by the ultrasound machine. Three healthy female sonography students (mean age 22 years old) participated in this study performing different positions of four different ultrasound modalities including carotid, echocardiography, lower extremity venous, and abdominal ultrasound protocols. Data were analyzed to identify positions that may have caused higher or lower strain. The study findings indicated that during a lower extremity vascular exam it is optimal for the sonographer to scan on the patients' right side with the machine adjacent to the patient (t-test $p=0.04$). We also found that during a carotid exam it is optimal for the sonographer to scan above the patients' head (one way ANOVA $p=0.022$, above the head is better than standing $p=0.031$). The positions compared for an abdominal examination and echocardiography did not show differences with the three subjects. This project identified positions associated with lower strain that may be useful for increasing sonographer comfort and long-term occupational health.

Michelle Likhtsheyn

Advisor(s): Manuel Martinez

Outcomes of Long Term Follow Up In Patients with Iron Deficiency Anemia And Initial Negative Upper Endoscopy, Colonoscopy And Video Capsule Endoscopy

Methods: Medical records at the VA NY Harbor were queried for patients who have IDA and underwent EGD, colonoscopy, and VCE between 2005-2015. Anemia was defined as hemoglobin less than 13g/dL in men and less than 12g/dL in women. Exclusion criteria were pre-menopausal women, IBD, CKD, CHF, and history of GI cancer. Baseline studies including hemoglobin, ferritin and iron levels were recorded prior to initial endoscopic and VCE studies and were subsequently followed at 1, 3, and 6 year intervals.

Results: A total of 7,000 records were reviewed; 311 patients had EGD, colonoscopy and VCE; 67 of these patients did not meet inclusion criteria. Of the remaining 244 patients, 86 patients had a negative workup and were included in analysis. The mean age was 69.99 ($\hat{A}\pm 11.1$). IDA resolved in 24 patients, 41 patients had persistent anemia, and 21 patients had recurrent anemia. Of the 86 patients with negative initial workup, 66 (76.7%) patients went on to have subsequent bidirectional endoscopy or VCE. 47 (71.2%) patients had subsequent EGD with 11 (23.4%) patients having positive findings such as gastric ulcers. 50 (75.7%) patients had subsequent colonoscopies, 13 (26%) of these patients had findings to explain their IDA such as bleeding hemorrhoids. 14 (21.2%) patients had subsequent VCEs, and 4 (33.3%) of these patients had findings to explain their IDA such as AVMs.

Conclusions: Our findings are consistent with previous reports indicating that elderly patients who have an initial negative workup for IDA tend to have favorable outcomes. 21.2-33.3% of our patients had some findings on subsequent workup to explain IDA, however those findings were benign. In addition to previous published data, our study also highlights the significance of VCE as a tool for identifying a bleeding source.

Marjon Vatanchi

Advisor(s): Daniel Siegel

Practicality of Optical Coherence Tomography to Accelerate Treatment of Basal Cell Carcinomas

Purpose: The gold standard of basal cell carcinoma (BCC) diagnosis is a skin biopsy. Given the steps involved in preparing and reading biopsies, BCC treatment involves multiple visits to the dermatologist. Incorporating optical coherence tomography (OCT) into a clinic setting can expedite the diagnosis, treatment, and clearance of BCCs into a single clinic visit.

Design: On a routine full-body skin exam of a 71-year old Caucasian, four pink scaly papules on the torso were concerning for BCCs under dermoscopy. He wished to have all of the lesions treated in one visit without delay. All 4 lesions were photographed, triangulated, and imaged with OCT (Vivosight, Michelson Diagnostics, Kent, UK). The OCT images were used for both diagnosis and margination. A thin shave of the 4 lesions was sent to pathology for confirmation. Then each site was treated with curetting once for treatment followed by a small application of 35% trichloroacetic acid for hemostasis. OCT was repeated to view the margins of each lesion. No evidence of residual BCC was present at the lateral margins. Next, a second thin shave was performed on all 4 treated sites and sent to confirm clearance.

Three days later, the 4 pretreated shave specimens were all diagnosed as superficial BCCs (sBCC), and all 4 post-treated sites were clear of BCC and had clear margins. The patient returned at one-month and all the sites were healed appropriately with very minimal scarring. At one year follow-up, there was no evidence of recurrence at any site.

Conclusion: We present a case where cutaneous imaging was used in vivo to identify BCCs. On the day that he came for a full-body skin exam, our patient was able to have 4 different sBCCs diagnosed, treated, and have confirmation of clearance all in one visit. Cutaneous imaging and OCT has been used in dermatology for over 10 years now, yet it is still used sparingly. Its utility is valuable and can expedite the identification of BCCs as well as other skin cancers.

Alisen Huang

Advisor(s): Jared Jagdeo

The Role of Reactive Oxygen Species (ROS) in High Fluence Light Emitting Diode Red Light (HF-LED-RL) Therapy for Melanoma

Melanoma is a deadly and highly invasive cancer that is challenging to treat. There is a clinical need to develop therapeutics for melanoma and enhance the efficacy of current therapies, especially for advanced disease. One novel affordable and noninvasive therapy for melanoma is light emitting diode (LED) phototherapy. LED phototherapy at high fluences (≈ 200 J/cm²) has inhibitory and/or cytotoxic effects. We have demonstrated that high fluence LED red light (HF-LED-RL) at 640 J/cm² inhibits melanoma proliferation and we seek to characterize the mechanism. The photobiomodulatory effects of HF-LED-RL are likely mediated by cytochrome c oxidase. Cytochrome c oxidase absorbs red light to generate ATP and free radical reactive oxygen species (ROS). In turn, ROS modulates gene expression and protein phosphorylation to alter cellular activity downstream. To determine if ROS have a role in HF-LED-RL therapy, commercially available A375 melanoma cell lines were pretreated with the antioxidants Trolox or N-acetyl cysteine (NAC) for two hours. After pretreatment, cells were irradiated with HF-LED-RL using commercially available LED devices at a fluence of 640 J/cm². Each HF-LED-RL-treated group was matched with a bench control group. Crystal violet assays were performed to determine cell proliferation of HF-LED-RL alone and with Trolox or NAC pretreatment. In our pilot studies, we found pretreatment with 100uM Trolox to be the most effective, restoring proliferation by 60% compared with vehicle pretreatment. 5mM NAC increased proliferation by 20% compared to vehicle. The restoration of cell proliferation with pretreatment with antioxidants suggest ROS involvement in the therapeutic property of HF-LED-RL.

Determining the action of these proteins in melanoma may contribute to a deeper insight on the aberrant processes in melanoma cells, provide mechanistic support for the use of HF-LED-RL, and guide the future development of novel targeted therapies for melanoma.

Ziv Schwartz

Advisor(s): Cynthia Magro

A Sheep in Wolf's Clothing: Indolent T-cell lymphoproliferative disease of the gastrointestinal tract restricted to the oral cavity

The World Health Organizations (WHO) classification of lymphoid neoplasms recently included an entity entitled indolent T-cell lymphoproliferative disorder of the gastrointestinal tract (iT-LPD GI). Unique to this entity is tendency to masquerade as an aggressive lymphoma given its propensity for the intestine, while following a benign course. To date, 57 patients have been identified in the literature consistent with this diagnosis. A myriad of presentations have been observed, involving all segments of the gastrointestinal tract. Symptoms include abdominal pain, malnutrition, weight loss and diarrhea. Many patients identified in review of literature have undergone chemotherapeutic treatment, only to later discover the indolent nature of the disease. To date, five patients have transformed to more aggressive neoplasms with at least one related to chemotherapy. We present a 50-year-old female with a markedly atypical presentation affecting solely the oral cavity. This represents the only patient to date with isolated oral cavity presentation, eschewing expected intestinal involvement. Histological characteristics, as well as her course, are in fact consistent with iT-LPD GI. Another entity recently accepted into the WHO classification is primary cutaneous acral CD8 positive T-cell lymphoma, a similar 'sheep in wolf's clothing.' Our patient's lack of T-cell clonality and a focal dot-like CD68 staining are highly reminiscent of this diagnosis, however the present patient in-fact suffers from iT-LPD GI based on histological patterns. Furthermore, our patient reveals a CD8 predominant immunophenotype, unlike the commonly described CD4 variant, supporting a hypothesis of divergent clinical presentations sharing a common underlying pathophysiological driver. Overall, this patient serves as a terrific study valuable to multiple specialties that may encounter iT-LPD. Increased awareness is critical to avoiding chemotherapeutic treatment for what is an indolent condition.

Lisa Kim

Advisor(s): Nils Hennig

Factors Influencing Continued Utilization of Antenatal Visits in Oyam District, Uganda

Sub-Saharan Africa had a maternal mortality rate of 546/100,000 live births and neonatal mortality of 28/1,000 live births in 2015. In Oyam District, Uganda, the rates were 500/100,000 live births and 191/1,000 live births, respectively. Antenatal care (ANC) contacts provide expectant women with nutritional interventions, maternal and fetal assessments, preventative measures, and interventions for common physiologic symptoms. These services can improve maternal health through education, early detection and management of risky conditions. The 2016 WHO model recommends a minimum of eight contacts during pregnancy to support a positive pregnancy experience. In Oyam, Uganda there is a sharp decrease in ANC attendance in expectant women from the first and second visit from 16,177 to 5,372. This study was conducted to understand factors that expectant mothers, health care personnel, and village health teams have found to influence the continued attendance of ANC services.

Methods: A cross sectional study of focus group discussions were conducted in Oyam District, Uganda amongst expectant women, Health care personnel and Village health team. Tape and note-based analysis were used to create and elaborate on pertinent themes and factors.

Results: Modulating factors of continued ANC use were separated into five themes: Support, Intrinsic, Clinic Environment, Logistical and Health Care Personnel. These themes show how a woman's support network, factors that impact the woman, the environment and adequacy of the clinic, as well as the impact of health care personnel influence continued ANC use.

Conclusions: There is a significant need for improved guidance on access across all relevant sectors for improving antenatal care accessibility, along with increased evidence on effective approaches for integrating comprehensive ANC services into existing responses.

Diandra Wong

Advisor(s): Carla Boutin-Foster

Perceived Barriers and Attitudes Regarding Access to Kidney Transplantation among Racial and Ethnic Minority Patients on Hemodialysis

In the U.S., End-Stage Renal Disease (ESRD) disproportionately affects racial and ethnic minorities and low-income patients. Along with its high morbidity and mortality rates, ESRD impacts mental health and quality of life. Despite the known benefits of kidney transplantation compared to chronic dialysis therapy, studies have found that racial and ethnic minorities with ESRD experience lower rates of transplantation and longer duration on dialysis. The increasing shortage of deceased donor kidneys suitable for racial and ethnic minority patients also highlights the need to increase living donations among these patients. Yet, few studies have addressed their perspectives on challenges and barriers in accessing live renal transplantation.

This qualitative study involved 36 Black and Latino adult dialysis patients in a medically underserved urban community and looked at their perceptions surrounding live donor renal transplantation. Interview transcripts were coded through manual content analysis, using the constant comparative method. The transcripts were then coded and categorized into a final list of overarching themes that captured patients' attitudes towards and perceived barriers for live renal transplantation.

Themes of fear, faith, family, finances, patient-doctor relationship, and lengthy screening process were identified. Like other studies, this study shows that Black and Latino patients were concerned about pressuring their donors, placing their loved ones at risk, and taking a kidney that may be needed in the future. The study also identified more novel themes such as faith, financial concerns, and the lengthy screening process. The findings underlined the need for more patient education, particularly the need for more tailored education efforts for minority ESRD patients to learn how to approach and answer concerns of potential donors. Future interventions may also incorporate discussions with faith-leaders to educate patients about live transplantati

Thomas Monaghan

Advisor(s): Jason Lazar

Sodium Restriction Reduces Nocturnal Voiding Frequency in Cardiovascular Patients

Rationale: There exists a robust association between nocturia and a variety of cardiovascular diseases. Excessive dietary sodium intake is an independent risk factor for nocturia in patients seeking urological care, but it remains unclear whether dietary sodium restriction is an effective therapy for nocturnal voiding symptoms beyond urological practice.

Methods: Patients who had established care at a cardiology clinic from 2015-2018 were subject to a comprehensive sodium intake interview and dietary counseling by their cardiologist in accordance with best practice standards. Average nocturnal voiding frequency was recorded at each visit. A voiding database was compiled for retrospective analysis upon approval from the SUNY Downstate IRB.

Results: For the entire group, sodium restriction resulted in mean void frequency decreasing in a progressive manner upon sodium restriction from 2.9 ± 1.7 (n=95) at baseline to 2.0 ± 1.7 (77) on the 1st follow-up to 1.7 ± 1.2 (50) to 1.6 ± 1.3 (34) to 1.5 ± 1.2 (24) on the 2nd through 4th follow-up visits. Among the 50 subjects with 2 follow-up visits, mean voiding frequency decreased significantly upon sodium restriction from 3.1 ± 1.6 to 2.1 ± 1.6 to 1.6 ± 1.1 on the 1st and 2nd follow-up visits, respectively ($p < .01$). Changes in nocturnal voids were significantly correlated with female gender ($p = .024$) and baseline number of voids ($r = .52$, $p < .001$), but not with body mass index, blood pressure, creatinine or edema. There were trends with orthopnea ($r = .23$, $p = .094$), heart rate ($r = .21$, $p = .076$) and age ($r = .174$, $p = .15$). On multivariate analyses, change in voiding frequency was independently associated with baseline number of voids and a trend toward female gender.

Significance: The absolute reduction in nocturnal voiding frequency meets or exceeds that seen in currently available urologic interventions for nocturia. More work is needed to establish the clinical predictors of nocturia severity and treatment response in cardiovascular patients.

Perry Wengrofsky

Advisor(s): Louis Saliccioli

Functional Mitral Regurgitation in Sickle Cell Anemia and Hemoglobin SC Disease

Background: Anemia, a risk factor for cardiac disease, causes in changes in left ventricle (LV) morphology and physiology. LV dilation through eccentric hypertrophy is associated with development of functional mitral regurgitation (FMR). FMR is a risk factor for development of congestive heart failure (CHF). Sickle cell anemia (HbSS) and Hemoglobin SC (HbSC) disease are associated with LV structural changes. Little is known about FMR in the setting of LV changes associated with HbSS and HbSC. Methods: A retrospective, cross-sectional study was performed in adult patients with HbSC and HbSC. Clinical and hematologic data was obtained based on date of echocardiography. Pearson chi-square analysis was used to assess differences in clinical, hematologic, and echocardiographic parameters in patients with HbSS with and without FMR, and in patients with HbSC with and without FMR. Results: HbSS patients (n=225) with FMR had a higher mean age (mean 39.6%, $p = 0.045$), and higher rates of kidney disease (prevalence 20.7%, $p = 0.014$) and CHF (prevalence 7.8%, $p = 0.009$). HbSS patients with FMR had lower mean hemoglobin (Hgb) level (mean 7.61, SD 1.34, $p = 0.034$), and higher mean tricuspid maximum velocity (mean 232.97, SD 56.02, $p = 0.040$) and lower mean medial mitral valve (MV) e' velocity (mean 9.28, SD 2.79, $p = 0.033$). HbSC patients (n=82) with FMR had lower mean Hgb levels (mean 10.35, SD 1.29, $p = 0.006$), but no significant differences in rates of CHF or LV structural or physiologic parameters. Conclusions: In patients with HbSS and HbSC, differences in Hgb level were seen in patients with and without FMR, and FMR was seen at a higher rate of HbSC patients with HbSS. While HbSS is associated with diastolic dysfunction and CHF with preserved ejection fraction, the role of FMR in the pathophysiology of CHF in HbSS patients merits further study. This data elucidates the need for echocardiographic screening guidelines in patients with sickle cell anemia, both HbSS and HbSC.

Priscile Kouamo

Advisor(s): Gavini Madhavi

How does the 30-day readmission rate differ between patients who had an encounter with a clinical pharmacist and those who did not?

Background: Numerous studies have proven the positive effects of post-hospital discharge pharmacist interventions. In our institution, hospitalized patients who meet specific criteria at discharge are referred to the transitional care clinic (TCC). A nurse practitioner and/or physician and clinical pharmacist work collaboratively to manage patients' medication regimens and treatment plans. In collaboration with the provider, the clinical pharmacist reviews medications for appropriateness, assesses adherence, recommends medication changes and provides education.

Objective: To determine if there was a difference in 30-day readmission rate in patients who had an encounter with a clinical pharmacist in the transitional care clinic and those who did not.

Methods: Retrospective chart review was conducted on adult patients seen at the transitions of care clinic between January 1st, 2016 to December 31st, 2017.

Results: Data were analyzed for 573 records; 73.6% (422/573) of patient visits had a clinical pharmacist encounter. 46 (8%) out of 573 patients seen in the TCC had 30-day readmissions. 32 (69.6%) of the 46 were seen by the pharmacist and 14 (30.4%) were not (p=0.490). 30-day readmission rates for patients seen by the pharmacist was 7.6% (32 /422), and those not seen by the pharmacist was 9.3% (14/151). There was no significant difference in 30-day readmissions based on the total number of pharmacist interventions (p=0.305) and each of the top 5 pharmacist interventions at each encounter. For the secondary outcome, the only significant independent predictor of readmission was the number of comorbidities (adjusted odds ratio 1.26, 95% confidence interval 1.07-1.47, p=0.005). Results were similar when readmissions for the same reason, or a different reason, were excluded.

Discussion: Although our study showed that there was no significant difference in 30-day readmission rates in patients seen by the clinical pharmacist, there is a potential for reduced readmission rates.

Michael Megafu

Advisor(s): Janet Rosenbaum

Association Between Forced Sexual Intercourse and Condom Use

Background: Condoms can prevent both STIs and unplanned pregnancies, but adolescents may not use them correctly or consistently. Connell's theory of gender and power suggests that gender-based power inequalities may be a barrier to engaging in health protective behaviors such as condom use. Past research finds that adolescents who experience unwanted sexual intercourse are more likely to have unsafe sex and sequelae including STIs and unplanned pregnancies.

Objective: This study evaluates the association between forced sex and condom use at last sex.

Methods: Looked at the YRBS 2017 data using multivariate logistic regression to predict condom non-use at last sex from forced sex, sexual assault, sexual assault by a date and physical assault by a date, controlling for demographic variables. We used separate models for males and females.

Results: 7.4% of adolescents reported sexual assault. Adolescents who reported forced sex were less likely to use condoms than adolescents who reported no forced sex (47% vs. 60%, chi-squared p<0.001). Females who reported sexual assault and were physically assaulted by their partner had a 41% (OR=1.41, p<0.01) and 44% (OR=1.44, p<0.01) greater odds of not using a condom respectively. Males who were sexually assaulted, assaulted sexually by a date or physically assaulted by a date had a 44% (OR=1.44, p<0.05), 80% (OR=1.80, p<0.01) and 51% (OR=1.51, p<0.01) greater odds of not using a condom, respectively.

Conclusion: Adolescents do not enter sex education classes or STI/HIV prevention interventions as blank slates; some may have already experienced sexual assault or rape. This may be either a marker of adolescents' unequal social contexts, or experiences with forced sex may reduce adolescents' self-efficacy to negotiate condom use. Comprehensive sex education programs should be theory-based and talk about consent, condom negotiation, and refusing unsafe encounters rather than focusing only on the mechanics of condom use.

Richie Chen

Advisor(s): Janet Rosenbaum

Polypharmacy as a predictor for hospitalization in a national longitudinal study of middle-aged Americans

Patients with chronic conditions are often given multiple medications in an attempt to control symptoms. Recent studies have shown the detriments of polypharmacy including harmful drug interactions, poor medication adherence, and low patient satisfaction. This can lead to poorer outcomes and complex, prolonged hospitalization courses. Using the Midlife in the United States (MIDUS) dataset looking at middle-aged Americans, this study looks at whether polypharmacy predicts the frequency of hospitalizations. The sample includes over 1100 respondents who reported on the number of medications used in 2004-2006 and reported on number of hospitalizations in 2013-2014. Polypharmacy was defined as taking more than one type of medication. A full matching propensity score method was used to achieve covariate balance between predictor groups (polypharmacy and no polypharmacy). A Poisson regression model was then created using the matched data to evaluate the relationship between polypharmacy and hospitalization. Controlling for age, race, education, smoking status, and comorbidities such as cancer, diabetes, depression and heart disease, those who are on polypharmacy have a 78% ($p < 0.0001$) increased risk of hospitalization compared to those not on polypharmacy. The regression model also showed that those with cancer, diabetes, and heart disease have an increased risk of hospitalization, but not for those with anxiety or depression. These results suggest that polypharmacy is a marker for hospitalization even with our conservative definition. This study does not exclude selection bias that sicker individuals are on polypharmacy, but it does control for several comorbidities that are associated with both polypharmacy and hospitalization. Efforts to reduce medication load may be beneficial in improving health outcomes associated with frequent hospitalizations.

Delna John

Advisor(s): Richard Sinert

The Prevalence of Bacteremia in Febrile Sickle Cell Patients: A Systematic Review and Meta-analysis

Background: Streptococcal pneumoniae bacteremia is a significant cause of morbidity and mortality in Sickle Cell Disease (SCD) patients. Pneumococcal vaccination has decreased the bacteremia rate in both the general pediatric and SCD populations, however it remains standard practice to obtain blood cultures and administer antibiotics in all febrile (>38.5 °C) SCD patients. We conducted a systematic review and meta-analysis of the available studies of the prevalence of bacteremia in febrile SCD patients.

Methods: We searched the medical literature up to November 2018 in PUBMED, EMBASE and Web of Science using the search terms “epidemiology, prevalence, bacteremia, sickle cell anemia.” We only included studies with patients after 2000, when the pneumococcal 7-valent conjugate vaccine became widely available. Data were reported as means with 95% confidence intervals (95% CI). We calculated the prevalence of bacteremia (95% CI) by dividing the number of positive blood cultures by the number of febrile episodes. The I² statistic measured heterogeneity between prevalence estimates. Bias in our studies was quantified by the Newcastle-Ottawa quality assessment scale.

Results: Our search identified 228 citations with 9 studies meeting our inclusion/exclusion criteria encompassing 1,680 patients with 3,974 febrile episodes. The weighted prevalence of bacteremia across all studies was 1.76% (95% CI, 1.06%-2.67%) which showed moderate heterogeneity (Cochrane $Q=19.7$, $p=0.01$, $I^2=58\%$). For *S. pneumoniae* the weighted prevalence with very low heterogeneity (Cochrane $Q=3.57$, $p=0.83$, $I^2=0\%$) was 0.26% (95% CI, 0.14%-0.48%). Risks for bacteremia except central lines could not be determined because of the low prevalence of the outcome.

Conclusion: Obtaining blood cultures on all febrile SCD children should be reconsidered in the face of the low prevalence of bacteremia, unless an obvious source is identified or if a central line is present.

Nathan Kwak

Advisor(s): Shivakumar Vignesh

Adverse Events Associated with ERCP in a Predominantly Black Urban Population

Introduction: Endoscopic retrograde cholangiopancreatography (ERCP) has an overall complication rate of 6.9% to 12%. There is a paucity of literature on post-ERCP complications in the Afro-Caribbean and African American population that comprises greater than 80% of our patient population. The aim of this study was to determine the frequency of post-ERCP complications in a predominantly black urban population.

Methods: Retrospective review of all ERCP cases performed at two academic medical centers from 2007 to 2017. The main outcomes were post-ERCP complications (pancreatitis, perforation, infection, hemorrhage, cardiopulmonary events, all-cause mortality) within 30 days of the procedure. Complications were defined and classified according to previously defined consensus criteria in the literature.

Results: Of 1,075 cases reviewed 927 had documented ethnicity and birthplace. 792 (85.4%) were black, of which 475 (51.2) were Afro-Caribbean and 301 (32.5%) were African-American. 100 (9.3%) patients experienced a total of 124 complications (Table 1). 18 (1.7%) patients experienced post-ERCP pancreatitis (PEP). 16 (1.5%) patients had hemorrhage. 36 (3.3%) patients experienced an infection. Seven (0.7%) patients had a perforation while 22 (2.1%) had a cardiopulmonary event. 25 (2.3%) patients died within 30 days though only 3 cases were directly related to the ERCP (Table 2).

Discussion: Outcomes of ERCP in a predominantly Afro-Caribbean and African-American population demonstrate a lower incidence of PEP (1.7% vs. 3%-10%) and all-cause 30-day mortality (2.3% vs. 5%). The incidence of hemorrhage (1.5% vs. 0.3%-2%), perforation (0.65% vs. 0.08%-0.6%), cardiopulmonary events (2.3% vs. 2.1%), post-ERCP cholangitis (1.3% vs. 0.5%-3%) and cholecystitis (0.55% vs. 0.5%) are consistent with previously reported values in the literature. Our results suggest that the black population may have a lower rate of PEP and 30-day mortality but require larger studies for validation.

Sama Al-Bayati

Advisor(s): Luis Daniel Lugo

A Rare Complication Following the Relatively Common Chemoembolization Procedure

TACE (trans arterial chemoembolization) is a known treatment for HCC (hepatocellular carcinoma) with certain expected complications and adverse reaction. These adverse events can range from mild abdominal pain to fatal complications. Post TACE acute pancreatitis is a rare but potentially fatal complication with incidence of less than 2%. The presentation can mimic post embolization pain syndrome which is the most common complication following such a procedure, however measuring serum pancreatic enzymes should be performed if acute pancreatitis is suspected. Here we present a rare case of acute pancreatitis developing within 24 hours of TACE procedure for HCC.

Sama Al-Bayati

Advisor(s): Liza Valdivia

Improving Rates of Influenza Vaccination in Health Care Workers and Patients at an Urban Primary Care Practice: A Quality Improvement Project

The annual influenza vaccine is one of the most effective ways to reduce the risk of contracting the influenza disease. However, in the 2017-2018 season, only 37.1% of adults in the US received it. Perhaps more surprising, flu vaccination coverage among health care personnel was 67.8%. There appears to be multiple misconceptions regarding the effectiveness and safety of the flu vaccine. This quality improvement project strives to improve flu vaccination rates in both health care workers and patients at an urban primary care practice.

Vandana Kumar

Advisor(s): Latif Salam

Valproate-Induced DRESS Syndrome: A Case Report

Drug reaction with eosinophilia and systemic symptoms (DRESS) syndrome is a potentially life-threatening condition characterized by fever, lymphadenopathy, blood dyscrasias, cutaneous findings, and internal organ damage. A number of medications, most commonly the aromatic anticonvulsants, have been implicated in the pathogenesis of DRESS syndrome. In this report, we describe the diagnosis and treatment of a case of DRESS syndrome manifesting primarily as hepatic dysfunction in an elderly patient who had been initiated on valproate treatment for seizures about 4 weeks prior to hospitalization.

Christian Abraham

Advisor(s): Melissa Lee

Reducing Resident Clinic Cycle Time Using On-Time Starts

Objectives: To improve visit cycle time by 20% in the Internal Medicine resident clinic by focusing on an on-time start.

Relevance: Patients seen in the Internal Medicine resident primary care practice at Kings County Hospital, a large, urban, safety-net ambulatory care practice in Central Brooklyn, spend over 100 minutes in our office. Long cycle times, particularly non-value added time, lead to patient and staff dissatisfaction and decreased efficiency. Oftentimes, the first scheduled patient is not in the room with their provider at the appointed start time leading to a domino effect with subsequent patients.

Methods: We focused on addressing the barriers to first appointment “on time starts” through timely staff arrival, pre-visit financial clearance and patient triage. When patient volume exceeded capacity for medical assistants to screen patients, residents performed vital signs just for their first patient of the day to avoid bottlenecks at the start of the day. We measured cycle time for each patient in the resident practice prior to and after the intervention.

Results: After our intervention, we noted a 23.8% decrease in mean overall cycle time (127 minutes to 96.7 minutes) and a 26.2% decrease in non-value added time (100 minutes to 73.2 minutes). Notably, face to face time with a physician was not impacted by this intervention.

Pre-visit financial clearance increased from 70 to 95%, decreasing the number of patients who needed to visit a financial counselor at the beginning of the visit.

Conclusions: On-Time Starts are a critical component of improving practice cycle time. A focused reduction of wait times for each physician's first visit led to the desired outcome of reduced cycle time for the entire practice.

Mohammed Al-Sadawi

Advisor(s): Mohamed Nakeshbandi

Implementation of a clinical order set reduces volume of unnecessary urine cultures

Introduction: We designed urine culture order set in order to reduce unnecessary urine cultures. The order set required orders for urinalysis (UA) and urine culture and, in addition, five yes/no questions to address if the patient is pregnant, neutropenia, transplant recipient, or has recent or scheduled urology interventions. A computer algorithm only allows the urine culture to be performed if the UA shows >10 WBC. Patients meeting any of the clinical exemption criteria, based on the five questions, will receive a urine culture, independent of UA results. Here, we evaluated the efficacy of the urine culture order set.

Methods: We extracted a list of order sets in 5 months duration to assess and to determine frequency of unnecessary repeat UA orders within 24 h of ordering order set.

Results: There were 1,555 order set orders during the study period and, of these, 882 specimens collected for urine culture. Of these specimens, 259 (29.4%) were cancelled by the algorithm because the patients did not meet the clinical exemption criteria and the UA WBC was <10. Of the remaining 621 urine cultures that were performed, 124 (20.0%) were positive for any organism >50,000 CFU/mL. During the same time-period in 2017, 2,998 urine cultures were completed, of which 469 (15.6%) were positive for any organism >50,000 CFU/mL, a significant difference in culture positivity rate between the two years ($p=0.000$). 127/621 (20.4%) of the completed urine cultures were performed inappropriately, whereby the patients did not meet the clinical exclusion criteria and their UA WBC was <10 or not done, failures due to ordering errors. Only 16/127 (12.6%) of the inappropriate cultures were positive, a significant difference in culture positivity rate compared to the appropriate urine cultures ($p=0.000$).

Conclusion: Data demonstrates that our overall urine culture volume was reduced and the positivity rates of the urine cultures increased relative to the same timeframe the previous year.

Sairaman Nagarajan

Advisor(s): Rauno Jok

The Protective Effects of High IgE and Eosinophilia on Cancer Diagnoses in the National Health and Nutrition Examination Surveys (2005-2016)

Rationale: Limited studies have examined the association between eosinophil counts, IgE levels and cancer prevalence using national data in the United States. Using nationally representative data from the CDC*, this study examined the association between serum eosinophil counts, IgE levels and physician-diagnosed cancer in the National Health and Nutrition Examination Surveys (NHANES) 2005-2016.

Methods: Bivariate analyses between demographic variables, IgE levels, eosinophil levels and overall cancer prevalence (physician-diagnosed). IgE data from 2005-2006 was used and required logarithmic transformation due to non-normality. Nested multivariate logistic regression models were then conducted. All statistical analyses were weighted and run using SAS v9.4 and the level of significance was 0.05.

Results: Out of 60,936 adults included in this study, we found a significant difference in cancer prevalence in patients with eosinophilia vs. normal levels (>500 vs. ≤ 500 cells/uL), 1.9% vs. 3.3%, $p < 0.0001$. Similar differences were seen in patients with high vs. low-IgE (>100 vs. ≤ 100 kU/L), 1.9% vs. 3.3%, $p < 0.0001$. High IgE was significantly negatively associated with cancer diagnosis in unadjusted models, $OR = 0.65$ (0.49-0.86), $p < 0.0001$. Although similarly negative odds were seen after adjustment for age, sex, race, body mass index, insurance and smoking status, these results were non-significant, $OR = 0.73$ (0.53-1.02) $p = 0.059$. Eosinophilia was significantly protective against cancer diagnosis, adjusted $OR = 0.94$ (0.91-0.96), $p < 0.0001$.

Conclusions: Higher eosinophil counts and IgE levels were strong protective factors for cancer diagnosis in this multi-year, nationally representative sample of US adults; suggesting that IgE-mediated eosinophil responses are important in the body's defense against cancer cells.

Abida Hasan

Advisor(s): Roosevelt Boursiquot

Improving Metabolic Syndrome Screening. A Simple Addition to Assist Physicians in Identifying Patients with Metabolic Syndrome: A Quality Improvement Project

Metabolic syndrome is a constellation of common metabolic abnormalities associated with endothelial dysfunction and atherosclerosis resulting in an increased risk of cardiovascular disease and diabetes mellitus, both of which affect many patients at UHB. This prospective interventional study aims to examine the incidence of patients being diagnosed with metabolic syndrome in primary care clinic and to investigate if providing tools for housestaff could potentially increase the incidence of patients diagnosed with metabolic syndrome. Using the Adult Treatment Panel III (ATP III) guideline's by the National Cholesterol Education Program and the plan-do-study-act (PDSA) cycle, we are examining the pre-intervention incidence of diagnosis for metabolic syndrome through an EMR search. Then, the housestaff are being provided with tape measures and flyers that list the ATP III guidelines for diagnosis of metabolic syndrome. Data collection and analysis are ongoing. The EMR will then be re-examined for the incidence of metabolic syndrome post-intervention for 2 weeks. By increasing awareness for screening of patients, we hope to diagnose metabolic syndrome sooner allowing for early interventions. This way, we may prevent the complications of metabolic syndrome such as DM, atherosclerotic cardiovascular disease, stroke, NAFLD, PAD and CKD.

Benjamin Silver

Advisor(s): Roosevelt Boursiquot

Pulmonary Function Testing For Diagnosing and Treating Asthma in Primary Care: A Quality Improvement Project

Purpose: Asthma, as a heterogeneous disease, is usually characterized by chronic airway inflammation. It is defined by history of respiratory symptoms such as wheezing, shortness of breath, chest tightness, and cough that vary over time and in intensity. Making the diagnosis requires a clinical history of typical asthma symptoms, but the next step is to confirm the diagnosis with pulmonary function testing (PFT) which shows variable expiratory airflow limitation. In order to properly treat the patient, the primary care physician must be able to properly diagnose asthma. Many clinicians do not perform PFTs when diagnosing and subsequently treating asthma and this can lead to mismanagement and misdiagnosis of the disease.

Studying the use of PFTs in the diagnosis and management of asthma is important to ensure that patients are treated properly. The initial goal is to quantify how many diagnosed asthma patients were referred for PFT testing. The second goal is to increase PFT referrals in asthma patients by at least 10%.

Methods: A retrospective analysis using patient records will be performed on patients being treated at the Internal Medicine Resident Clinic at the University Hospital of Brooklyn starting from July 2018. The records will be examined for the percentage of patient with asthma who are referred for PFT testing. This data will be used as a baseline for intervention to increase PFT referrals in asthma patients by 10%. Inclusion criteria include all patients that have a diagnosis of asthma treated with albuterol inhaler or inhaled corticosteroids. Exclusion criteria include patients that are treated by an outside-unaffiliated pulmonologist.

Conclusion: Ideally, we hope to quantify the percentage of asthma patients who were referred for PFT testing and increase the amount of patients referred for PFT testing through education of clinicians and implementation of methods to streamline the process of referrals in order to ultimately improve patient care.

Ganesh Thirunavukkarasu

Advisor(s): Roosevelt Boursiquot

Quality Improvement Initiative: Multidisciplinary Approach to Increasing Influenza Vaccination Rates

Introduction: Influenza vaccination is the best way to prevent influenza infection and among adults 65 years and older vaccination has been shown to decrease up to 23% of influenza-related hospitalizations. With this project, our aim is to ultimately improve the seasonal influenza vaccination status of our community to reduce the rates of influenza-related illnesses by understanding and addressing barriers to influenza vaccination here at SUNY Downstate.

Methods: Informative pamphlets from the CDC about the influenza vaccine will be distributed to each patient at the time of registration in Suite R for review. Patients will be included and excluded in our project based on specific criteria. As part of the triage vitals, nurses will address and document patient influenza vaccination status for the season including reasons for refusal. For those patients who have not been vaccinated, physicians will discuss the consequences of influenza infection and the benefits of vaccination. Vaccination rates of this season will be compared to those of prior seasons. We expect to positively impact the seasonal influenza vaccination rates of our community by starting the Influenza vaccine conversation from the moment they walk into clinic.

Results: Data collection will continue until the end of the current flu season. We will analyze the results of our study upon completion of data collection.

Conclusion: We aim to identify and address the numerous barriers to vaccination in an underserved population of Brooklyn in order to improve vaccination rates. We hope our results show that incorporation of educational pamphlets in addition to targeted communication with nursing staff during triage will lead to improved communication about vaccination during the resident physician-patient encounter. Our goal is to ultimately improve vaccination rates, reduce the number of influenza infections, influenza-associated medical visits, and influenza-associated hospitalizations.

Dimitri Vital-Herne

Advisor(s): Roosevelt Boursiquot

Improvement of angiotensin-converting-enzyme inhibitor use in patients with documented diabetic microalbuminuria

According to Comper et al., microalbuminuria is the most important predicting factor for a patient to develop diabetic nephropathy and subsequently require hemodialysis. Currently, in the United States diabetes is the leading cause of chronic kidney disease and the most preventable cases of hemodialysis dependency. The key to prevention of diabetes-related CKD is the early detection and treatment of microalbuminuria. Bakris et al. in 2008 and Wang et al. in 2018 have shown the efficacy of using angiotensin-converting-enzyme (ACE) inhibitor medications and angiotensin II receptor blockers (ARB) to improve all case mortality and progression of renal disease in diabetic patients.

It is our hypothesis that Suite R patients are not adequately treated for diabetic microalbuminuria. We estimate approximately 15% of patients are being treated with an ACE-inhibitor with documentation of microalbuminuria. As seen with previous studies, it is imperative that these patients be treated with an ACEI or ARB in order to prevent progression to CKD.

It is our aim to improve the appropriate treatment of microalbuminuria of the patient seen in Suite R Ambulatory Clinic during Firm C by 30% within 3 months. Our proposed project will first assess the current level of appropriate treatment of microalbuminuria in diabetic patients seen in clinic during Firm C, offer multiple implementations for improve management, test those interventions, and then adapt with further interventions if needed.

At this stage we have submitted our IRB application and are awaiting approval for data extraction and analysis

John Michael Teotico

Advisor(s): Sneha Neurgaonkar

Increasing lung cancer screening rates in a primary care setting at the Brooklyn Veterans Hospital

Objective: Lung cancer is the leading cause of cancer-related death for veterans. Since 2013, the USPTF recommended that patients aged 55-80 years old with a greater than 30 pack year smoking history who continue to smoke or have quit less than 15 years ago should undergo low dose CT-scan for lung cancer screening. The goal for this quality improvement project was to increase lung cancer screening rates by at least 50% from baseline by March 1, 2019 for patients within our primary care clinic panel who meet the low dose CT criteria.

Methods: Plan-Do-Study-Act (PDSA) quality improvement methodology was used to identify methods to increase lung cancer screening rates within a single primary care clinic panel at the Brooklyn Campus of the VA NY Harbor Healthcare System. Several interventions throughout the course of the study were implemented lasting for a total of 32 weeks (July 1, 2018 – February 9, 2019). Interventions included were resident and attending education, triage nurse education, process map creation, and standardized template implementation. Data was compared pre and post intervention. Main outcome measure was the number of patients screened divided by total eligible patients. Process measure was the number of patients with properly documented social history divided by the maximum number of potentially age eligible patients despite not having proper social history documentation.

Results: Of the 275 age eligible patients throughout the 32 weeks of this study, main process outcome of patients screened divided by total eligible showed an increase from 40% (2/5) to 88% (22/25). Whereas, the process outcome measure of properly documented social history divided by maximum number of potentially age eligible patients showed an increase from 18% (11/61) to 44% (95/214).

Conclusion: Lung cancer screening guideline education and institution of a standardized template for smoking history increased the lung cancer screening rates for a primary care panel at the VA.

Chetan Virmani

Advisor(s): Andrew Chang

Discussing All Options: Increasing Rates of Shared Decision Making Discussions about Bariatric Surgery in an Urban Underserved Population

Statement of Problem or Question: Only 20% of eligible patients had a documented discussion about bariatric surgery in our clinic despite its proven outcome benefit.

Objectives of Program/Intervention: To increase the rate of discussions of bariatric surgery in our practice by 20%.

Description of Program/Intervention: A retrospective cross-sectional analysis reviewed all patients seen by 6 residents between July and December 2018 to determine baseline discussion rates of bariatric surgery in the primary care clinic. Interventions included decision support reinforcing indications for bariatric surgery, a physically accessible patient information sheet, and resident feedback on baseline performance. Data was collected for 18 days post-intervention, reviewing charts of 13 residents to assess rates of discussion.

Measures of Success: Discussion rates of bariatric surgery pre- and post-intervention were assessed with the goal to increase discussion rate by 20%.

Findings to Date: Pre-intervention, 502 charts were reviewed and 58 patients met criteria for bariatric surgery. The most common comorbidity was hypertension, with a median age of 56 and median BMI of 39.4. Out of these, 12 (20%), had documented discussions of bariatric surgery.

Post-intervention, 45 patients met the criteria for bariatric surgery. Of those, 19 (42%) (p-value for the change from baseline: 0.018), documented discussions of bariatric surgery.

Key Lessons for Dissemination: Education, decision support, and resident feedback improved discussion rates for bariatric surgery by 22%. This project demonstrated that a succinct intervention can be effectively applied to other areas of primary care where shared decision making is a crucial component to beneficial outcomes. Furthermore, this is an example of a project that can be implemented within the confines of a busy resident schedule making a difference in quality of care.

Leonel Mendoza

Advisor(s): Melissa Lee

Demystifying the influenza vaccine: video media improves vaccine acceptance in an urban resident-physician clinic

Statement of Problem: Many of our primary care patients are hesitant to accept the influenza vaccine. Our goal was to increase vaccination rates from 35% (2017 season) to 50% during the 2018 season using a resident-made informational video.

Methods: Internal Medicine residents at H+H/Kings County produced a 2-minute educational video addressing common reasons for flu shot refusal. The message was delivered by culturally familiar staff and physicians. From October to December 2018, patients who declined the vaccine were asked their rationale. The video was played while the resident met with their preceptor. Subsequently, residents engaged in shared decision making (SDM) and patients were offered the vaccine again.

Vaccine acceptance was recorded. Intention-to-treat analysis was used when video playback was refused. The primary objective was to measure the conversion rate of vaccine refusal to acceptance after intervention. A secondary objective was to enumerate patients' preconceived reasons for refusal.

Results: The most common reason for vaccine refusal was "I don't get the flu." In October, flu vaccine acceptance increased by 16.7% following the intervention; 58.3% patients received a flu shot. More patients agreed to vaccination in November (81.25%) and December (70%), and 9 out of 23 (39%) patients who initially declined the flu vaccine changed their mind post-intervention. Consistent use of the educational video and SDM improved flu vaccination in our population, leading to an increase from a baseline of 35% in the 2017 season to 72.4% during our study period.

Discussion: Using a locally-made video enhanced the shared decision-making process around flu vaccination and increased the vaccination rate in our population. Our video was a tailored, culturally relatable educational platform featuring our patients' healthcare team. We highlight here the importance of using personalized alternative media as an approach to improving health literacy and wellness.

Justin Poon

Advisor(s): Patrick Geraghty

Cigarette smoke exposure reduces leukemia inhibitory factor levels during respiratory syncytial viral infection

Background and rationale: Patients with Chronic Obstructive Pulmonary Disease (COPD) can experience frequent exacerbation. Viral infections are considered a major driving factor of COPD exacerbations and thus contribute to disease morbidity and mortality. Respiratory syncytial virus (RSV) is detected at a rate ranging from 0.8 to 22% in COPD patients during an exacerbation. Previously, we demonstrated that leukemia inhibitory factor (LIF) expression was increased in the lungs during RSV infection. Subduing LIF signaling enhanced lung injury and airway hypersensitivity in mice. In this study, we investigated lung LIF levels in COPD patient samples to determine the impact of disease on LIF expression. Equally, we investigated the effect of cigarette smoke on LIF expression in cell and mouse COPD models.

Methods: Bronchoalveolar lavage fluid (BALF) were obtained from healthy never-smokers, smokers without disease, and COPD patients. Human bronchial epithelial (HBE) cells were isolated from healthy never-smokers and COPD patients, grown at the air-liquid interface and were infected with RSV. Mice were exposed to cigarette smoke daily for 6 months and were subsequently infected with RSV. LIF expression was profiled in all samples.

Results: In human BALF, LIF protein was significantly reduced in both smokers and COPD patients compared to healthy never-smokers. HBE cells isolated from COPD patients produce less LIF compared to never smokers during RSV infection. Animals exposed to cigarette smoke had reduced LIF and its corresponding receptor, LIFR. Smoke exposed animals had reduced LIF expression during RSV infection. Two possible factors for reduced LIF levels were increased LIF mRNA instability in COPD epithelia and proteolytic degradation of LIF protein.

Significance: Cigarette smoke is an important modulator for LIF expression in the lungs. Loss of LIF expression in COPD could contribute to a higher degree of lung injury during virus-associated exacerbations.

Justin Poon

Advisor(s): Debora Ponce

Telehealth at the Brooklyn VA - Decreasing Barriers for Enrollment

Background/Rationale: In the last decade, the Department of Veteran Affairs (VA) pioneered in utilizing Telehealth in managing chronic medical conditions. Several studies in VA health administration show promising benefits in conditions such as Heart Failure and Diabetes Mellitus. As of August of 2018, the overall enrollment of Telehealth in Manhattan VA and Brooklyn VA is roughly 3%. While exact distribution of enrollment is unclear, low enrollment rate is observed among the uncontrolled diabetic patients in Brooklyn VA. Our aim is to establish a Quality Improvement study to understand the barriers to Telehealth implementation in a Diabetic Cohort, and to increase enrollment of Telehealth in an outpatient clinic, POD F team 1, in Brooklyn VA by 50% among patients with Hemoglobin A1c greater than 9.

Methods: Plan-Do-Study-Act (PDSA) Model is implemented. Our diabetic cohort was obtained by extracting patients' data from the resident panel. A process map was used to illustrate the existing process for Telehealth enrollment and a fish-bone diagram to identify obstacles in enrollment. Lastly after a meeting with Telehealth team, we proposed same-day Telehealth enrollment. We agree to contact the telehealth team via Skype message on the day patient was seen for his/her primary care visit.

Result: We found total of 24 patients with A1C > 9, and only 2 patients are enrolled in Telehealth. At the end of one PDSA cycle, we managed to increase our enrollment by 50%. We noted the extensive requirements for proper Telehealth use by the patient. Our biggest obstacle was patients' noncompliance. We also noted the extensive lack of knowledge that the residents in the POD had about Telehealth.

Significance: Telehealth is an important tool to deliver high quality of care for the patients. While patient noncompliance can negatively impact the enrollment, we can increase Telehealth utilization by increasing ease of access and improving the providers' knowledge of Telehealth.

Bill Blessington

Advisor(s): Andrew Chang

Think Before You Test: Optimizing Metabolic Panel Lab Testing in an Urban Underserved Resident Primary Care Practice

Background: Patients often receive “routine” tests, like metabolic panels (MP), that may offer limited clinical benefit and lead to more unnecessary testing, anxiety, and increased healthcare costs. Our objective is to observe resident documentation of clinical reasoning behind ordering MP to facilitate high value care and inform future interventions.

Methods: A retrospective chart review was performed on patients in an urban resident practice. Residents ordering MP in the initial and follow-up visits and documentation of reasoning was noted. Documentation was defined as any mention of a disease process warranting MP in the plan. An online survey was given to residents to ascertain reasons for ordering MP.

Results: Total 65 charts reviewed; 59 patients had MP ordered on initial visit and had a follow-up visit (missed follow-ups were excluded). Total MP with Documentation = 12 (12/59) = 20.3%. Total MP without Documentation = 47 = (47/59) = 79.7%

Documentation Group: 12. MP results: 3 normal, 9 abnormal (75%). Follow-up visits: 2 reordered MP (2 initially abnormal) 100%. No Documentation Group: 47. MP results: 26 normal, 21 abnormal (44.7%). Follow-up visits: 27 reordered MP (16 initially normal, 11 initially abnormal) 40.7%. Of 14 residents surveyed, 50% ordered MP as a “routine” screening test. Top other reasons for testing were varied and included: renal/liver disease, statin use, obesity, or known hypertension/diabetes.

Conclusions: Mindfulness of test ordering leads to more efficient use of resources and reduction in potential patient anxiety. 50% of surveyed residents used MP for screening purposes despite the lack of supporting evidence. Encounters without documentation of testing reasoning correlated with more subsequent MP orders despite normal results.

Documentation of reasoning appears to be correlated with less unnecessary testing and greater diagnostic accuracy. Our next step will be to focus on evaluating and educating on the utility of “screening” MP.

Ian Kaplan

Advisor(s): Sikander Zulqarnain

Tuberous Sclerosis with Lymphangiomyomatosis (LAM) Treated With Sirolimus: A Case Report

Lymphangiomyomatosis (LAM) is a rare, indolent, progressive proliferation of atypical smooth muscle cells throughout the lung parenchyma, vasculature, lymphatics and pleurae. Proliferation of atypical cells leads to distortion lung architecture, cystic emphysema and progressive deterioration of lung function. We present a case of LAM with Tuberous Sclerosis (TSC) successfully treated with Sirolimus. A 48 year old female from Jamaica initially presented to the emergency department with shortness of breath and cough. Physical exam showed sparse, hypomelanotic macules on the face and trunk. Chest x-ray showed diffuse fine reticular patterns with basilar predominance. CT abdomen and pelvis showed multiple large soft tissue masses in the kidneys bilaterally and thin walled bilateral cysts in the lungs. Clusters of small cystic structures within the right corona radiata and right basal ganglia were seen on Brain MRI. CT of the chest showed uniform rounded, thin-walled cysts. Skin lesions, angiomyolipomas in the kidneys and cystic lesions in the lungs bilaterally raised suspicion for TSC with LAM. TSC 2 genomic testing confirmed the diagnosis. After a multi-disciplinary tumor board the patient was started on Sirolimus. After a week on Sirolimus our patient had marked symptomatic improvement with less shortness of breath. PFT’s have remained stable after nearly a year of treatment. LAM is a rare disease affecting less than 1 in a million people. It is a disease of younger, primarily white women. Our patient's Afro-Caribbean descent and late onset in symptoms (48 years old) make our case even more rare. Our patient has had a significant clinical response to Sirolimus. Sirolimus has been tested primarily in sporadic LAM and fewer patients with TSC and LAM. Our patient’s dramatic response to sirolimus therapy may indicate in an increased efficacy in patients with TSC and LAM vs. patients with spontaneous LAM.

Rishard Abdul

Advisor(s): David Stevens

Increasing pneumococcal vaccination rates in a resident led primary care clinic

Rationale: Low pneumococcal vaccination rates lead to an avoidable increase in morbidity and mortality. The aim was to increase the vaccination rates through resident education.

Method: We assessed whether a resident education program would lead to an increase in pneumococcal vaccination rate in Kings County's Primary Care Practice. Baseline resident knowledge about pneumococcal vaccination was assessed through surveys and board-style questions prior to the intervention. Resident education was conducted through a PowerPoint presentation and placing vaccine algorithms in resident offices. Post-intervention, we re-assessed residents' knowledge through another survey and board-style questions. We assessed residents' practice of appropriate pneumococcal vaccinations through chart review of patients seen by residents during Oct and Nov 2018 comparing them to a similar pre-intervention period from Oct to Nov 2017. A direct comparison of the pre and post intervention results of the mean vaccination rates for 2 patient groups; diabetics < 65 years and all patients ≥ 65 years was performed via a chi-square analysis.

Result: 277 cases were analyzed, 147 were pre-intervention and 130 were post. There was an overall increase in vaccination rate by 0.9% (p=0.884). In diabetics < 65 years, rates changed from 59.8% to 59.4% (p=0.963) and in all patients age ≥ 65 years, the rate improved by 3.8% (p=0.660). Comparing the pre and post intervention survey, residents' knowledge about appropriate vaccination protocols increased from 37.5% to 77.8% (p=0.125).

Discussion: It is clear that resident education through our intervention improved knowledge, but this did not translate into an improvement in vaccination rates. Perhaps, more than just a physician directed knowledge-based intervention is required to increase vaccination rates. Strategies such as communication training for physicians and nurses as well as patient education through various modalities maybe more effective.

Mohamed Aboseria

Advisor(s): James Iatridis

A machine learning approach to measuring lumbar intervertebral disc height in rat radiographs

Back pain is highly associated with Inter-vertebral disc (IVD) degeneration. A possible clinically relevant metric that is currently being explored to assess IVD degeneration is IVD height. Manually measuring IVD height, however, is time consuming, subject to inter- and intra-observer variability, and potential experimenter bias. This study aimed to design a machine learning model that can be used towards automating the process of measuring IVD height with the goal of creating a standardized method to measure IVD height in a shorter amount of time. X-rays of the lumbar spine of Sprague-Dawley rats were used as training data. Segmentation, the process of grouping pixels into categories, of these X-rays was performed using ScanIP to categorize each pixel as one of two classes: "Vertebrae" and "Other". Transfer learning, a process by which a pre-trained neural network is retrained to accommodate new data, was then used to retrain a VGG-16 convolutional neural network with 68 segmented training images. The reason for using transfer learning was to decrease the number of training images that would be needed to train a machine learning model. Performance of the model was evaluated using 8 training images that the algorithm was not exposed to previously. A global accuracy of 98.17% was achieved across the testing set in terms of correctly identifying pixels in the X-rays with a Dice similarity coefficient of 0.94 for the vertebrae class. Comparisons between manually measured IVD heights and heights measured by the algorithm, however, showed that there was a statistically significant difference between measurements. This was, in part, due to the low accuracy of segmentation at the IVD-vertebra interface which accounts for a small percentage of the total accuracy, but plays a major role in determining the IVD height. Further adjustments need to be made to the machine learning model to improve accuracy at IVD-vertebra boundaries to decrease error in IVD height measurements.

Darwin Ng

Advisor(s): Mohammad Faysel

Evaluating Critical Value Notification Methods in the Clinical Laboratories

Objective: Critical values indicate life-threatening conditions. The current method seems inefficient; it relies on calling and sometimes delay patient treatment. The objective of this study is to assess how lab workers and health providers feel about the use of mobile apps in critical value notification compared to calling.

Methods: A paper-based survey of 6 questions was given to each participants. The questions assessed the participants' opinions based on 10-point scale of the current calling method vs. mobile app-based automatic notification method. Survey participants include 10 lab workers and 10 health providers at a large hospital in NYC as part of its lab's quality improvement. The data collection is currently on-going. The collected preliminary data were manually entered into MS Excel 2016 spreadsheet and analyzed using descriptive statistics.

Results: Based on preliminary data, 90% (9/10) of lab workers mentioned mobile app to be more efficient than the current calling method. Lab workers gave a mean score of 6.5 out of 10 for effectiveness of the calling method and a mean score of 9 out of 10 for likelihood of using mobile app while 100% (2/2) of health providers found mobile app to be less efficient than the current calling method. Health providers gave a mean score of 10 out of 10 for effectiveness of the calling method and a mean score of 3.5 out of 10 for likelihood of using mobile health apps as the critical value notification method.

Discussion: Health providers have different workflows and responsibilities. They are busy and could easily ignore app-based notification; consequently, they will miss critical results. That is a reason why health providers want the calling method.

Conclusions: The findings indicated mixed views: lab workers favored the mobile apps while clinician's opposed it due to different workflows. More research needs to be done at a larger scale to determine the clinicians' view on using mobile app to notify critical lab value.

Nataliya Ferdinand

Advisor(s): Mohammad Faysel

Mortality predictors in patients who have suffered a stroke.

Objective: This study seeks to determine the association between mortality of ischemic stroke (AIS) patients and multiple risk factors related to AIS, including age, gender, race, tobacco use, obesity, diabetes, hypertension, hypercholesterolemia, hyperlipidemia, atherosclerosis, transient ischemic attack (TIA), and heart disease.

Methods: We identified patients admitted to the hospital with AIS from the Nationwide Inpatient Sample (NIS) hospital discharge database for the year 2014. Our study population comprised of 109,581 discharges with AIS as the primary diagnosis. Demographic and clinical characteristics were systematically collected, and patient data were extracted by ICD-9 codes. A Multivariable logistic regression model was used to determine the probability of occurrence of in-hospital death based on predictors listed above.

Results: We are still in the data analysis phase of this study and hope to have a complete result before Research Day. Our preliminary logistic regression model showed that five risk factors were positively associated with mortality among people with AIS, and these are: tobacco use, obesity, hypertension, hyperlipidemia, and TIA. Three other factors age, race, and heart diseases were negatively associated with mortality among people with AIS. The four factors disassociated with mortality were: gender, diabetes, hypercholesterolemia, and atherosclerosis. Comparing the Odds Ratio values of the predictors, we reached the conclusion that tobacco users and people with high blood pressure and hyperlipidemia have the greatest risk of death for patients who have already suffered a stroke.

Conclusion: Using the multivariable logistic regression model, our preliminary findings identified potential positive and negative mortality risk factors among people with AIS. Identifying predictors of mortality in individuals with AIS might be helpful to medical professionals who determine the appropriate treatment course for minimizing the mortality.

Marites Estoque

Advisor(s): Mohammad Faysel

Cost Comparison of Asthma-Related Hospitalization in New York

Objective: To conduct a cost comparison of asthma-related hospitalizations in New York State by Medicaid recipients' age and gender, and length of hospital stay by utilizing the inpatient hospitalization cost across New York State hospitals. This study also investigates if there is a relationship between length of stay and cost of admission for the sample population.

Methods: Statewide Planning and Research Cooperative System (SPARCS) hospital inpatient data for the year 2016 were used and a total of 1,081 patients between 18 to 29 years old, and a total of 1,988 patients between 30 to 49 years old were included for this comparison. We compared the overall cost and charges of asthma-related hospitalization between these two groups and compared the cost and charges by patient's gender within the focused age groups using two-sample t-tests. A linear regression was performed to verify the linear relationship between length of stay and costs.

Results: The mean difference of charges between the age groups 18 to 29 and 30 to 49 is \$2,393 ($P < .0001$). The mean difference of asthma-related hospital charges between male and female was \$3,195 ($P < .0001$). The mean difference of cost between the age groups is \$939 ($P < .0001$). The mean difference of cost between female and male is \$791 ($P < .0001$).

Furthermore, there is a strong relationship between length of stay and cost for patient's ages 18 to 29 and 30 to 49 years old with asthma-related hospitalizations in New York State in 2016 ($P < .0001$; $R^2 = 0.7$).

Discussion: This study indicated that mean asthma-related hospitalization costs and charges for females were costlier than men which supports the findings from published results. The length of stay likely attributed to more expensive asthma-related hospitalization costs for both age groups.

Conclusion: Among Medicaid recipients, there is a gap in asthma-related hospitalization charges and costs between the age groups 18 to 29 and 30 to 49, as well as gender in 2016.

Ruth-Ann Diah

Advisor(s): Mohammad Faysel

Assessing the Usefulness of Wearable Devices for Collecting Patient Health Data

Objective: The purpose of this study is to assess if wrist-based wearable devices' generated health information is useful for inclusion in personal health records.

Methods: An online anonymous survey consisting of 18 questions was administered to all students in the College of Health Related Professions. The survey questions were designed to gauge exactly how and why individuals use these devices, for how long they wear these devices and if they would ultimately feel comfortable sharing this data with their doctors. Responses from the survey were analyzed using descriptive statistics.

Results: The preliminary data consisted of 22 participants who own wrist-based devices. Preliminary results showed that based on the responses the most useful features of wrist-based wearable devices are telling time (20%), and both heart rate tracking and counting steps (18%). Heart rate tracking and counting steps are useful features in tracking an individual's health progress.

Discussion: Our findings provided insights into how owners of wearable devices use their devices. We used this information to infer if data from the devices would be useful in a personal health record. For example, the heart rate tracking feature is involuntary and can provide providers with up to date readings of their patient's heart rate.

Conclusion: Wrist-based wearable devices have several benefits such as tracking and monitoring fitness and medical daily activities. These functions are amongst the most used by current users. Data collected from these devices integrated with personal health records will be a benefit in tracking an individual's health progress in conjunction with interventions from medical providers.

Yasemin Kaynas

Advisor(s): Mohammad Faysel

Is the Length of Stay Impacted by the Gender, Race and Insurance type for Diabetes with Complications in New York State?

Objective: To determine if there are healthcare disparities in length of hospital stays (LOS) among diabetes patients with top two most common complications of amputation and peripheral, cranial & autonomic issues based on patients' race, insurance status, and gender.

Methods: We obtained 2016 hospital discharge data for this study from the New York State Department of Health Statewide Planning and Research Cooperative System (SPRACS). We included diabetes patients who were over 50 and had amputation or peripheral, cranial & autonomic issues in our study. Patient insurance categories included Medicare, Medicaid, and self-pay and race categories include White, Black, Multiracial and Other. We excluded gestational diabetes and our final dataset included 1475 records. One-way analysis of variance was used to compare mean LOS among races. Two-Sample t-test was performed to compare the mean difference in LOS between gender categories (male and female).

Results: Our study indicated a statistically significant difference in LOS between White and Other race categories where mean LOS for Whites was 1.4 days longer than Other race category. The P value .0379 indicated a relationship between the LOS and race categories. The Tukey test was used to establish that Whites and Other Races have an impact on the length of stay. There were no differences between LOS among Black/African American, and multiracial races except for whites and other races. There was no significant difference in LOS based on patient's gender. There was no statistically significant difference in LOS based on patient's insurance type.

Conclusion: The study concludes, White race plays a role in the hospital length of stay among diabetes patients who had amputation or peripheral, cranial & autonomic issues. However, patient's gender or insurance status did not impact the length of stay for these patients.

Duarxy Sainvilien

Advisor(s):

Food as Medicine: Medical Nutrition Therapy for Patients Living with Diabetes

Despite recommendations from the ADA, only 20% of patients living with diabetes (DM) at our Internal Medicine resident practice have received medical nutrition therapy (MNT). Our goal was to engage the clinical team in recognizing and referring eligible patients for MNT and increase access to MNT by integrating services into the primary care visit during non-value added time.

The East New York (ENY) Diagnostic and Treatment Center, with a DM control rate of 59% is the lowest performer in the NYCH+H system. Records of diabetic patients seen in the practice from July to August 2018 were reviewed to identify those who had received MNT. 30% eligible patients were referred for MNT. 68% of those referred completed MNT.

Using a team-based approach, we sought to engage patients in MNT during their primary care visit. Performance data and clinical guidelines were shared with the clinical team. Medical Assistants (MA) identified patients with diabetes who did not receive MNT within 3 months of their last HbA1c. MA initiated the MNT referral while patients were waiting to see their primary care provider (PCP).

The measure of success was an increase to the number of MNT referrals and completed MNT visits for diabetic patients by 5% from a baseline of 30% and 68% respectively. During the post-intervention study period from October to November 2018, 51% patients living with DM were referred for MNT. MNT completion rate, 68% prior to the intervention, was 70% after the intervention, essentially unchanged.

High rates of uncontrolled diabetes in our patient population necessitate creative team-based clinical interventions to help close gaps in care. Engaging MA in identifying patients living with diabetes who had not received MNT proved an effective way of increasing referrals for diabetes self-management education compared with PCP referral alone. Future studies should include the voice of the patient to better understand barriers to integrating MNT into routine care.

Khabbab Amin

Advisor(s):

Unusual presentation of Alcohol associated Cardiomyopathy

Introduction: The most common cause of nonischemic dilated cardiomyopathy [DCM] is alcohol associated. The common presentation are symptoms of right or left heart failure (HF). We discuss an unusual presentation of this common disease.

Case: An 83 year old AA male with hypertension and excessive alcohol use presented with typical anginal pain. EMS reported spontaneously resolved episode of monomorphic ventricular tachycardia (VT) of unknown duration. In the hospital he was hypertensive and physical examination was unremarkable/euvolemic. ECG showed normal sinus rhythm with first degree AV, incomplete right bundle branch, and left anterior fascicular blocks. Chemistries, electrolytes, serum protein electrophoresis panel: normal. Chest x-ray: cardiomegaly without signs of fluid overload. Troponin I [peaked at 5.68] and BNP were elevated. 2D echo: LVEF 35-40%, and grade 1 diastolic dysfunction. Impression was of an ischemic event however left heart catheterization showed nonobstructive coronary artery disease with moderate global left ventricular systolic dysfunction. Telemetry: sinus node dysfunction and premature ventricular complexes. Provisional diagnosis was non-ischemic DCM from alcohol use. His alcohol dependence was addressed and managed during stay. Discharged on aspirin, metoprolol, rosuvastatin, enalapril and thiamine. Life vest was given for his episode of VT. Patient follows up with cardiology and continues to be NYHA class 1.

Discussion: Alcoholic CM is a diagnosis of exclusion, here ischemic and infiltrative causes were ruled out. Based on literature review a third of patients with alcoholic CM have documented arrhythmias, with ten percent of those having VT. Our case had VT, sinus node dysfunction and diverse conduction delays. The presentation was a type II NSTEMI caused by arrhythmia secondary to otherwise asymptomatic newly diagnosed cardiomyopathy related to alcohol misuse. We should be cognizant of this common disease amongst our predisposed population.

Mosab Prefer

Advisor(s): Franco Falcone

Risperidone and Pulmonary Embolism

Introduction: Pulmonary Embolism is a common and sometimes fatal disease. With many factors contributing to the development of PEs, it is important for clinicians to identify these risk factors and help reduce them, thus preventing patients from developing PEs. However, what is the approach in patients who develop PE's who have no risk factors?

Case: A 56 y/o AA female with schizophrenia/bipolar disorder on Risperdal and Zoloft, HLD and DM2 presented after sudden collapse. Upon arrival to the ED, patient was found with a blood pressure of 88/60, O2 saturation 70% and heart rate 114 beats per minute. CTA showed saddle embolism with extension of thrombus into the lobar and segmental pulmonary arteries findings suggestive of associated right heart strain. Bedside echo notable for D sign and dilated RV. Initial labs notable for a negative troponin, with repeat 3 hours later of 0.221. Patient's vital signs improved, hence TPA was not pursued. Patient was started on full dose lovenox and monitored closely.

Discussion: Pulmonary embolism is a commonly encountered problem in the hospital setting. Differentials can be very broad as to the precipitating factor. In this case we observe a patient with no risk factors for PE who presents with a submassive PE. On review of literature, multiple cases have been reported as to the associated between atypical antipsychotics and PE, more specifically Risperdal. The underlying mechanism is not well understood, however multiple theories, for example the antagonistic effect on 5HT2 receptors may induce platelet aggregation increasing the risk of a thromboembolic event.

Conclusion: Given the potential fatality of developing a PE and the possible association between Risperdal and developing a PE. Clinicians should take extra precaution in prescribing Risperdal to patients who already have risk factors of developing a PE.

Mosab Prefer

Advisor(s): Otis Jones

Lung Cancer Screening

Objective: This is a prospective project which aims to assess the way in which the outpatient physician screens his patients for Lung Cancer. We aim to compare a written questionnaire to a verbal assessment of smoking history, and analyze which method is most effective in detecting those patients that needs Lung Cancer screening.

Introduction: Lung cancer is the most common cause of cancer mortality worldwide for both men and women, even greater than breast cancer, colorectal cancer and prostate cancer combined (1, 2). During 2018, an estimated 230,030 new cases of lung cancer are expected to be diagnosed, and an estimated 154,050 Americans are expected to die from lung cancer in 2018, accounting for approximately 25% of all cancer deaths (3). With the implementation of a written questionnaire that served to routinely screen for patients that fulfill the qualification criteria for LDCT screening, we expect to improve the LDCT screening, the early detection rates for lung cancer, and thus reduce the mortality of lung cancer mortalities in our outpatient clinic.

Project Design: The written questionnaire will consist of 4 questions, two of which are “yes or no” questions and two of which are open ended questions. This questionnaire will be standardized. All of the patients that receive a written questionnaire will also be asked a standardized set of 4 questions by the provider to assess their smoking history later in the visit. The written questionnaire will be provided to the patient by the clerk and be completed prior to triage. The verbal assessment will be conducted during the physician-patient interaction later during the visit.

Conclusion: Screening for Lung cancer can be difficult given the social stigma regarding cigarette smoking, especially of late. Our aim is to compare methods by which we assess patients smoking history to see if one method is more successful at identifying those who needs Lung cancer Screening.

Christina Agudelo

Advisor(s): Itsaso Garcia-Arcos

Alveolar type II cell LRP1 regulates surfactant homeostasis and extrapulmonary lipid metabolism

Rationale: Pulmonary type II pneumocytes (T2C) synthesize surfactant that reduces alveolar surface tension. Surfactant insufficiency is associated with multiple pulmonary diseases through mechanisms that are not completely understood. To sustain supply and coordinated recycling of alveolar surfactant, T2C maintain a strictly regulated lipid metabolism. The LDL receptor-related protein 1 (LRP1) partakes in multiple lipid metabolic and signaling processes, and single nucleotide mutations in LRP1 correlate with decreased lung function in smokers and COPD patients. We hypothesize that T2C lipid homeostasis is essential for surfactant function.

Methods: We generated a cell line of human T2C with stably transfected LRP1 shRNA (LRP1 KD), while cells stably transfected with scrambled shRNA were used as control cell line. We also generated tamoxifen-inducible T2C-specific LRP1 knockout mice (SPC-LRP1^{-/-}). Knockout was induced at 6 weeks of age, after completion of lung development.

Results: LRP1 KD cells showed decreased surfactant phospholipid secretion associated with decreased intracellular phospholipid availability. mRNA expression of proteins involved in surfactant synthesis and secretion was downregulated. However, the intracellular content of triglyceride and cholesterol esters was significantly increased, and the expression of the exporters ABCA1 and ABCG1 was decreased. SPC-LRP1^{-/-} mice had decreased surfactant phospholipid in their bronchoalveolar lavage fluid (BALF), increased BALF surface tension, and showed lipid accumulation in alveolar cells. SPC-LRP1^{-/-} mice showed decreased respiratory compliance, forced vital capacity and forced expiratory volumes. SPC-LRP1^{-/-} mice also became obese, and mRNA expression of inflammatory mediators was increased in the lungs and in other tissues.

Conclusion: Together, these data show that LRP1 in T2C regulates pulmonary function through surfactant lipid metabolism and plays a role in extrapulmonary metabolic homeostasis.

Andrew Wang

Advisor(s): Jason Lazar

Robust Fractal Analysis of Coronary Angiograms

Background: Coronary angiography is a common diagnostic procedure to assess for coronary artery disease that is often interpreted as normal in the absence of epicardial stenoses. However, patients may have abnormalities of the coronary microvasculature. Microvasculature assessment could lead to improved screening and risk stratification of patients. Fractal geometry is a branch of mathematics that measures patterns of self-repetition such as in the branching structure of vascular networks in the retina. This aim of this study was to develop methodology to accurately measure the fractal dimension (Db) of coronary angiograms and determine its responsiveness to perturbation.

Methods: We retrospectively studied the coronary angiograms of 34 patients previously determined to be “normal”. Briefly, the angiograms were binarized using the Trainable Weka Segmentation tool available as part of the ImageJ image processing suite. The resulting classified angiograms were cropped parsimoniously to maximize the signal-to-noise ratio. Specifically, a freeform shape was cropped closely around identified vasculature with an average clearance of 1 cm at 100% magnification. Db were calculated with the FracLac suite in ImageJ.

Results: We observed a high degree of reproducibility and agreement in Db across independent coders with an intraclass correlation coefficient (ICC) of 0.908 (95% CI: 0.780, .955) for a two-way mixed effects model. We found that Z-axis rotation in 45° increments produced oscillations in Db with an amplitude of 0.006 for the LCA and 0.002 for the RCA. In addition, abstraction of small vessels produced appreciable changes in Db with higher sensitivity in the RCA. A serial subtraction of 1-4 tertiary vessels showed average reduction of Db by 0.0019 or 0.12% after each for the LCA, compared to a 0.0054 or 0.37% decrease after each for the RCA.

Conclusion: We have developed a robust method for measurement of the Db in coronary angiograms

Leanna Smith

Advisor(s): Jason Lazar

Heart Rate and Blood Pressure Recovery in Normal Subjects After Different Levels of Lower Body Pressure During Treadmill Exercise

Background: Lower body positive pressure (LBPP) treadmill exercise improves functional capacity in patients with orthopedic and neurological conditions and may be useful in cardiac patients. At rest, LBPP decreases heart rate (HR) likely due to centralizing blood volume and subsequent baroreceptor activation. HR and systolic blood pressure (SBP) rise during exercise and fall in recovery. Since rates of recovery reflect autonomic function, HR recovery (HRR) and blood pressure recovery (BPR) predict adverse cardiac events. Effects of LBPP exercise on recovery HR and SBP may differ from conventional exercise, prompting us to measure HRR and BPR after LBPP exercise in 20 healthy subjects (30±6 yrs).

Methods: Each subject exercised per modified Bruce protocol on an anti-gravity treadmill with 3 different levels of weight support (WS) on 3 separate days: 0%WS =100% body weight (BW), 40% WS=60% BW, and either 20% WS=80%, or 60% WS=40% BW. We measured BP and HR before, at each stage and at every minute in recovery. We calculated HRR as peak HR-HR at 1 and 2 min post exercise and defined BPR as recovery SBP at 1 min divided by peak SBP.

Results: In both WS groups peak HR decreased and the corresponding % predicted maximal HR decreased (p=.04, p<.001) with increasing WS. A trend towards differential HRR responses at 1 min was significant for both groups at 2 min (p=.02). While subjects exhibited similar rises in SBP with varying WS (p=NS), BPR decreased progressively in both groups with higher levels of WS at 1 min (p<.001, p=.006).

Conclusions: The data suggest that increasing LBPP lowers peak exercise HR with no change in peak SBP and increasing WS lowers HRR and BPR, which might reflect changes in autonomic tone.

Rabani Bharara

Advisor(s): Jason Lazar

Characterization of Microvascular Disease in Pediatric Patients with Sickle Cell Disease Using Nailfold Capillaroscopy

Sickle cell disease (SCD) is a chronic disorder characterized by repetitive vaso-occlusion due to obstruction of microcirculation by erythrocytes and leucocytes causing tissue ischemia/infarction leading to pain, acute and chronic organ damage and vascular injury. Nailfold videocapillaroscopy (NFC) is a non-invasive imaging technique used to directly visualize capillaries located near the fingertip in patients with rheumatologic diseases, and abnormalities have been associated with disease severity. NFC is increasingly used to assess the microvasculature in various non-rheumatic conditions; data in SCD is limited and confined to adults. To characterize NFC abnormalities in pediatric SCD patients, we studied 48 patients and 75 controls age (11 ± 4 yrs) and gender (55% female) matched. NFC was performed on 8 digits using a video capillaroscope and analyzed to determine mean capillary number and final capillary score (capillary dropout measure inversely related to capillary density), dilated capillaries and neovascularization. Height, weight and BMI were not different between the groups ($p=NS$). As compared to controls, the mean capillary number was lower (6.4 ± 1.4 vs. 7.4 ± 1.7 ; $p=.002$) and the final capillary score higher (1.4 ± 0.6 vs. 1.1 ± 0.6 ; $p=.029$) in the SCD group, indicating that SCD is associated with lower capillary density measured by NFC. In our small cohort capillary density appears unrelated to Hemoglobin levels or other markers of disease severity measured, except that previous hospitalizations for sickle crises correlated with capillary density ($p=0.03$). The relation between microvascular structure; markers of target organ involvement and vasculopathy; and clinical severity of SCD merits further study.

Nabila Khondakar

Advisor(s): John Muthu

Hemoglobin and Left Atrial and Ventricular Changes Associated with Diastolic Dysfunction in Sickle Cell Anemia

Anemia is associated with changes in left ventricle (LV) morphologic and physiologic changes, with alterations such as LV and left atrium (LA) dilation being well documented in sickle cell anemia (HbSS). While LV structural changes in HbSS adjusted for level of hemoglobin (Hgb) have been studied, there is little known on the prediction measurements of diastolic dysfunction by age, Hgb level, and structural and physiologic echocardiographic parameters. Methods: A retrospective cross-sectional study was performed in adult patients with HbSS and HbSC. Clinical and hematologic data was obtained based on date of echocardiography. Stepwise linear regression analysis was used to assess associations between age, Hgb and Hgb subtype level, and LA and LV size and physiologic parameters and LV diastolic dysfunction. Results: In patients with HbSS ($n=235$), age and hematologic parameters were correlated with LA Volume (LAV) index (R^2 7.4%), Mitral Valve (MV) E/A ratio (R^2 15.2%), Tricuspid regurgitation maximum velocity (TR max vel) [R^2 15.2%], and MV E/e' ratio (27.7%), with age correlated with with MV E/A ratio ($\hat{\beta}$ -coefficient -0.017, $p<0.001$), Hgb correlated with LAV index ($\hat{\beta}$ -coefficient -2.74, $p=0.003$), and age and Hgb both correlated with TR max vel (age $\hat{\beta}$ -coefficient 0.737, $p=0.044$, Hgb $\hat{\beta}$ -coefficient -14.4, $p<0.001$) and MV E/e' (age $\hat{\beta}$ -coefficient 0.063, $p=0.03$, Hgb $\hat{\beta}$ -coefficient -0.711, $p<.001$). Furthermore, LV and LA structural and physiologic parameters were correlated with LAV index (R^2 70.7%), TR max vel (R^2 13.0%), and MV E/e' ratio (25.2%), with LV diastolic diameter correlated with LAV index ($\hat{\beta}$ -coefficient -4.492, $p=0.003$), and LV systolic diameter correlated with TR max vel ($\hat{\beta}$ -coefficient 27.356, $p=0.003$) and MV E/e' ratio ($\hat{\beta}$ -coefficient 1.216, $p=0.021$). Conclusions: HbSS patients have diastolic dysfunction that is associated with age and level of Hgb. This data indicates the need for recommendations on echocardiographic screening guidelines in HbSS.

Jenny Paredes

Advisor(s): Laura Martello-Rooney

Gene Expression and Mutational Load in Colon Tumors From African American Patients

Colorectal cancer (CRC) is the third most common cancer among African Americans (AA) and when compared to Caucasian Americans (CA), they present more advanced CRC disease and lower survival rates. Therefore, we aimed to investigate if differences in the immune, cellular anti-tumor activity in AA and CA patients play a role in the cancer progression observed between these populations. Our approach includes examining tumor gene expression, immune cell recruitment at the tumor site as well as genetic biomarkers associated with tumor inflammation and secretion of cytokines characteristic of effector T helper cells (Th) by whole transcriptome sequencing in colon tumors (Illumina), biomarkers in immuno-oncology in RNA (NanoString), ELISA assays (RayBiotech) in plasma and western blot assays in CRC cell lines. Our gene expression results indicate that the immune profiles of AA patients differ from CA in the expression of 532 genes out of 3,479 significantly expressed genes, including cytokines and markers of cellular anti-tumor activity, such as higher FOXP3, IL-1 β and IL-8 in AA and higher Granzyme B, PDL-1, CTLA-4 and INF- γ in CA. These findings evidenced the differential expression of immunological pathways involved in immune-surveillance, cancer progression and antigen presentation in colon tumors from these two races that were in accordance with the systemic cytokines' expression patterns observed in plasma and cell recruitment to the tumor sites. Importantly, our data indicates that the IL-17A and TNF- α cytokines promote the protein production of PD-L1 in an AA cell line which may result in the impairment of T cells' anti-tumor activity and in contrast, they fail to induce the protein production in the CA cell line. Taken together, the differences in the immunological profiles in AA when compared to CA suggests a deficiency of the appropriate immune defense mechanisms in this population that may contribute to the cancer health disparities among CRC patients.

Xiao Wei Liu

Advisor(s): Richi Chowdhury

Case Report and Literature Review: Posterior Mediastinal Paraganglioma

Paraganglioma is a neuroendocrine tumor arising from the sympathetic or parasympathetic ganglia. Approximately 2% of paragangliomas are found in the mediastinum. Here we present a case report and literature review of the presentation and diagnosis of paraganglioma.

A 42 year old female presented to the emergency department with sweating and palpitations that night after consuming 2 alcoholic beverages. She also had associated weakness all over, dizziness, chest pain and shortness of breath. She felt nauseous and had 1 episode of nonbilious nonbloody vomit. A similar episode happened 2 years ago. At that time, she went to a different hospital and was told she had a mass in her back. Although she was supposed to continue workup of the mass outpatient, she was lost to follow up. She also endorsed unintentional weight loss of 20lbs over 2 years. She denied fever, chills, headaches, visual changes, recent illness, cough, diarrhea, constipation.

Her past medical history included hypertension managed with Nifedipine, Losartan, Metoprolol, and hydralazine. She had 3 miscarriages and sees a gynecologist for fibroids. Past surgical history included a C-section and breast reduction. Family history only significant for grandmother with unknown type of cancer. Social history significant for smoking. She stated she had a fainting episode after taking codeine for a tooth extraction.

Her initial vital signs were a blood pressure of 198/24, heart rate 133, respiratory rate 22, temperature 36.4 $^{\circ}$ C. She was saturating 95% oxygen on room air. Her physical exam was significant for profuse sweating, systolic murmur at the left and right second intercostal spaces, tachycardia, and clear breath sounds.

Mediastinal paragangliomas are usually diagnosed incidentally on chest CT as they are asymptomatic. However, middle mediastinal masses are more typically nonfunction in older patients compared to posterior mediastinal masses which are functional and more often in younger patient.

Karlene Lawrence

Advisor(s): Safak Reka

Improving the Quality of Colon Cleanse Preparation with the Addition of a Patient Education Video in an Urban Academic Gastroenterology Practice

Background: Incomplete colon cleanse reduces colonoscopy visualization. Standard verbal and printed colon cleanse education results in 25% of patients for colonoscopy having poor, incomplete colon cleanse. **Purpose:** Evaluate a supplemental YouTube[®] colon cleanse education video's effectiveness to improve patients adherence and colonoscopy quality.

Methods: Investigator-initiated, prospective, randomized, blinded, controlled project implementing a YouTube[®] colon cleanse video. Screening colonoscopy participants were randomized to a control or intervention-video group. Participants received the standard 2-day, split-dose colon cleanse instructions. The intervention-video group participants viewed the video at the office and received the website link. A 6 – 9 BBPS total score indicated adequate-excellent colon cleanse. Demographics and Boston Bowel Preparation Scale

(BBPS) total scores were extracted by prospective chart reviews, for statistical and comparative analysis for group differences. **Results:** From 180 randomized participants, 146 remain; 135 colonoscopies completed: (control: n = 68; intervention-video: n = 67) and 41 participants-reported video views. No demographic differences identified between the groups. Fisher's Exact Test analysis of Bowel Preparation Scale (BBPS) total scores did not indicate any statistically significant difference between the groups colon cleanse (control = 100%; intervention-video = 100 %; P = 0.5). ***Additional Results Pending***

Conclusion: The supplemental YouTube colon cleanse video did not significantly increase participants adherence to the regimen. However, the mean BBPS total scores of the intervention-video group (8.3; SD: 0.91) indicated slightly better colon cleanse vs. the control group (7.8; SD: 1.4).

Keywords: colon-bowel cleanse preparation, education-instructions, quality colonoscopy, supplemental colonoscopy patient education

Angelina Zhyvotovska

Advisor(s): Samy McFarlane

A Choking Ring: An Unusual Cause of Shortness of Breath in a Young Pregnant Female.

Introduction: Vascular rings can present with non-specific respiratory and or esophageal symptoms. They are most common in children. Few reports document symptomatic vascular rings in adults. This case report will discuss aortic arch anomalies and will emphasize the necessity of maintaining a broad differential when facing shortness of breath.

Case Report: This is a case of a 24-year-old pregnant female at 29 weeks gestational age who presented with shortness of breath. The patient reported short, self-resolving episodes of shortness of breath and chest tightness every other day for the past 2-3 weeks, worse with exertion, and she complained of orthopnea. She remembered having similar episodes when she was a child between the ages of 9 to 12 and several more times throughout her adult life. Physical exam and laboratory work-up were unremarkable. A Computed tomography with angiography (CTA) exam ruled out pulmonary embolism (PE). On close observation, a right aortic arch with aberrant left subclavian artery was incidentally discovered. There was mild right-sided tracheal compression by the right aortic arch. Whether the ring is complete or incomplete – whether there is or is not a ligamentum arteriosum – can only be assessed by magnetic resonance imaging. Given these findings, the patient was instructed to avoid exertion and to undergo an MRI after the delivery.

Conclusion: Literature review has only identified 26 other cases of adults presenting with symptoms of a vascular ring. Vascular rings are a rare form of congenital malformations that completely or incompletely encircle the trachea and esophagus with vascular structures. This case highlights the importance of the utmost awareness among physicians to broaden their differential diagnoses to include congenital anomalies, especially how subtle the findings on imaging may be. Diagnosed patients may benefit from surveillance or interventional therapy, and from the prevention of misguided management.

Denis Yusupov

Advisor(s): Samy McFarlane

Diastolic Dysfunction in Patients with Chronic Obstructive Pulmonary disease: A Meta-Analysis and a Systematic Review of Case Controlled Studies

Background: Chronic obstructive pulmonary disease (COPD) is an important cause of morbidity and mortality around the world. Estimates show that in 2030 COPD will become the third leading cause of death worldwide. Additionally, heart failure is a disease of great morbidity and mortality whose prevalence is estimated to increase by 46% from 2012 to 2030. The objective of this meta-analysis was to determine if the prevalence of the diastolic dysfunction is increased in chronic obstructive pulmonary disease (COPD) patients as evidenced by echocardiographic parameters.

Methods: We used a time-and-language-restricted search strategy to identify 4912 studies. 4892 were excluded, and we did a systematic review and meta-analysis of the fourteen remaining case control studies conducted to compare echocardiographic parameters indicative of diastolic dysfunction in patients with COPD and controls.

ResultsOur study found the prevalence of diastolic dysfunction echocardiographic parameters were higher among COPD subjects versus control group patients. There were no differences in left ventricular ejection fraction. Patients with COPD had prolonged isovolumetric relaxation time (mean difference 20.84 [95% CI 12.21, 29.47]; $P < 0.00001$), lower E/A ratio (mean difference - 0.24 [95% CI -0.34, 0.014]; $P < 0.00001$), higher transmitral A wave peak velocity (Apv) (mean difference 11.71 [95% CI 4.80, 18.62]; $P < 0.00001$), higher E/e' ratio (mean difference 1.88 [95% CI 1.23, 2.53]; $P < 0.00001$), lower mitral E wave peak velocity (E_{pv}) (mean difference -8.74 [95% CI -13.63, -3.85]; $P < 0.0005$), prolonged deceleration time (mean difference 50.24 [95% CI 15.60, 84.89]; $P < 0.004$), a higher right ventricular end diastolic diameter (RVEDD) (mean difference 8.02 [95% CI 3.45, 12.60]; $P < 0.0006$) compared to controls. There were no differences in septal e' velocity (mean difference - 2.69 [95% CI -6.07, 0.69]; $P < 0.12$) and in lateral e' velocity (mean difference -2.84 [95% CI 5.91, 0.24]; $P < 0.07$).

Joe Joseph

Advisor(s): Sneha Neurgaonkar

Increasing Advance Care Planning in Elderly Patients Through Clinic Handouts

Rationale: Advance care documentation is critical in appropriate healthcare to patients, particularly if are elderly with chronic diseases. It has been associated with fewer admissions, decreased length of stay, and improved emotional wellness of patients. This study measured the number of advance directives in a geriatric subset of a Veteran Affairs hospital clinic panel before and after displaying handouts on advance directives. Our aim was to increase advance care documentation in our electronic health record (EHR).

Methods: Advance care documentation was defined as Advance Directives (AD) or Life-Sustaining Treatment (LST) notes in the EHR. The study population was a panel of patients 75 years or older. The clinic panel began at 89 patients and grew to 164 patients, with 22 patients remaining continuous. The outcome measure was the number of AD and LST documents completed by panel patients, measured for three months prior and three months after the test of change, a display next to patient check-in requesting appropriate age range patients to complete of a questionnaire.

Results: AD and LST notes increased after implementing the test of change, with increase in resident clinic from 14% to 36% and entire clinic from 19% to 25%, with a decrease in attending clinic from 28% to 21%. Attending clinic grew in elderly patient load from 28 to 126 patients, while resident clinic decreased from 61 to 38 patients. Of the 22 patients who remained continuous throughout the test of change, 3 had a prior advance care document, and no increase after test of change.

Conclusion: The study was more successful with patients who had not recently visited or were new to the clinic. Having a simple display at check-in provided a low-cost solution to encourage consideration of advance care planning.

Iryna Bets

Advisor(s): Anna Babinska

Role of F11 receptor (F11R/JAM-A) antagonist in neointimal hyperplasia

Background: We have previously shown that activated smooth muscle cells (SMC) express the F11 receptor (F11R), and that partial knockdown of the F11R gene inhibited SMC proliferation and migration in vitro. We also showed that the F11R antagonist Peptide 4D, inhibited SMC proliferation in vitro. In this study, we hypothesized that Peptide 4D will inhibit Neointimal Hyperplasia (NIH) in an in-vivo carotid artery ligation model.

Methods: Carotid artery ligation was performed on 14 uremic C57BL/6 mice (with 5/6 of nephrectomy). One week after nephrectomy, ligation of the left carotid artery (LCA) was performed on each mouse. Mice were fed a regular mouse diet and divided into 2 groups of 7 mice each; the experimental group received Peptide 4D while the Control group received saline injections by intraperitoneal route for 21 days. The mice were euthanized on day 21 and both LCA and right carotid artery (RCA) were excised for analysis. Specimens were embedded in paraffin. Serial sections (6 µm thick) were collected at 200-µm intervals of the LCA from distal-focal stenosis as well as from the RCA serving as control. Data was analyzed qualitatively and quantitatively using Image J software. The two groups were compared for differences in mean Intima area.

Results: No NIH developed in the contralateral RCA in each group. All LCA in control mice developed severe NIH with two having complete luminal occlusion. In experimental mice LCA, only one had severe NIH and the rest of the 6 had significantly less NIH compared with Control. Overall P4D treated mice had significantly lower intima area compared with controls (0.0082 + 0.0103) vs (0.031 + 0.031); p=0.011.

Conclusion: Administration of Peptide 4D significantly inhibits NIH in uremic C57BL/6 mice in a carotid ligation model. Discovery of P4D, an F11R antagonist now paves the way for development of pharmaceutical therapy to slow NIH. Implications for these finding in vascular access stenosis needs to be explored.

Hannah Goldenberg

Advisor(s): Patrick Geraghty

Linking Continued Exposure to E-Cigarette Vapor Constituents with Chronic Obstructive Pulmonary Disease

E-cigarette usage is becoming a global epidemic, but the correlation between frequent e-cigarette use, subsequent exposure to yet-to-be identified components, and ensuing respiratory disease remains unexplored. To that end, a hollow 3D-model of an adult lung was created to trap/detect compounds of e-cigarette vapor that enter the lungs as gas and re-condensate with a major component of e-cigarette vapor propylene glycol (PG). Absent of water, 50+ compounds were detected, including nicotine, PG, ethanol, and diacetyl, a flavorant linked to bronchiolitis obliterans, informally known as popcorn lung, which results in the obstruction of the smallest airways of the lung. A correlation between exposure to e-cigarette compounds and COPD was then sought. Human bronchial epithelial cells (HBEs) were exposed to practical concentrations of e-cigarette liquid, nicotine, diacetyl, ethanol, and phosphate-buffered saline; an LDH cytotoxicity assay measured the toxicity of e-cigarette liquid, nicotine, and diacetyl. Increased LDH release indicates cell damage. E-cigarette liquid caused a 32% increase in LDH, while diacetyl caused a 26% increase. Concurrently, the mRNA produced by cells was templated by reverse transcriptase to produce cDNA, which was analyzed for augmentation of two mucin genes, MUC5AC and MUC5B. Increased MUC5AC/MUC5B is indicative of increased mucin production, which is directly linked to COPD. Increased MUC5AC gene expression was found for diacetyl (1.3x), e-cigarette liquid (2.2x) and nicotine (2.3x) at nontoxic concentrations. Diacetyl caused 1.2x increase in MUC5B gene expression. A Western Immunoblot of proteins within e-cigarette-treated HBEs highlights a 54% increase of MUC5AC protein, further supporting increased mucin production and increased COPD risk. Collectively, LDH and MUC5AC/MUC5B increases highlight COPD risk for e-cigarette users.

Christopher Railwah

Advisor(s): Patrick Geraghty

Chemical Inhibition of S100A9 Signaling Reduces Cigarette Smoke-Induced Loss of Lung Function in Mice

Introduction: Inflammation is a major pathological factor in pulmonary diseases. Our group has demonstrated that S100 calcium-binding protein A9 (S100A9), a potent inflammatory and pro-cell death protein, plays a prominent role in immune cell recruitment and lung injury. We have also determined that S100A9 levels are elevated in plasma and BALF from emphysema patients. Currently, the direct impact of S100A9-mediated inflammation on lung obstruction and emphysema is unknown. Here, we tested the S100A9 inhibitor paquinimod in a mouse model of emphysema.

Methods: Paquinimod was synthesized by Active Biotech AB (Lund, Sweden) and administered to A/J mice daily at 3.75 mg/kg, via oral gavage. Animal weight and physical appearance was monitored throughout the study. Mice were exposed to cigarette smoke daily for two months to induce emphysema-like phenotypes. Forced oscillation and expiratory measurements were performed using the SCIREQ flexiVent system to determine changes in lung function. Airway inflammation, protease responses and lung tissue remodeling were examined in each animal.

Results: Long-term paquinimod administration resulted in no notable toxicity in mice, with external appearance, behavior, body weight and liver to body weight ratios similar to vehicle groups. As expected, exposure to cigarette smoke-induced changes in pressure volume loops, airway inflammation, lung compliance, inspiratory capacity and FEV_{0.05}/FVC. Importantly, treatment with paquinimod reduced establishment of these parameters in smoke-exposed mice. Equally, paquinimod reduced cigarette smoke-induced airspace enlargement, alveolar remodeling and destruction. Paquinimod treatment also prevent smoke-induced MMP-3, MCP-1, IL-6 and IL-8 release into the airways.

Conclusions: Our data suggests that inhibition of S100A9 signaling with paquinimod can slow the progression of emphysema and could be a new candidate for the treatment of smoke-induced emphysema.

Shabnam Seydafkan

Advisor(s): Jason Lazar

Case report of severe chronic obstructive pulmonary disease

Chronic obstructive pulmonary disease (COPD) affects 30 million adults in the US and is the 4th leading cause of death. Pulmonary rehabilitation improves walking distance, muscle strength, mood disorders and quality-adjusted life years, yet fewer than 5% of eligible patients participate. Disabilities have steadily been increasing to 13% of the US population (35% aged ≥65). Most common is mobility disability afflicting patients with severe oxygen-dependent COPD, excluding them from rehabilitation programs. NASA developed a lower body positive pressure (LBPP) treadmill that offloads up to 80% of wt. allowing comfortable walking for disabled people. After having undergone a six-minute walk test (6MWT) showing severe mobility disability (distance: 186 meters), we offered a 67-year old, obese (BMI 32), alert woman with oxygen-dependent chronic obstructive pulmonary disease (COPD), class GOLD 3 and asthma, with comorbidities including rheumatoid arthritis (OA), hypertension, hypothyroidism, history of bilateral pneumothoraces and multiple cerebrovascular accidents to try walking on an LBPP treadmill. She participated in twelve weeks of twice-weekly half-hour sessions off-loading 40 percent of her body weight. Repeat 6MWT at six (402 m) and 12 weeks (507m) improved 2.2- and 2.7-fold, off supplemental oxygen. Pulmonary function tests before vs. after showed: FVC pre 2.32, post 2.64 liters (↑ 14%); FEV₁ pre 0.96, post 1.34 lit (↑ 39.6%); VC pre 2.41, post 2.64 lit. (↑ 9.5%). The patient reported great satisfaction noting improved capacity to perform activities of daily living that she had been unable to perform for more than one year, remarkably including air travel, swimming and scuba diving. We conclude that low intensity, low amount LBPP + walking with no changes in diet or body weight resulted in independence from O₂, resumption of ADL, and improved pulmonary function. LBPP walking may provide clinical benefit in patients with severe COPD and mobility disability.

Aleksandra Walasek

Advisor(s): Eugene Pietzak

Characterization of Clinically Actionable Genomic Alterations in Patients with Bacille Calmette-Guerin (BCG) Unresponsive Bladder Cancer

There is a limited number of effective treatment options for patients with BCG-unresponsive Non-Muscle Invasive Bladder Cancer (NMIBC) and alternatives to radical cystectomy are desperately needed. Next-generation sequencing helps identify therapeutic opportunities for clinical trial of novel agents. We used DNA from BCG treated, chemotherapy naïve, secondary MIBC tumors and matched normal DNA that underwent targeted exome capture sequencing or whole exome sequencing to identify possible clinically actionable alterations.

Alterations in the RTK/MAPK pathway were seen in 42% of cohort, with FGFR3 (18%) and ERBB2 (15%) being most commonly altered genes. Activating PIK3CA mutations occurred in 21% of specimens; often co-occurring with RTK/MAPK pathway alterations that may be potential resistance mechanisms to FGFR or ERBB2 directed monotherapies. Loss of CDKN2A in FGFR3 mutated tumor, hypothesized to be a driver of disease progression, occurred in 10% of cohort. Alterations in cell cycle regulators were seen in 65% of specimens, of which 40% also had an intact RB gene and could potentially be vulnerable to CDK4/6 inhibitors. Inactivating mutations in CREBBP or EP300 occurred in 17% of samples and might confer sensitivity to HDAC inhibitors. Truncating mutations in KDM6A and ARID1A were seen in 19% and 33% of samples respectively. These might be sensitizing to EZH2 inhibitors.

Genomic profiling reveals that majority of tumors have potentially actionable alterations. Targeted therapy for NMIBC patients warrants investigation as further advances are made in development of more selective systemic inhibitors.

Geoffrey Bryant

Advisor(s): Davis Mulholland

Treatment Induced Changes in Tumor Immuno-phenotypes in Bladder Cancer

The use of immune checkpoint inhibitors (ICIs) targeting PD-1 and PDL-1 have been approved for use in patients with locally advanced and metastatic bladder cancer. These agents include Nivolumab (anti PD-1) and Pembrolizumab (anti PD-1) among others. Previously, the primary treatment available to patients with this disease was the platinum-based chemotherapy Cisplatin, and it remains the first line treatment. Although ICIs have been shown to increase overall survival in these patients by up to 3 months, use of these agents is not curative and the mechanisms for resistance to ICIs are poorly understood. Furthermore, the ways in which these agents and first line chemotherapies may impact the tumor microenvironment (TME) by modulating changes in immune cell infiltration have not been well characterized. To evaluate the ways in which immunotherapies alone and in combination with conventional chemotherapies might alter the landscape of immunophenotypes within the TME, cohorts of mice were established in a novel syngeneic murine model system of muscle invasive urothelial carcinoma. Subdivided cohorts were administered treatments including a control group, cisplatin treated, anti-PD-1 blocking antibody treated, and combination treated mice (each N=5) and dosing was administered over a 6-cycle treatment period to mimic clinical dosing. Tumor progression was monitored by volumetric analysis, as well as the through flow cytometry to evaluate differences in immune cell infiltration and the ratio of helper-T to cytotoxic T-cell phenotypes. Our results indicate a potential synergy between standard of care therapies and immunotherapies through a reduction in overall tumor burden, as well as the induction of a greater number of effector T-cells in combination treatments than with either agent used as a monotherapy. Further evaluation is warranted to determine whether combination treatments may be optimized to provide additional benefits in the clinical setting.

Akyia Myrie

Advisor(s): Mariana Markell

Early Post-transplant Weight Gain In Inner-city Kidney Transplant Recipients (ktrs) Does Not Remit And Is Associated With Poor Food Quality, Stress And Anxiety

Purpose: Weight gain is a significant issue in the post-transplant period and can contribute to morbidity and development or worsening of diabetes and hypertension. Studies suggest that weight gain is greatest in the first six months following transplantation but long-term follow up and associated factors in a food insecure population have not been studied.

Methods: A random convenience sample of 28 KTRs was interviewed via face-to-face survey in an inner-city outpatient transplant clinic. Chart review was conducted by retrospective examination of electronic health records. Stress and anxiety were measured using validated questionnaires (PSS and PHQ9). 24-hour food recall was analyzed using ASA24 software. Values for macronutrients and minerals were used to calculate HEI (Healthy Eating Index) scores. Scores range from 0 to 100 reflecting how closely diet allies with recommendations for healthy adults. The average HEI in the US is 59, which is considered poor adherence.

Results: Mean age of the population was 55.6+/-13.7 yrs. There were 18 men (64.3%) and 10 women (35.7%). 82% were black, 32% had completed college, and 75% had a household income <\$40k/yr. Initial BMI was 26.8 +/- 7.3. 14 (50%) of patients had an increase in BMI of >10% from initial weight. 60% of patients had >5% weight change within the first 6 months post-transplant with 53.6% of patients gaining 7 pounds or more. More patients that participated in food programs and got SNAP/EBT gained post-transplant than those who did not ($X^2= 3.884, p=0.049$). Weight gain at 6 months correlated with presence of diabetes at time of transplant ($r=-.611, p<0.005$) and lower HEI score ($r=-.460, p<0.05$).

Conclusions: Significant weight gain at 6 months did not remit by last follow up, with 50% experiencing a 10% gain in BMI. Lower HEI score was associated with greater weight gain and for our whole population fell below national average, suggesting overall poor dietary habits.

Clara Wilson

Advisor(s): Mariana Markell

Dietary Patterns of Caribbean/Central American and US Born Patients with Chronic Kidney Disease (CKD) in an Inner-City Setting

Understanding diet patterns of specific groups can better guide dietary counseling among immigrant CKD patients.

Face-to-face survey was conducted in random convenience sample of 86 patients from inner-city CKD (35), dialysis (22) and transplant clinics (29). Diet intake was assessed by 24-hour food recall, analyzed by ASA24 software and Healthy Eating Index (HEI) scores were calculated. Newest Vital Signs toolkit (6 questions relating to a standardized food label) assessed nutritional literacy (nut lit). Food frequencies for staples of Caribbean and American diet were scored by hand.

54 pts identified as Caribbean/Central American (CAR) and 32 pts US born (US). There was no significant difference in age or gender. Countries of birth included Jamaica, Guyana, Haiti, Trinidad, Barbados, DR, Central America, and other islands. Mean time in US was 34.1 $\hat{\pm}$ 15.2 yrs. CAR pts had lower nut lit (1.34 $\hat{\pm}$ 1.6 vs 3.0 $\hat{\pm}$ 1.9 $p< 0.001$), but better HEI (60.7 $\hat{\pm}$ 12.9 vs 53.8 $\hat{\pm}$ 9.1). CAR pts had lower intake of spaghetti/pizza/pasta (4% vs 20.7% $p=0.018$), greater intake of whole grains (1.55 $\hat{\pm}$ 0.25 vs 0.758 $\hat{\pm}$ 0.24 $p=0.023$), lower intake of yogurt (0 $\hat{\pm}$ 0 vs 0.071 $\hat{\pm}$ 0.04 $p=0.02$), and cheese (0.162 $\hat{\pm}$ 0.058 vs 0.415 $\hat{\pm}$ 0.11 $p=0.032$). There was no difference in intake of cereal, bacon, egg, rice, bread/bagel/oatmeal, total vegetables/fruits, takeout/fast food, hot dogs/hamburgers, and American brand snacks/drinks/desserts. CAR pts had different sources of legumes ($p=0.040$ by Chi square) compared to US born: lentils (2%), pigeon peas (2%), kidney/lima/red/white/black beans (12%), and other (24%). CAR pts had seafood: salt fish (6%), red snapper fish (8%), escovitch fish (2%); vegetables: cassava (2%), green banana/plantain (6%), corn (2%), sweet potato/yam (2%), callaloo (4%), okra (6%) eggplant (4%), and chayote (2%); and meat: jerk chicken (2%), mutton/cow foot/chicken stew (8%), oxtail (6%), and curry chicken (4%).

CAR vs US-born diet patterns show that cultural background should be considered when counseling.

Jessamine Fazli

Advisor(s): Mariana Markell

Differences in Stress and Social Support in Inner-City CKD Patients with Diabetes Mellitus vs Non-Diabetic CKD Patients

Jessamine Fazli, Akya Myrie, Matthew Moy, Isaiah Rosenstein; Senior Author: Dr. Mariana Markell

Stress and social support impacts chronic kidney disease outcomes, more so with co-morbid conditions like diabetes. We sought to determine if stress and social support measures differ in patients with DM + CKD vs CKD alone. Methods: 48 patients were randomly selected for case-control analysis after face-to-face interviews at 5 settings at SUNY Downstate: CKD outpatient, transplant, diabetes, and internal medicine clinics, and the dialysis center. In addition to the HRP survey (Health Risk Perception), stress and social support was measured with internally derived questions, PHQ (Patient Health Questionnaire), PSS (Perceived Stress Scale) and MOS (Medical Outcomes Study) surveys. Results: Mean age was 62.7 +/- 10.2 yrs with 24 women (50%) and 24 men (50%). 50% of patients had CKD and DM (n=24), and 50% of patients had only CKD (n=24). Patients with diabetes were less likely to agree that "other people play a big part in whether [they] become healthy or sick" as length of time with diabetes increased (HRP 7, $r = -.668$, $p = .0004$). As length of time with diabetes increased patients with diabetes were more likely to agree that they may need another person's help to get to the doctor (MOS 10, $r = .441$, $p = .040$) or would need someone's help to prepare meals for them (MOS 11, $r = .505$, $p = .017$). Conclusion: In this population, 1. Patients with diabetes for longer were less likely to say that others play a role in whether they become healthy or sick, but more likely to say that social support is important for getting to the doctor or preparing meals. 2. Previous studies suggest that diabetes is associated with increased stress and anxiety, but this population didn't show a relation between diabetes status in CKD patients and composite scores for stress. 3. Addressing specific factors of transportation and food preparation may be more impactful in this group of patients.

Jonathan Leong

Advisor(s): Mariana Markell

Sodium Intake in Inner-City Patients with Diabetes and Chronic Kidney Disease (CKD): Relationship to Age, Depression/Anxiety, and Diet Quality

We examined factors associated with adherence to 2.3g/d sodium (Na) intake in a population of pts from specialty clinics where Na restriction is advised.

Methods: A random sample of 109 patients from an CKD (37), dialysis (23), medicine/diabetes (18) and transplant clinic (31) were studied. Dietary intake was assessed by 24-hour food recall, analyzed using ASA24 software and used to calculate Healthy Eating Index (HEI). Nutritional literacy was assessed via the Newest Vital Signs toolkit. Depression and anxiety were assessed using PHQ-9 and PSS scales.

Results: There were 41 men and 67 women with 89 black, 5 white, 3 Hispanic and 14 other. 65% pts were foreign born (time in the US 35.9±15.3 yrs). 53% of pts made <\$20K/yr. Mean Na intake was 2.53±0.99g/d.

14 pts restricted Na to <1.5g/d. 45 pts ate ≈ 2.3 g Na/day (LoNa). LoNa pts were older than pts who ate >2.3g/d (HiNa) (69.1±11.4 vs 58.4±15.9, $p < 0.001$), but did not differ for other demographics. LoNa pts had lower scores for depression (2.33±4.3 vs 4.22±4.3, $p = 0.016$) and anxiety (7.83±7.4 vs 11.7±6.6, $p = 0.019$). LoNa pts ate fewer calories overall (1093±258.9 vs 1594±401.5, $p < 0.0001$) and less cured meat and total grains, but similar total fat and vegetable intake, eggs, dairy or added sugars.

They ate a higher percent of calories from carbohydrates (50.4±13.4 vs 44.4±10.9, $p = 0.012$), but did not differ for fat or protein. LoNa pts scored lower for food insecurity than HiNa (3.67±0.69 vs 3.17±1.1, $p = 0.012$, 4=food secure, <4=food insecure) and had higher HEI (61.0±12.9 vs 54.3±11.5, $p = 0.009$).

Conclusions: In our population: Most pts ate HiNa. Pts who ate LoNa were older, ate fewer calories and scored lower for depression, anxiety, and food insecurity. Pts who ate LoNa ate a higher percentage of calories from carbohydrates and less cured meat and grains but did not differ for fat, vegetables, eggs, dairy or added sugar. The contribution of depression/anxiety, stress and food insecurity to higher Na intake is unclear.

Katerina Lembrikova

Advisor(s): Mariana Markell

Confusion Regarding the DASH Diet and Sodium Restriction in Inner-city Clinic Patients: Association with Poor DASH Scores and Sodium Adherence

Objectives: Adherence to DASH (Dietary Approaches to Stop Hypertension) diet is associated with slower progression of kidney disease and decreased cardiovascular risk. We evaluated association btwn knowledge of DASH diet, DASH scores and nutrient intake in inner-City population.

Methods: Random sample of pts from CKD (37), medicine/diabetes (18) and transplant clinic (31) studied using 24-hr food recall, w/nutrient intake analyzed by ASA24 software to calculate DASH score. Pts asked to respond to "Do you know what the DASH diet is?"

Results: Mean age was 63.8 ± 14.1 yrs; 50% (43) diabetes; 85% (73) HTN. 45% (39) income < \$20K/yr. 78% (67) std familiar with DASH diet / defined as decreased or "low" intake of Na or salt (LoNa); 33% (28) were unfamiliar (NoAns). No pt able to provide correct explanation of DASH diet. Answers were "no salt" (26), "low salt" (38), 3 pts std limit of Na as 2gm (2) or < 80mg (1). Some pts commented "nasty"/"tasteless". Mean DASH scores were poor and didn't differ btwn 2 groups (LoNa 3.75 ± 0.88 vs NoAns 3.8 ± 0.8 , $p=NS$), nor did intake of Na (LoNa 2.51 ± 0.96 g vs NoAns 2.59 ± 1.3 g, $p=NS$). There was no difference in creatinine (LoNa 2.0 ± 1.6 vs 1.79 ± 1.3 mg/dl, $p=NS$), BMI, BP, income, education or marital status btwn 2 groups. 92% (57/62) pts in the LoNa group std yes to question "Are you familiar with low Na diet" vs 1% (1/16) in NoAns group, $p < 0.0001$.

Conclusions: In population of inner-City pts: 1. Understanding of DASH diet poor and equated w/low or absent Na intake w/unclear understanding of actual amount. 2. DASH adherence was poor in all groups. 3. No difference in Na intake between pts who std that they knew about DASH diet and those who didn't. No group met recommendations for <2gm/d intake. 4. Pts who std they knew what DASH diet was more likely to report familiarity w/low Na diets. 5. Confusion regarding DASH diet and Na restriction is common. As DASH eating pattern is a more comprehensive change in dietary habits, targeted education is needed.

Matthew Moy

Advisor(s): Mariana Markell

Food Security and Use of SNAP Benefits in Inner-City Patients with Diabetes: Associations with Gender, Social Support and Stress

We examined prevalence and impact of food insecurity and use of SNAP benefits in a cohort of inner-city patients with diabetes. 57 patients were interviewed. Food security was scored from 1-4 using a USDA survey module. 24-hour food recall was evaluated using ASA24 software. Stress was assessed using the Perceived Stress Scale (PSS). Mean age was 67.3 ± 10.87 yrs, with 21 men, 36 women, 82% black or African American, 61% high school education or less and 81% had household income <\$40k/yr. 16% (8/50) were food insecure (score 1-2) and another 28% (14/50) were at risk (score 3). 42% (21/50) received SNAP benefits. There was no significant difference in macronutrient intake, total fruits, total vegetables, or added sugar intakes for food secure (FS) vs food insecure or at risk pts (FIS), and no significant difference in BMI, blood pressure, total cholesterol, HbA1c, or serum albumin. FIS patients scored significantly higher on PSS than FS (12.69 ± 4.5 vs 7.1 ± 7.4 , $p=0.012$). Patients receiving SNAP benefits were more likely to be FIS (2.9 ± 1.12 vs 3.59 ± 0.68 , $p=0.01$), more likely to be women (55% (18/33) vs. 17% (3/17, $p=0.012$), report income <\$25k annually (68% (17/25) vs 12% (2/16), $p=0.006$) and be single, divorced or widowed rather than living with a partner or married (64% (18/28) vs 14% (3/22), $p=0.001$). In our population: 1. Over 25% reported being at risk or food insecure. 2. At risk or food insecure pts scored significantly higher on the PSS. 3. Patients receiving SNAP benefits were more likely to be at risk or food insecure. 4. Patients receiving SNAP benefits were more likely to be severely indigent, female and living alone. 5. Although we did not find differences in nutrient intake on 24 hour recall, our data suggest that patients with diabetes who are food insecure and especially those who are receiving SNAP benefits feel social stress and are high risk over the long term as they also lack social and financial support to help deal with their chronic illness.

Sarah Leventer

Advisor(s): Mariana Markell

Poor Nutritional Literacy and Diet Quality in Inner-city Kidney Transplant Recipients

Intro: Poor nutrition habits may cause progression of complications in kidney transplant recipients (KTRs), and impact kidney function long-term. We investigated dietary quality and nutrition literacy in a population of KTRs.

Methods: A survey was conducted in a random convenience sample of 31 pts from a transplant clinic. Dietary intake was assessed by 24-hour food recall, with nutrient intake analyzed using ASA24 software. Intake was used to calculate DASH (Dietary Approaches to Stop Hypertension) and Healthy Eating Index (HEI) scores. Nutritional literacy was assessed via the Newest Vital Signs toolkit consisting of 6 questions relating to a food label.

Results: There were 19 (61%) men and 12 (39%) women. Racial breakdown was 26 black, 1 white, 2 Hispanic and 2 other. Mean age was 56 ± 2.4 (range 18-56). 17 pts were born abroad (mean time in US 32.6 ± 2.7 yrs), time since transplant 6.7 ± 1.4 yrs, creatinine 2.32 ± 0.4 mg/dl, BMI 27.5 ± 1.04 . Mean HEI score was $55.5 \pm 1.98\%$ (range 36.7 - 76.5%), scored as $< 80\%$ = poor/needs improvement, and $< 51\%$ = poor. Mean DASH score was 3.69 ± 0.19 (scaled 1-10); < 5 is poor adherence. Only 8 (26%) patients had adequate nutritional literacy (>5 out of 6 points), 19 (61%) pts scored ≥ 4 points. 28 (90%) pts reported receiving counseling from a doctor or a dietician but only 25% had seen a dietician in the past year, and 35% got information from a friend or the Internet. 20 (69%) agreed with the statement "I maintain a high quality, nutritious diet", 23 (80%) believed that their diet could be improved.

Conclusion: In our population of inner-City KTRs: The majority reported receiving dietary counseling but had poor nutritional literacy. Most believed their diet was healthy but could be improved. Many pts get nutrition information from a friend or the Internet. The population had poor dietary habits, measured by HEI and DASH indices. Inability to understand food labels may prevent meaningful dietary change despite counseling and a desire to do so.

Taylor Conrad (previously at A103)

Advisor(s): Richard Sinert

The Utility of Interval Likelihood Ratios of Lactate to Predict Mortality

Background: Several cutoff values for lactate have been proposed to aid in directing resuscitation efforts across various disease states given its relevance as a marker of end organ perfusion and its association with in-hospital mortality. This study was designed to determine if interval likelihood ratios for lactate could provide improved clinical significance as a predictor of in-hospital mortality when compared to use of a typical dichotomous cutoff.

Methods: A database of patients at the University Hospital of Brooklyn was created for those that received a lactate level drawn in the emergency room. Receiver Operator Characteristic (ROC) curves were created to calculate the Area Under the Curve (AUC) for the ability of lactate to predict death. Interval likelihood ratios (LR's) for lactate predicting mortality rate were also calculated, and Bayes theorem was used to calculate post-test probability of death at each interval of lactate using the study's overall mortality rates as a pre-test probability.

Results: From November 2014 through November 2018, 52,070 patient encounters were returned. The sample consisted of 59.8% females with a mortality rate of 1,060/52,070 (2.04% 95% CI, 1.92%-2.17%). The AUC was statistically significant ($p < 0.001$) 0.734 (95% CI, 0.717-0.751), with the ROC curve showing the best discriminatory value of lactate at 1.85 mmol/L (Sensitivity 67%, Specificity 69%). Interval LR's were less than 1.0 for lactates between 0.0-2.0 mmol/L, LR=1.4 (2-4 mmol/L), LR=5.2 (4-6), LR=14.1 (6-8), LR=31.5 (8-10) and LR=33.8 (>10). Post-test probability of death with a lactate < 2.0 decreased from 2.04% to 1.07% and increased with higher LR's to 2.8% (2-4 mmol/L), 9.8% (4-6), 22.6% (6-8), 39.6% (8-10) and 41.3% (> 10).

Conclusion: Although the ROC curve analysis showed that a lactate of 1.85 mmol/L was the optimal cutoff, interval lactate analysis showed only a lactate > 4.0 mmol/L significantly impacted post-test probability of death.

Jeetendra Sah

Traumatic brain injury unmasking sturge-weber syndrome - a case report and review of the literature.

Introduction: Sturge-Weber syndrome (SWS) is a neurocutaneous disorder characterized by angiomas involving the face, choroid, and leptomeninges. Traumatic brain injury (TBI) has been associated with worsening neurological symptoms in patients with SWS. Herein we describe a previously asymptomatic healthy boy who developed status epilepticus (SE) and focal neurological deficits following a mild TBI where neuroimaging findings were consistent with SWS.

Case Description: A 13-year-old boy presented to ER after a mild TBI with fluctuating mental status, emesis, and unsteady gait. Neurologic examination revealed aphasia and right hemiparesis. Non-contrast CT head showed an engorged left internal cerebral vein. MRI brain with contrast demonstrated abnormal leptomeningeal enhancement involving the entire left cerebral hemisphere and ipsilateral choroid plexus consistent with SWS. He had no associated features like facial angioma, glaucoma or other neurological symptoms. He subsequently developed refractory SE and left oculomotor nerve palsy. Repeat neuroimaging revealed left hemispheric cerebral edema with impending uncal herniation.

Discussion: Our patient was diagnosed with a rare subtype of SWS characterized by isolated leptomeningeal angiomatosis. Similar to previously published cases, mild TBI preceded the appearance of neurological symptoms. It is postulated that abnormal development of superficial cortical veins leads to overloading of the deep venous system and results in venous hypertension. This mechanism has been implicated in acquired vulnerability to minor insults including mild TBI. MRI perfusion imaging was consistent with hyperemia within the left hemisphere resulting either from SE or from venous hypertension.

Conclusion: Our case further supports prior evidence that TBI can unmask neurological manifestations of SWS, possibly by compromising already vulnerable cerebrovascular hemodynamics. The exact underlying mechanisms require further study.

Oluwatosin Akintola

Advisor(s):

A Rare Case of Primary Glioblastoma Multiforme In The Pineal Region

Objective: A case presentation of high grade glioma in the pineal region in a young woman.

Background: Pineal region tumors arising in or around the pineal gland account for about 1% of brain tumours in adults.

Histological subtypes typically include germ cell tumors and pineal cell tumors (pineocytoma, pineoblastoma and mixed pineal tumors). Rarely, glioblastomas of the pineal region have been reported in the literature.

Case Description: A 38 year old woman presented with daily, moderate-severe headaches for two months. CT head showed moderate obstructive hydrocephalus. The patient had no other neurological complaints. MRI Brain revealed a 4.4 x 3.6 x 3.3 centimeter mass in the pineal region with associated perilesional edema. Histopathological examination showed a high grade glioma with intermediate O-6-methylguanine-DNA methyltransferase (MGMT) promoter methylation and absence of isocitrate dehydrogenase (IDH 1/2) mutation.

Samuel Apple

Advisor(s): Deborah Gustafson

Brooklyn Cognitive Impairments in Health Disparities Pilot Study

Introduction: Detecting cognitive impairments during adulthood and with aging is challenging and recognized as an urgent health care priority. In health disparities communities this urgency is accentuated by low socioeconomic status, low educational level, high cardiovascular disease risk and issues related to healthcare access, socioeconomics, ethnoracialculture, social stress, and urban environments.

Methods: The Brooklyn Cognitive Impairments in Health Disparities Study (BCI-HD) investigated early detection of cognitive impairments in traditional and nontraditional primary care settings in central Brooklyn, New York, USA. We measured cognition using a novel, language-invariant digital cognitive assessment tool, Cognigram, among patients, age ≥40 years, in Family Medicine, the Emergency Department, and Geriatric Psychiatry waiting rooms. After finishing the Cognigram, participants completed a 6-item Yes/No liking survey. Inclusion criteria were age (calculated via birth year), adequate vision, and use of at least one upper extremity.

Results: 58 adults (23 men, 35 women), 67.9 +/-9.8 years (range 43-91), completed the Cognigram and a Liking Survey in Family Medicine and Geriatric Psychiatry clinics in central Brooklyn. Several qualitative aspects of successful protocol facilitation and completion were gathered. Of a total Liking score of 5, the range was 1-4, with 50% of respondents scoring 3 or 4. No differences in Liking were observed by sex or age.

Discussion: The Cognigram was a positive addition to the waiting room experience in Primary Care Settings. Assistance from a trained adult as well as clinic endorsement were keys to successful administration, and depending on the setting, a participant incentive may be a useful enhancement. How Cognigram performs in a geographically compact, population-dense global setting such as Brooklyn with high cardiovascular disease risk and a plethora of Health Disparities, is being uncovered.

Hyeyoung Seol

Advisor(s): Gregory Kapinos

Pontine Ischemic Infarct Mimicking Seizure with Non-reactive Beta Coma

Objectives: Beta coma is usually seen in sedative intoxication such as barbiturates or benzodiazepines. Few case reports mention beta waves in comatose patients from anoxic brain injury or brainstem lesions. We present the case of a comatose patient with a pontine ischemic infarct whose EEG showed beta activity without reactivity.

Methods: Case report and literature review

Results: A 67-year-old woman, with history of hypertension and hyperlipidemia, had a sudden episode of straightening of arms and trembling of hands at home. Upon arrival in the ER, she was unresponsive with right-gaze deviation. A continuous EEG was obtained out of concern for nonconvulsive status epilepticus. The EEG showed generalized beta activity without reactivity even 72 hours after last benzodiazepine administration. MRI revealed a massive pontine ischemic infarct. The patient remains comatose.

Conclusions: Various EEG patterns can be expected among comatose patients; some have a prognostic value. Alpha coma shows rhythmic alpha waves, most prominently in the frontal area, without reactivity. It can be seen in anoxic brain injury, toxic metabolic encephalopathy, or deafferented state. Apart from sedative intoxication, beta coma is not well understood. Beta unreactivity is very rarely associated with brainstem lesions or clinical prolonged coma. There have been only a few case reports of beta coma resulting from anoxic brain injury or brainstem lesions.

This case was a rare presentation of brainstem ischemic stroke with decerebrating posturing on initial presentation. Because this mimicked seizure, we promptly obtained an EEG, which showed a predominance of beta activity suggestive of an activated alert state, but there was no EEG reactivity. With a clinical exam compatible with coma, we made the diagnosis of beta coma. This case demonstrates the existence of beta coma in brainstem lesions and calls for larger electrophysiological studies among brainstem-injured patients.

Yazan Radaideh

Advisor(s): Herman Moreno

Brotezomib-induced Posterior Reversible Encephalopathy Syndrome

Posterior reversible encephalopathy syndrome (PRES) is a neuro-radiologic syndrome that is recently being more frequently recognized in relation to immune-modulators and chemotherapeutic agents.

Brotezomib, a proteasome inhibitor, has been linked to PRES in extremely rare cases. Here we present a case of PRES in association to the second dose of Brotezomib in a woman recently diagnosed with multiple myeloma. Prompt recognition and management of this serious complication is of paramount importance to prevent significant morbidity and mortality.

Yazan Radaideh

Advisor(s): Paul Maccabee

Acute Disseminated Encephalomyelitis in a patient with HIV

Acute disseminated encephalomyelitis (ADEM) is typically a monophasic demyelinating disease of the central nervous system. The diagnosis heavily relies on clinical suspicion aided by imaging findings. It has been linked to various viral infections. We herein present a case of autopsy proven ADEM in an adult male who was previously infected with human immunodeficiency virus and received influenza virus vaccine just prior to presentation.

Irina Kharisova

Advisor(s): Susan Law

Cerebral Amyloid Angiopathy Related Inflammation: A Case Series

Cerebral amyloid angiopathy-related inflammation (CAARI) is a rare but increasingly recognized entity characterized by a combination of specific clinical and radiological criteria. Clinical features include subacute encephalopathy, behavioral changes including psychosis, headaches, seizures, dementia, and focal neurologic deficits. On MRI, symmetric or asymmetric areas of high T2/FLAIR signal indicative of inflammation are adjacent to microhemorrhages characteristic of cerebral amyloid angiopathy (CAA.) The inflammation is thought to be a consequence of autoimmune response to amyloid deposition in cerebral blood vessels. CAARI may be treated with corticosteroids or other immunomodulating agents leading to clinical improvement. Awareness of CAARI in the differential of transient neurologic deficits mimicking TIA is crucial given the unmapped added risk antiplatelets may pose of cerebral hemorrhage in this population.

Herein we present 5 cases of CAARI, emphasizing clinical and radiographic findings. Our case series suggests that physicians should keep a high level of suspicion for CAARI, despite diverse clinical features at presentation, because recognition of this syndrome has implications for treatment: the use of immunomodulating therapies and avoidance of antiplatelet agents.

Connor Berlin

Advisor(s): Viviane Tabar

Methotrexate-Induced Cognitive Impairment Reveals Disruption of White Matter Progenitor Cells that Correlates with Detectable Changes on Diffusion Tensor Imaging

Objective: To develop a long-term rodent model of methotrexate (MTX) chemotherapy-induced cognitive impairment (CICI) and determine the effects on white matter oligodendrocyte progenitor cell (OPC) populations, myelination, and hippocampal neurogenesis. It was hypothesized that any observed microstructural changes would be readily identifiable on diffusion tensor imaging (DTI).

Methods: Rats (P24) were given four weeks of single dosed intraperitoneal MTX (200mg/kg) followed by leucovorin rescue (total MTX dose of 800mg/kg) and then tested on the Morris-water maze (MWM) and novel object recognition task (NORT) at 1.5, 3, 6, and 16-months. Brains were analyzed with stereology, immunohistochemistry, and DTI.

Results: Behavioral analysis revealed significantly worse performance in MTX-exposed rats on MWM at 3, 6, and 16-months, and NORT at 16-months. Stereology revealed a significantly decreased number of Olig2+ cells in the corpus callosum of MTX rats at 6 and 16-months post-chemotherapy, significantly lower corpus callosum volumes at 6 and 16-months, and significantly decreased Ki67+ cells in the hippocampus at 3 and 6-months. Myelin basic protein (MBP) immunofluorescence revealed significantly decreased MBP mean intensities in MTX rats at 6 and 16-months. 16-month DTI data demonstrated significantly lower fractional anisotropy (FA) values in the majority of MTX rat white matter tracts.

Conclusion: To date, no study has investigated the long-term effects of MTX chemotherapy, particularly on white matter tracts. Here, in a robust model of juvenile CICI, we demonstrate long-term disruption of OPC populations that are never fully able to recover, leading to subsequently decreased myelin production and decreased corpus callosum volumes. We have also demonstrated the utility of using DTI as a sensitive tool for correlating FA with white matter microstructural damage, a noninvasive strategy that will be useful in tracking future reparative strategies directed at CICI.

Daniel Martinez

Advisor(s): Ozgul Muneyyirici

Fibroids and Breast

Introduction: Shen TC et al (2017) has found the incidence of breast cancer is higher in women with uterine leiomyoma than in those without it. Increased risk of breast cancer was documented in women with history of uterine leiomyoma. According to Tseng JJ et al (2017) increased density of breast tissue has been associated in some studies with a greater risk of breast cancer than those with no densities. We hypothesized that dense Breast tissue is expected to be the most prevalent radiological findings among women with uterine leiomyomas (UL).

Daniella Alviar

Advisor(s): Ozgul Muneyyirici-Delale

Maternal hyperglycemia and its effects on oocytes

Gestational diabetes mellitus (GDM) has been extensively studied. It has been confirmed that GDM has effects on both maternal and fetal outcomes. Because of these detrimental effects, screening tools have been put in place to effectively detect GDM early in pregnancy. Although metabolic and physiologic complications to mother and fetus have been observed, few research has been done to identify any ovarian abnormalities in the offspring of a diabetic mother. This literature review manages to delve into the work that has been done regarding offspring oocyte development exposed to hyperglycemia. Results, mostly from pre-implanted murine and bovine models, confirm that maternal hyperglycemia affects cellular differentiation/apoptosis, oocyte morphology, and offspring fertility. In light of this possible correlation, it is important to conduct more research on this specific topic, which can potentially be performed using primate models. This specific research is important to conduct to further expand our knowledge on the detrimental effects of GDM on the offspring. This in turn may allow us to question whether or not screening for GDM may need to occur at an earlier stage, so as to prevent its devastating consequences.

Sheina Leboeuf

Advisor(s): Robert DiRaimo

The Effect of Imaging Modality on the Selection of Hemodialysis Access Type

Objective: The selection of hemodialysis access type (arteriovenous fistula versus graft) has clinical implications for patients requiring dialysis. Currently, there are no recommendations for the use of pre-operative contrast venography (CV) or intra-operative duplex ultrasound (DUS) as the most effective imaging modality for selection of hemodialysis access type. The purpose of this study was to determine whether intra-operative duplex ultrasound (DUS) changed the selection of hemodialysis access type recommended after pre-operative contrast venography (CV).

Methods: We conducted a retrospective cohort study in which we identified 48 patients who had hemodialysis access creation with intra-op DUS after having had pre-op CV. We determined the percentage of cases in which intra-op DUS changed the selection of hemodialysis access type after pre-op CV and the percentage of cases in which the change yielded the selection of more favorable access types.

Results: Of our 48 patients, 42 (87.5%) had arteriovenous fistula creations while 6 (12.5%) had graft insertions. Intra-op DUS changed the selection of hemodialysis access type in 20 (41.7 %) of our patients with selection of more favorable access type in 13 (27.1%) of these patients. Access failed in 4 of these 20 patients with only 2 patients ultimately requiring the access type recommended prior to intra-op DUS.

Conclusions: Our study shows that intra-op DUS changed the selection of hemodialysis access type recommended after pre-op CV and that in most of these cases, intra-op DUS yielded the selection of more favorable access types. Further research is required to establish the most effective imaging modality for the selection of hemodialysis access types.

S M Golam Mohiuddin

Advisor(s): Brahim Chaqour

Connective Tissue Growth Factor: An important extracellular cue in retinal progenitor cell growth and differentiation

The mouse retina is an established model for investigating the mechanisms of progenitor cell proliferation and cell fate specification. During development, multipotent retinal progenitor cells (RPC) give rise to seven major classes of retinal cell types that organize into three layers. The outer nuclear layer contains the cell bodies of the light-sensing rod and cone photoreceptors. The inner nuclear layer contains the cell bodies of various interneurons and Müller glia. Finally, the ganglion cell layer contains retinal ganglion cells (RGCs), which send their axons to the brain. Major efforts have been deployed to develop stem cell-based therapies to replace lost or deficient retinal cells causing blindness. However, transplantation of multipotent RPC or mature cells into the adult retina did not achieve significant integration. Although extracellular matrix (ECM) proteins play significant roles in adhesion, migration, proliferation, and, differentiation, their role in RPC differentiation and lineage specification is unknown. This study focuses on the connective tissue growth factor (CTGF), a multimodular ECM protein involved in different cellular and biological events. In this study, we examined the role of this protein in retinogenesis using lineage tracing and mouse genetics. Using a green fluorescent protein (GFP) transgenic mouse under the CTGF promoter control, a proxy for endogenous CTGF expression, we found that the CTGF:GFP signal is dynamic within a subset of RPCs and RGCs. The GFP expression is co-expressed with the molecular markers of these cells (e.g., Sox2, CHX10 and Brn3) at embryonic stage E14. Concordantly, CTGF deletion resulted in reduction of both retinal thickness and cell proliferation and lower levels of RGC and CHX10+ cells compared to wild-type embryos. These data underscore the important role of CTGF, as an extracellular cue, in driving RPC growth and differentiation and possibly retinal tissue regeneration in inherited retinal diseases.

Natasha Bobrowski-Khoury

Advisor(s): Edward Quadros

Absorption and Tissue Uptake of Folate Forms in a Rat Model: Implications for the Treatment of Folate Receptor Autoimmune Disorder in Pregnancy and Autism.

Folate is an essential vitamin whose cellular transport is mediated by folate receptor alpha (FR) and reduced folate carrier (RFC) once absorbed in the gut by the proton-coupled folate transporter. The specificity and affinity of the transporters for various forms of folate is thought to influence absorption and cellular uptake. Therefore, the aim of this study is to compare absorption and tissue distribution of folate forms available and evaluate the effect FR antibodies (FRAb) on this distribution. Four forms of folate L-Folinic acid (Fusilev, Levofolate, LFol); DL-Folinic acid (Leucovorin, DLFol); L-Methylfolate (MTHF) and folic acid (FA) were orally administered (dose 4mg/kg) to adult male rats, GD14 pregnant rats, and PND21 male rats and measured intestinal absorption, maternofetal transport, and brain uptake respectively. Where applicable, pregnant rats received 200ug FRAb IP, 24 hours prior to folate administration and young pups received 100ug of FRAb. Results of tissue absorption in adult male rats showed peak absorption of all folate forms at 1 hour. While half of FA is converted to MTHF by 4 hours, most of LFol and DLFol are absorbed unconverted. In either maternofetal transport and brain uptake, LFol emerges as the form that is better absorbed, transported, and distributed in the presence of FRAb. Currently, pharmacologic doses of DLFol are used in clinical trials to treat children with autism. The D-Form is metabolically inactive, clears slowly, and can interfere in folate dependent reactions. Since LFol transport is via RFC only, LFol appears as the folate form of choice to treat fetal and brain folate deficiency due to FRAb interfering with folate transport. These results support the use of LFol to treat autism and other developmental disorders where FRAb are present and to prevent fetal folate deficiency during pregnancy. The use of LFol to fortify food products would also negate the issue of unmetabolized folic acid.

Sayed Imtiaz

Advisor(s): Richard Kollmar

Tropism and Proliferation of Colon and Pancreatic Cancers Using an in-vivo Zebrafish model

Xenotransplantation in zebrafish embryos has been used in numerous studies to understand how different tumors undergo vascular invasion and localize to specific organs that are analogous to their activity in humans. These studies have been carried out in transgenic zebrafish previously with GFP (green fluorescent protein) labeled blood vessels or specific organs. We aim to create a model of tropism and proliferation of various colon cancer and pancreatic cancer cell lines. We will use fluorescently labeled cells injected into zebrafish embryos that will be followed for 1 week to evaluate early and late metastatic activity using fluorescent microscopy. We will also use immunofluorescence to check various cell markers including Ki-67 to establish area where tumor cells implant and actively divide and compare the various cell lines for qualitative and quantitative differences in tumor metastasis. Using these preliminary studies we aim to develop a transgenic zebrafish model to evaluate specific markers and interactions that are involved tumors that display perineural invasion.

Robert Colbourn

Advisor(s): Sabina Hrabetova

Dynamic Volume Changes of the Brain's Extracellular Space Underlying Seizures

It has been established that during seizures the brain's extracellular space (ECS) undergoes a long lasting shrinkage of about 30%, which is likely a consequence of the increased neuronal activity during this pathological state. This shrinkage is believed to help synchronize and excite neurons through amplifying pro-excitatory factors in the brain, such as excitatory neurotransmitters and ions. The problem with these volume measurements of the ECS is that their time resolution is too long to directly detect ECS shrinkage during individual local field potentials. By using a technique called relative volume monitoring (RVM) to continuously track relative changes in ECS volume, we have determined that the ECS undergoes a fast shrinkage of up to 13% (on top of the previous 30%), then slow recovery during each synchronous neuronal discharge that occurs during epileptiform activity. Because these dynamic volume changes (DVCs) of the ECS are likely dependent on the development of osmotic gradients between the intracellular and extracellular compartments, we decided to pharmacologically block channels and transporters that were likely to be involved. This would help us determine if stopping these DVCs is a possible way to stop epileptiform activity. Pharmacological blockade of the NBCe1 transporter, an astrocytic sodium-bicarbonate cotransporter, led to the elimination of both DVCs and epileptiform activity. Based on the effect of blockade, we determined that it was likely because of the elimination of DVCs that the epileptiform activity was halted. Based on these results, DVCs likely represent a force that helps promote excitability and synchrony and therefore may serve as a possible target for seizure treatment.

Derek Laskar

Advisor(s): Susan Gottesman

Renal Cell Carcinoma in Dialysis Patients: Criteria for Transplant Wait List Inclusion

Introduction: End-stage renal disease (ESRD) patients on long-term hemodialysis have higher incidence of renal cell carcinoma (RCC) in their native kidneys than the general population. Most cancer diagnoses require a cancer free period before transplantation. Yet, low-stage RCC (tumors <5 cm) does not, based on the now disproven belief that RCC <5 cm do not metastasize. Histologic subtype and tumor grade are also not considered in the eligibility criteria. Long time dialysis patients, those most likely to develop RCC, are therefore among soonest transplanted. We reviewed our 15-year history of RCC diagnoses and correlated subtype, grade and stage with clinical outcomes for ESRD patients and sporadic tumors. Our intention was to find evidence for or against instituting a watch and wait period for RCC before transplant.

Methods: We reviewed charts and tumor slides for all RCC diagnosed from 2002-2017. Pathologic characteristics assessed were: histologic subtype; tumor size; grade; and staging. Clinical data recorded were: ESRD status; renal failure cause; dialysis time; transplanted or not; immunosuppressive medication; symptomatic or incidental; treatment; and recurrence. 87 patients were identified. Analyses were based on differences between patients with and without ESRD, while correlating tumor subtype, size and grade with patient outcomes. The outcome of interest was recurrence.

Results: There were no differences in tumor staging or grading between ESRD and non-ESRD groups. Yet, further analysis showed overall recurrence was more frequent in higher grade tumors (67% vs. 22%, $p=0.038$). Among ESRD patients with recurrence, there was increased total dialysis time (18yrs vs. 6yrs, $p=0.024$). In subanalysis of ESRD patients with clear-cell (CC) histology and <5 cm tumors, recurrence was more frequent compared to non-ESRD patients (33% vs. 0%, $p=0.048$).

Conclusions: CCRCC subtype should require a wait period before transplant regardless of tumor size at diagnosis.

Florenal Joseph

Advisor(s): William Chirico

YPK9, a homolog of Parkinson's associated PARK9, has a role in peroxisomal proliferation

Mutations in ATP13A2, a putative divalent cation transporter located in lysosomes, have been implicated in the aging disorder, Parkinson's disease. Yeast PARK9 (YPK9), an ortholog of human ATP13A2, suppresses alpha-synuclein toxicity in yeast. The accumulation of alpha-synuclein into Lewy bodies is a hallmark of Parkinson's. We speculated YPK9 loss affects chronological lifespan and oxidants, such as hydrogen peroxide, exacerbates it. We found *ypk9* and wildtype growth rates were nearly identical. However, growth was severely impaired and peroxisomes proliferated when *ypk9* was treated with hydrogen peroxide. Double deletions of YPK9 and genes regulating peroxisomal proliferation yielded insight into YPK9's role in this process. Together, these results suggest YPK9 negatively regulates peroxisomal proliferation and plays an important role in hydrogen peroxide detoxification.

Erica Griffith

Advisor(s): William Lytton

Modeling Cell Types in the Claustrum

An unsupervised machine learning classifier was previously used to classify claustrum neurons based on their intrinsic electrophysiological properties, namely the firing patterns and action potential waveforms elicited in response to a sequence of current steps. Here we use this *in vitro* data to construct *in silico* models of the major cell types identified by this classifier. Each cell type was modeled with a single-compartment conductance-based model, which used biologically-based current mechanisms to maintain membrane potential and to create spiking behavior. Every model used leak, fast sodium, and slow potassium current mechanisms, while others included additional mechanisms such as M currents that were used to modulate more complex properties such as adaptation. All single-cell models were instantiated using NetPyNE. Each of these models contained several parameters that were optimized in order to replicate certain properties of the cell. These cell properties included subthreshold dynamics, firing rate, and spike frequency adaptation. All parameters were optimized using a multi-objective evolutionary optimization algorithm that employed python's *inspyred* module. To optimize the passive parameters, this algorithm explored different parameter combinations, generated simulated subthreshold voltage traces, and directly compared these simulated voltage traces with the experimental traces. To optimize the active parameters, the simulated and experimental F-I curves were compared. In cell types with adaptation, adaptation curves (instantaneous firing rate vs. time) were compared at each current step. In the future, we aim to expand these single cell models to include morphological reconstructions, and to also use these models in conjunction with emerging connectivity data in order to explore network dynamics in the claustrum.

Yeun-po Chiang

Advisor(s): Xian-Cheng Jiang

Sphingomyelin synthase gene family has mammalian phospholipase C activity

Mammalian specific phospholipase C (PLC), such as phosphatidylcholine-PLC (PC-PLC) and phosphatidylethanolamine-PLC (PE-PLC), plays an important role in lipid signaling and cell membrane structure formation. The product, diacylglycerol (DAG), is well known as second messenger mediating many biological functions. However, so far, the gene(s) which is(are) responsible for mammalian specific PLC activity is not known. We hypothesized that the SMS gene family members have specific PLC activity since they have the ability to do so. SMS family has three members: SMS1, SMS2, and SMSr, they use ceramide with PC/PE to produce sphingomyelin (SM) and ceramide-phosphatidylethanolamine (CPE), respectively. Utilizing both cell lines and specific knock-out mouse models, we indicate that SMS1/2 have PC-PLC activity and SMSr has PE-PLC activity. Furthermore, SMS1/SMS2/SMSr triple deficiency on hepatocytes significantly increase PC and PE levels, whereas significantly decrease DAG levels. Thus, SMS1/2/r genes are responsible for PC-PLC activity, PE-PLC activity, and DAG level. Their biological function deserve further investigation.

Aron Egelko

Advisor(s): Xian-Cheng Jiang

Of Mice and Men: Depot Specific Enzyme Differences in Adipose Tissue

Since the identification of the thermogenic role of Brown Adipose Tissue in 1961, it has been understood that adipocytes are not all functionally equivalent. Research has shown that brown, white, and beige fat have different genetic markers and different cells of origin. It is now known that adipocytes have varying morphology depending on the location within the body (known as depots). These differences are implicated in obesity and various metabolic conditions. However, little work has been done to elucidate the molecular basis for these depot differences. Our research focused on two enzymes, Sphingomyelin Synthase (SMS) and Lysophosphatidylcholine acyltransferase (LPCAT3), both of which are integral in synthesis of cell membrane proteins. The integrity of these membranes is vital for signal transduction and regulation of apoptosis. The goal of our research was to assess for the presence of any difference in SMS and LPCAT3 activity in visceral (VAT) as compared to subcutaneous (SQAT) adipose tissue. We VAT and abdominal SQAT samples from humans and mice. We measured enzyme activity using thin layer chromatography (TLC) to determine SMS and LPCAT activity. We used PCR spectroscopy to measure mRNA levels of SMS and LPCAT. TLC consistently revealed differences between visceral, specifically retroperitoneal, adipose and subcutaneous adipose in terms in LPCAT 3 and SMS activity. PCR spectroscopy data similarly showed significant differences in mRNA expression among the various depots. This data not only further demonstrates that adipocytes are functionally distinct in different depots, but also offers a molecular explanation for some of the previously documented morphologic differences.

Aparajita Bhattacharya

Advisor(s): Jin Montclare

Engineering and characterizing a clickable micellar block protein CE2 conjugated to a bimodal fluorescent/PET probe for theranostic applications.

Theranostic agents are being developed for their ability diagnose disease and improve drug delivery at target tissue site. Traditional chemotherapeutic drug delivery has been inefficient due to factors such as drug insolubility, tissue indiscriminate cytotoxicity, their inability to stimulate release and their lack of direct monitoring. So, we have engineered a nature-inspired smart protein nanofiber-based theranostic agent by rational design from a construct based on COMPcc (cartilage oligomeric matrix protein) and ELP (elastin-like protein), combined to form a block protein called CE2. CE2 has previously been shown to self-assemble into micellar structures and consist of hydrophobic pores in its COMPcc domain, capable of carrying hydrophobic chemotherapeutic drug molecules such as doxorubicin. Its ELP domain imparts the CE2 a thermoresponsive nature. Next, we aim to perform residue-specific incorporation of a non-natural amino acid analog to replace methionine with AHA (azidohomoalanine), to give rise to clickable azide-functionalized CE2 protein. This property would then be used to perform its conjugation to a PET (positron emission tomography) agent named BODIPY leading to a 18F-labeled BODIPY-F1 azide, imparting the compound the added ability to be used as a dual modality PET probe.

After validating the expression of the protein by E. Coli and measuring the incorporation of AHA into CE2 via MALDI-TOF (Matrix assisted laser desorption ionization- time of flight), we have been working on biophysical characterization of the CE2-AHA micelles via CD (circular dichroism), DLS (dynamic light scattering), TEM (transmission electron microscopy). CE2-AHA showed maintenance of alpha-helical structure, sized to be 20-30nm in diameter, that would facilitate their interaction with cells by EPR (enhanced permeation and retention), and their micellar character and size was validated using TEM. These results show that CE2-AHA holds promise for being used as a theranostic agent

Rachel Irizarry

Advisor(s): Mark Stewart

Seizures induce obstructive apnea in DBA/2 audiogenic seizure-prone mice: lifesaving impact of tracheal implants

Patients with epilepsy suffer from a higher mortality rate than those without (Becker 2000), and sudden unexplained death in epilepsy (SUDEP) accounts for the majority of deaths during epileptic episodes (Walczak et al. 2001). Previous studies have shown that seizures can induce laryngospasm that leads to a sequence of obstructive apnea, cardiopulmonary dysfunction, and death (Nakase et al. 2016). However, these findings were obtained with anesthetized animals. In this study, we examined whether a novel tracheostomy procedure protected awake mice from fatal audiogenic (not drug-induced) seizures. Sixty-eight animals were implanted with a tracheal T-tube that provided either a closed or an open alternative airway. All animals were then exposed to loud noise to trigger audiogenic seizures, and the outcome—death vs. survival—was recorded. Twenty-seven animals each with either a closed or an open T-tube displayed a tonic-clonic seizure with full hindlimb extension during noise testing. Only one animal with a closed T-tube survived, whereas 13 animals with an open T-tube survived, indicating that the odds ratio for survival was more than twenty times higher with an open T-tube (Fisher's exact test, $p < 0.001$). Our results support the hypothesis that upper-airway obstruction due to laryngospasm is the proximal cause of death from audiogenic seizures and highlight the importance of airway management during epileptic episodes.

Sean Mooney

Advisor(s): Mark Stewart

Seizure-associated central apneic responses replicated by nasopharyngeal irrigation induced diving response

The spread of epileptic seizure activity to brainstem respiratory and autonomic regions can elicit episodes of obstructive apnea and of central apnea with significant oxygen desaturation and bradycardia. Previously, it has been argued that central apneic events were not consequences of respiratory or autonomic activity failure, but rather an active brainstem behavior equivalent to the diving response resulting from seizure spread. To test the similarities of spontaneous seizure-associated central apneic episodes to evoked diving responses, we used nasopharyngeal irrigation with either cold water or mist for 10 or 60 s to elicit the diving response in urethane-anesthetized animals with or without kainic acid-induced seizure activity. Diving responses included larger cardiovascular changes during mist stimuli than during water stimuli. Apneic responses lasted longer than 10 s in response to 10 s stimuli or about 40 s in response to 60 s stimuli, and outlasted bradycardia. Repeated 10 s mist applications led to an uncoupling of the apneic episodes (which always occurred) from the bradycardia (which became less pronounced with repetition). These uncoupled events matched the features of observed spontaneous seizure-associated central apneic episodes. The duration of spontaneous central apneic episodes correlated with their frequency, i.e. longer events occurred when there were more events.

Based on our ability to replicate the properties of seizure-associated central apneic events with evoked diving responses during seizure activity, we conclude that seizure-associated central apnea and the diving response share a common neural basis and may reflect an attempt by brainstem networks to protect core physiology during seizure activity.

Timothy Morello

Advisor(s): Mark Stewart

Three Dimensional Reconstruction of the NeuN Stained *Carollia perspicillata* Hippocampus

With the advancement of optical sectioning techniques, image processing and segmentation, and 3 dimensional (3D) reconstructive techniques, there is an increasing call for 3D representations of histologic data. Here we show a workflow for the 3D reconstruction of NeuN stained hippocampus of *Carollia perspicillata*, also known as Seba's short-tailed fruit bat, and discuss future uses for these techniques.

To begin, the animals are perfused with fixative. The brains are carefully removed and further prepared for sectioning. They then are sliced with a microtome generating serial sections that cover the entirety of the brain. Next, the sections are stained using traditional tissue staining techniques. We then image the sections by optical sectioning with the Zeiss LSM 800. Images are processed and segmented utilizing the Matlab extension, Microscopy Image Browser, to process, segment, and register the sections. With this processed data, the NeuN stained hippocampus can be represented in 3D. This example serves to demonstrate the workflow of 3D reconstruction of brain structures. and to display general structural relationships that can be difficult to appreciate when serial sections are analyzed separately.

Further applications of 3D reconstructions include the utilization of annotated 3D brain models that allow for the speedy alignment of experimental brain serial sections. Additionally, these annotated 3D reference models offer a way of using software to annotate the anatomy of experimental brain sections, removing a degree of the guess work involved in defining anatomical regions by eye alone.

Future work will consist of the continued acquisition of images of serial-sectioned tissue using neuronal and glial markers to classify cell types and characterize their anatomic distributions. Finally, 3D reconstruction of the bat brain will allow for the compilation of histologic findings, creating a centralized framework for analyzing histologic data.

David Havlicek

Advisor(s): Peter Bergold

Hyperphosphorylated tau and $\hat{I}\pm$ -synuclein aggregates coincide with diffuse axonal loss in a mouse model of traumatic brain injury

Traumatic brain injury (TBI) selectively damages white matter and increases the risk of developing neurodegenerative disorders, including Alzheimer's disease and Parkinson's disease. Alzheimer's and Parkinson's disease are characterized by aggregates of hyperphosphorylated tau (p-Tau) and $\hat{I}\pm$ -synuclein ($\hat{I}\pm$ -syn), respectively. Tau and $\hat{I}\pm$ -synuclein are located in axons and presynaptic termini, respectively. This suggests that the white matter injury produced by TBI may produce subsequent changes in p-Tau and $\hat{I}\pm$ -syn. We have begun testing this hypothesis by isolating parasagittal brain sections from C57BL/6 mice 14 days after experimental closed head injury. p-Tau and $\hat{I}\pm$ -syn were identified by immunohistochemistry and axons were visualized by Bielschowsky silver stain. Injured mice (n=5) exhibited more axonal loss and greater levels of p-Tau and $\hat{I}\pm$ -syn than sham-injured controls (n=3). This was noted in multiple brain areas, including the following: the cortex adjacent to the impact site, the hippocampal CA2 region, the cingulum, the ventral striatum, and the basal forebrain. These results suggest that markers of neurodegeneration coincide with diffuse axonal injury. Our laboratory previously showed that the drug combination of minocycline and N-acetylcysteine prevents white matter injury after TBI (Haber, et al., 2017; Sangobowale, et al., 2017; Sangobowale, 2018). We are currently evaluating if these treatments also prevent the emergence of p-Tau and $\hat{I}\pm$ -syn after closed head injury.

Syed Rahman

Advisor(s): Peter Bergold

Minocycline and N-acetylcysteine improves behavioral outcome, dendritic integrity, and Protein Kinase Mz levels when first dosed 72 hours after experimental traumatic brain injury.

Traumatic Brain Injury (TBI) produces long-term deficits in cognition and memory. There are currently no drugs to treat TBI, in part, because drugs lose potency as the time to first dose increases. The Bergold laboratory previously showed that the drug combination of minocycline plus N-acetylcysteine when first dosed 72 hours post-injury (MN72) allows mice to acquire Barnes maze when tested at either 14 or 60 days post-injury (DPI). Acquisition of Barnes maze requires one functioning hippocampus; previous studies also showed that MN72 restores long-term potentiation, a process that is needed to acquire Barnes maze, only in the hippocampus contralateral to the injury site. MAP2 and PKMz are two key proteins needed for long-term potentiation. We therefore examined the time course of MAP2 and PKMz after injury to see if MN72 alters their expression. Injured mice treated with saline or MN72 had a rapid loss of MAP2 or PKMz expression in the hippocampus ipsilateral to the injury site that remained low up to 60 DPI. MN72-treatment increased MAP2 expression in the contralateral hippocampus to sham-injured levels by 14 DPI while saline-treatment increased MAP2 expression only by 60 DPI, suggesting that MN72 accelerated the recovery of MAP2 expression. Injured animals treated with either saline or MN72 reduced PKMz expression at 3 and 7 DPI in the contralateral hippocampus. At 14 and 60 DPI, MN72 increased PKMz expression while saline treatment did not increase expression. Restoration of PKMz expression suggests that MN72 regulates key proteins that may improve deficits in synaptic plasticity, cognition and memory produced by head injury. Notably, these therapeutic effects occurred with drugs dosed in a clinically relevant time window to treat TBI.

Matthew Evrard

Advisor(s): Sheryl Smith

 $\alpha 4\beta\delta$ GABAA Receptors Initiate Adolescent Synaptic Pruning of the Medial Prefrontal Cortex

The medial prefrontal cortex (mPFC) is the anatomical substrate for higher cognitive functions including behavioral flexibility and working memory. Clinically, abnormal higher cognitive functions are implicated in neuropsychiatric disorders of mood or anxiety that typically emerge during adolescence. During normal adolescent development, the brain undergoes a significant reduction of dendritic spines, which are compartment-like structures representing the excitatory post-synaptic terminal, which can disrupt normal function. Previously, our lab has shown that the pubertal expression of $\alpha 4\beta\delta$ GABA-A receptors (GABARs) initiates synaptic pruning (Afroz et al., 2016). This study looked to see if the same mechanisms were also required for synaptic pruning in layer 5 of the prelimbic cortex (PL; rodent correlate of the mPFC). We used Golgi staining to assess spine density comparing pubertal (P35) vs. post-pubertal (P56) mice. Spine density quantification and morphological subtyping were analyzed using NeuroLucida 360. Spine density decreased across adolescence (~40% in females and ~50% in males) with mushroom spines showing the greatest decrease. Next, to test the role of $\alpha 4\beta\delta$ GABARs we assessed the pubertal expression of the $\alpha 4$ subunit using immunohistochemistry and confirmed the functional expression through whole cell patch clamp recordings. There was a 3-fold increase in the pubertal expression of $\alpha 4$ and a 4-fold increase in the holding current as a response to gaboxadol (GABA agonist selective for the $\alpha 4\beta\delta$ GABARs at 100 nM). Finally, to establish the role of pubertal $\alpha 4\beta\delta$ GABARs, we compared spine density and subtypes from post-pubertal wild-type to $\alpha 4$ knock-out mice. Post-pubertal densities were significantly higher in $\alpha 4$ knock-out mice when compared to wild-type and did not significantly differ from the pubertal wild-type densities. Taken together these data suggest that synaptic pruning in PL layer 5 is initiated by pubertal expression of $\alpha 4\beta\delta$ GABARs.

Benjamin Tessler

Advisor(s): Steven Fox

Optimizing Transcranial Electrical Stimulation in a Rat Model

Hippocampal theta is the largest amplitude rhythmic local field potential (LFP) in the mammalian brain. It is often associated with learning and memory due to its involvement in the timing of place cell firing. In the literature, anti-epileptic effects have been seen during theta with a dramatic reduction of epileptic discharges. Transcranial electrical stimulation (tES) techniques may provide for an advantageous method to elicit or modulate theta at low-cost and low-risk, allowing it to be easily translatable. In our lab, we tested tES methods that optimize the injected currents to target the CA1 of the hippocampus in a rat model. With 3-D reconstructions generated from MRI data that are inserted into powerful physics solvers, various electrode placements are iterated through to maximize the ratio of electric field intensity in the CA1 relative to the rest of the brain. We then validate these results by using phantom models of cleaned rat skulls filled with agar that has NaCl concentrations appropriate for the equivalent brain electrical conductivity. We have found our physics simulation results to be comparable to our phantom model results. One of the tES methods we tested is intersectional pulsing (ISP) stimulation, which is proposed to focus electric fields on deep targets by a rotation of the bipolar current injection. However, we have found ISP electric fields to be equal to the equivalent electrode placements without any rotation. The optimal tES method we have validated is temporal interference (TI) stimulation that uses two pairs of electrodes, one injecting a current of slightly higher frequency than the other causing an amplitude maximum at the difference frequency near the midline of the two pairs, thus properly targeting deeper structures. These results will guide us and other researchers to maximize the efficacy of their tES techniques when attempting to modulate neuronal oscillations of deep structures.

Veronica Sebastian

Advisor(s): Todd Sacktor

Hippocampal PKMzeta expression decreases with age in the APP/PS1 model of Alzheimer's disease

Alzheimer's disease (AD) is a neurodegenerative disorder, which results in severe cognitive and behavioral deficits characterized by progressive memory loss. Over 5 million Americans currently suffer from AD, with an estimated 13.8 million cases projected by 2050. One possible mechanism that could explain the memory deficits seen in AD is disruption of PKMzeta expression. PKMzeta is a persistently active atypical PKC isoform that is specific to the nervous system and necessary for maintaining long-term memory. Work in our lab has shown an age-dependent decrease in PKMzeta expression in the dendrites of CA1 neurons in the APP^{swe}/PSEN1^{dE9} model of AD, which shows hippocampal overexpression of amyloid-beta in cell bodies starting at 3 months and formation of amyloid plaques at 6 months. We also see abnormal increased PKMzeta expression in non-neuronal cells, which strongly co-localizes with the astrocytic marker, glial fibrillary acidic protein (GFAP). These results suggest that atypical PKCs may play a dual role in AD, involving both loss-of-function in neurons and excessive signaling in astrocytes, which may be related to astrogliosis and glial activity affecting neuronal function.

Michael Tekin

Advisor(s): Sheryl Smith

Sex differences in synaptic pruning of dendritic spines of mouse primary motor cortex at puberty

The primary motor cortex (M1) is essential for motor learning. Adolescent synaptic pruning is necessary for optimal learning, yet pubertal synaptic pruning of basilar dendrites in layer 5 (L5) of M1 is not fully understood. Because gender differences in motor learning and motor flexibility are reported after puberty, I compared synaptic pruning in M1 L5 of male and female mice. Golgi staining was used to assess spine density/types in each group from z-stack projection (0.3 μm) photomicrographs taken with a Nikon DS-U3 camera mounted on a Nikon Eclipse Ci-L microscope using a 100x oil objective. Spine density across the basilar dendrites (proximal, medial and distal segments) was compared using pubertal and post-pubertal (P35 vs. P56) mice. Using a Student T-Test, we found no significant difference in total spine density between P35 and P56. In female L5 there was a significant decrease in proximal mushroom spines (P35 = 0.574 ± 0.065 spines/10 μm , P56 = 0.258 ± 0.054 spines/10 μm , $P < 0.05$), and an increase in proximal thin spines (P35 = 1.06 ± 0.10 , P56 = 1.55 ± 0.18 , $P < 0.05$) and proximal long thin spines (P35 = 0.528 ± 0.080 spines/10 μm , P56 = 1.01 ± 0.140 spines/10 μm , $P < 0.05$). In male L5, mushroom spine density did not change, but there was a significant increase in proximal thin spines (P35 = 1.45 ± 0.40 , P56 = 2.63 ± 0.19 , $P < 0.05$). The increase of thin spines was significantly more in males (M) than females (F) (M = 1.27 ± 0.09 spines/10 μm , F = 0.49 ± 0.24 spines/10 μm , $P < 0.05$), the increase of long thin spines was significantly more in females (M = 0.21 ± 0.08 spines/10 μm , F = 0.48 ± 0.07 spines/10 μm , $P < 0.05$), and the decrease in mushroom spines was significantly more in females (M = 0.10 ± 0.06 spines/10 μm , F = -0.32 ± 0.03 spines/10 μm , $P < 0.05$). These results suggest that selective pubertal pruning of proximal mushroom spines in M1 L5 pyramidal cells exist in female mice but not in male mice and differences in thin and long thin proximal spine formation exist between male and female mice.

Shwetha Phatarpekar

Advisor(s): Ivan Hernandez

New ribosomal RNA expression is required during re-consolidation of memory

Long-term memories can be usually found in two different states. A labile state that happens right after the initial acquisition (of the memory) or during memory recall, and a stable state that happens after the labile state in the initial acquisition or after a recall. The initial transition from labile to a stable state after learning is called consolidation, whereas the stabilization after a recall is called reconsolidation. The purpose of such labile state after a recall is to update the original memory. It has been well studied that new protein synthesis and gene expression (Kandel, 2001) are required during consolidation and reconsolidation (LeDoux JE 2011) of memory. Most efforts to understand experience-induced changes in neuronal gene expression have focused on the transcription products of RNA polymerase II (Pol II) primarily mRNAs and the proteins they encode. While there has been significant progress in identifying the Pol II-dependent transcripts (primarily mRNAs) required for early phase long-term synaptic plasticity, the gene products responsible for late-phase and maintenance remain elusive. In contrast, the transcription products of RNA polymerase I (Pol I), responsible for producing non-(protein) coding ribosomal RNA, have been left unexplored despite the fact that Pol I transcription constitute more than 50% of nascent RNA synthesis in a cell. Without rRNA synthesis, new ribosomes cannot be made. We recently showed that new ribosomal RNA expression (therefore new ribosomes) are necessary for consolidation of memory. We ask does reconsolidation also require rRNA expression and the synthesis of new ribosomes?

In order to approach this question, we have specifically blocked polymerase -1 activity (ribosomal RNA synthesis) before the recall and assessed whether this inhibition affects memory after a second recall. Our data suggest for the first time that new ribosomal RNA expression (therefore new ribosomes) are required for memory reconsolidation

Michael Cupelli

Advisor(s): Nabil El-Sherif

Role of Spatial Dispersion of Repolarization in Reentry Around a Functional Core Versus Reentry Around a Fixed Anatomical Core

Introduction: Successful initiation of spiral wave reentry in the neonatal rat ventricular myocyte (NRVM) monolayer implicitly assumes the presence of spatial dispersion of repolarization (DR), which is difficult to quantify. We recently introduced a NRVM monolayer that utilizes Anthopleurin-A to impart a prolonged plateau to the NRVM action potential. This was associated with a significant degree of spatial DR that lends itself to accurate quantification.

Methods and Results: We utilized the monolayer and fluorescence optical mapping of intracellular calcium transients (FCai) to systematically study and compare the contribution of spatial dispersion of the duration of FCai (as a surrogate of DR) to induction of spiral wave reentry around a functional core versus reentry around a fixed anatomical obstacle. We show that functional reentry could be initiated by a premature stimulus acting on a substrate of spatial DR resulting in a functional line of propagation block. Subsequent wave fronts circulated around a central core of functional obstacle created by sustained depolarization from the circulating wave front. Both initiation and termination of spiral wave reentry around an anatomical obstacle consistently required participation of a region of functional propagation block. This region was similarly based on spatial DR. Spontaneous termination of spiral wave reentry also resulted from block in the functional component of the circuit obstacle, usually preceded by beat-to-beat slowing of propagation.

Conclusions: The study demonstrates the critical contribution of DR to spiral wave reentry around a purely functional core as well as reentry around a fixed anatomical core.

Joseph Thomas

Advisor(s): Jin Montclare

Engineered Protein-Lipid Hybrid Nanomaterial For Cutaneous Gene Therapy

Gene therapy has the potential to treat various diseases of the skin, including chronic wounds associated with diabetes. However, a vehicle capable of delivering nucleic acids across the many layers of the skin does not currently exist. We have recently developed a lipoproteoplex (LPP) consisting of a super-charged coiled-coil protein (CSP) and a cationic liposomal carrier, that has the ability to condense nucleic acids and deliver them trans-dermally in-vivo. A CSP variant known as N8 has been rationally designed to improve the efficacy of the LPP compared to the parent protein via increased nucleic acid binding. The physical properties of the N8 LPP have been probed using dynamic light scattering, zeta potential measurements and transmission electron microscopy in order to see the effect the new protein variant has on the assembled vehicle. The N8 LPP maintains optimal size and charge for cellular transfection while having an increased ability to condense siRNA, leading to higher transfection efficiency.

Jenna Fanelli

Advisor(s): Beth Elenko

Interdisciplinary Education Module for Early Intervention Team for Academic Partners

The Early Intervention (EI) interdisciplinary education module combines the knowledge between the New York City (NYC) academic partnerships in various professional fields in order to enhance their expertise in collaborating effectively. The information from our module can be implemented not only in NYC, but in other areas of the country. The module will assist members in gaining the skills they need to be an adequate team member amongst participants at the American Occupational Therapy Association (AOTA) conference. The EI module supports the importance for professionals to integrate and coordinate interventions for better treatment. Within these module sessions, AOTA participants will understand roles in EI, effective collaboration, team building strategies, the individualized family service plan (IFSP), and a final session that encompasses all topics. In addition, activities will be provided within each of the five modules for members to have the opportunity to interact with each other and share their knowledge acquired throughout the sessions. Even though the module is about EI, many AOTA members can benefit from the use of this training as it can be effective in various areas of occupational therapy.

Karina Sanchez

Advisor(s): Brigitte Desport

Babies' Transition From the NICU to Home: Clarifying Occupational Therapist's Role in the Process

Occupational therapists (OTs) play an integral role in the Neonatal Intensive Care Unit (NICU) multidisciplinary team during the transition process from the NICU to home. In many instances, parents with babies in the NICU independently acquire the knowledge necessary to manage and advocate for their child's ongoing needs after leaving the NICU. Parents often state they do not receive adequate support in the NICU and even less once they leave the hospital, leading to feelings of incompetence in their ability to care for their baby at home.

There is limited amount of literature regarding the OT's role in transitioning parents and babies to home. The poster will present information from semi-structured interviews that were conducted to gain insight into the personal experiences of parents in the NICU, specifically regarding their preparedness to transition their baby home from the hospital. The data collected were used to analyze the factors that influence the transition process, and to begin defining the OT's role in preparing a family's transition from the NICU to home.

Responses revealed the need for additional support and education during the transition from the NICU to home. Expanding on that, confidence was seen to be influenced by how much support parents were provided. It is clear that there were opportunities for OTs to address certain challenges parents faced when transitioning their baby home from the NICU. The findings gathered from this study contribute to the existing literature on the OTs role in transitioning a family from the NICU to home and informs the NICU community how the OT contributes to this process.

Genevieve Leclerc

Advisor(s): Richard Sabel

Effectiveness of a Multimodal Fall Prevention Program for Older Adults

Falls are a prevalent issue among older adults that affect performance in daily activities. The Easy-Does-It Falls Prevention, occupational therapy-based program was a quality assurance review aimed at helping participants in a group decrease their risk of falling, fear of falling, and increase their overall mobility confidence. The group was designed for adults aged 65 and older and combined education with physical activity. This taught participants strategies to improve their strength, balance, function and confidence. The sessions also incorporated movements which could be applied to activities of daily living. For example, activities include vacuuming, reaching for objects overhead, weight shifting to open heavy doors, maintaining balance on a public transportation as well as functional mobility. Essentially, the weekly sessions helped adults maximize their functions and fulfill their roles in daily life. Additionally, they emphasized the importance of body awareness while performing these occupations. The program was multi-modal, incorporating yoga, tai chi, Feldenkrais, breathing, and meditation. Feldenkrais involves slow motions and helps people develop body awareness during their daily functional activities. These movements assist people to advance their thinking, self regulation and organizational skills (1). The overall goal of this quality assurance review was to examine whether combining traditional techniques (e.g. yoga, tai chi), which have been proven to decrease fall risk, were effective when utilized as one comprehensive educational program (2). The results of this quality assurance review supplements current research on the impact of environmental, behavioral, and physical factors of fall risk and confidence among the older population.

Daniel DiGiacomo

Advisor(s): Suzanne White

Group Role Play: Introducing Group Roles to OT Students

Effective group counseling training is imperative for future OTs as activity-based group interventions continue to be an integral tool in OT mental health settings. A study demonstrated the following to be most helpful group counseling learning methods in graduate programs: group counseling practice, observation and supervision of group leadership, experiential group participation, and academic instruction. In particular, participants appreciated viewing other groups and conceptualizing the situations that can occur (1). Understanding the group roles that members take on during sessions provides valuable information to the OT, by allowing the therapist to help members develop goals, evaluate progress and outcomes, and gain meaning from the group dynamics. It will also allow the therapist to facilitate members' reflection on behaviors and possible consequences (2). This poster will review a student-developed educational video of an activity-based group session to introduce the concept of group roles to OT students. Occupational therapy educators can utilize this video in their group theory curriculum to allow students to identify, analyze and understand functional, maintenance, and self-serving member roles that can be observed during group therapy.

Keiona Ellison

Advisor(s): Vikram Pagpatan

Analysis of Burnout Experienced by Occupational Therapists Employed within a Physical Disability Setting

The purpose of this pilot study was to analyze the relationship between staff support and burnout experienced by occupational therapists (OTs) working in physical disability settings. Burnout syndrome is defined as a constellation of symptoms that occurs without any prior history of psychological or psychiatric disorders¹. A longitudinal cohort study was performed in 2002 discussed how changes in healthcare facilities impacted therapists' feelings of job satisfaction and methods used to cope². Another cross-sectional survey was conducted on psychosocial factors that influence burnout amongst OT professionals³. OTs often work in settings with high clinical demands and minimal institutional support, and yet limited research exists that provides data correlating these factors with burnout. When conducting this study, specific inclusion criteria was utilized to select candidates, such as 1-10 years experience working in a physical disability setting and being an alumnus of SUNY Downstate Medical Center's OT program. The analysis revealed that 72% of all respondents reported having greater than 5 types of staff support available within their facility. 76% of these participants experienced burnout, and 52% , attributed this burnout to lack of adequate staff support. This pilot study was unable to provide statistically significant correlations between burnout and the amount of staff support received within a physical disability setting. This study did, however, show that therapists believe that multiple factors may contribute to their symptoms of burnout.

Marissa Narman

Advisor(s): Daurn Tribble

Establishing an Implicit Bias Component within the SUNY Downstate Cultural Competence Education Module

The OT Program at SUNY Downstate is establishing a cultural competence module intended to educate students on the importance of cultural competence. This project's purpose is to fill the gap within the module specifically addressing implicit bias. Twelve individuals were chosen at random and interviewed about personal client factors and activities of daily living as described in The Occupational Therapy Practice Framework 3rd Edition. First year OT students were then asked to complete an online module addressing implicit bias which consisted of a pre and posttest measuring levels of implicit bias (Implicit Association Test [IAT] 'Gender-Career') and three matching quizzes that were based on the responses of the interviewees. A class discussion was held and mindfulness was introduced to increase awareness of implicit bias. Based on a 2x3 contingency table chi square analysis of pre and posttest IAT scores, it was determined that there was no statistically significant correlation between administration of the proposed implicit bias cultural competence module and IAT pre and post-test scores. Qualitative feedback indicated the perceived usefulness of the class discussion and module. Further research is needed to determine the effects of the cultural competence module on implicit bias, as the sample size was small (pre-test n=23; post-test n=13).

Farnaz Anwar

Advisor(s): Pamela Lawton

Systematic Review of Short Thumb Spica Orthoses to Determine Best Practice Design for Individuals with Dual Diagnoses of Systemic Lupus Erythematosus and Carpometacarpal Osteoarthritis

Systemic lupus erythematosus (SLE), the most common type of lupus, is a chronic autoimmune disease affecting various parts of the body including skin, organs, and joints. Osteoarthritis (OA) is a degenerative joint disease that affects the cartilage of joints, particularly the hip, knee, and hand. Painful, swollen joints, particularly in the CMC joints of the hand, are a common symptom of both SLE and OA, which can result in a disruption of daily function. Objective: This systematic review explored articles published between 2008-2018 that compare various thumb spica orthotic designs in order to explore best practice design for those with dual diagnoses of SLE and thumb CMC OA in terms of pain reduction and increased hand function. Method: We analyzed 12 research articles that considered at least one orthotic design for individuals with CMC OA of the thumb, in terms of pain reduction and hand function. Articles were evaluated based on level of evidence and PEDro score. Results: Orthoses that are more rigid and restrictive tend to be more effective at reducing pain than their softer, less restrictive counterparts. Rigid orthoses tend to be less effective in the areas of hand function and patient preference; patients typically preferred less restrictive orthoses due to the greater amount of mobility, hand function, and comfort. Conclusion: Short thumb spica orthoses are effective in decreasing pain and improving hand function in individuals with CMC OA of the thumb; however, there is no evidence to support the effectiveness of different orthotic designs in individuals with dual-diagnoses of SLE and CMC OA. Due to the prevalence of CMC OA of the thumb in women with SLE, it is imperative to explore the multiple types of thumb spica orthoses that may benefit this population.

Jordi Chanovas

Advisor(s): Stephen L. Macknik

Ultra-large field-of-view two-photon imaging of primary visual cortex foveal region in non-human primates

In the past decade, novel microscopy methods and genetically-encoded sensors have been revolutionary to understanding neural circuits in rodents and invertebrates. Using these methods in non-human primates (NHPs) has proven difficult due to technical hurdles that are being overcome. NHP advances have brought the technology closer to use in humans, such as with high-quality cortical imaging windows that are both larger than an entire mouse brain—allowing unprecedented ultra-large-scale circuit analysis that remain patent for years (periods longer than a mouse's entire lifespan), allowing for long-term all-optical interrogation of neural circuits over a time period relevant to human cognitive development. Here we show a new method for multicolor labeling of neurons in macaque area V1. We present a novel procedure for precise, deep brain injections using neurosurgical navigation without live imaging sources. We transfected cells using cortical and thalamic convection enhanced delivery (CED). The target for injections was pyramidal neurons in the primary visual cortex (V1), as well as in the lateral geniculate nucleus (LGN). Adeno-associated viruses (AAVs) encoding for 5 different fluorophores with nonoverlapping emission spectra were injected along with a GCaMP6/jGCaMP7 transgene. We transfected LGN neurons with the ChR2 optogene tagged with YFP. To image the cells, a Bruker Ultima IV two-photon imaging microscope with a MaiTai DeepSee Ti:Sash laser illuminated the cortex with a wavelength of 730 nm. To capture an entire 2-cm diameter imaging window, we tiled the window with 49 (7 x 7) 500 Åµm deep z-stack scans of 2.8mm on a side. We stitched the z-stacks into a single image to visualize the whole imaging window and performed a cell count with a total cell count of ~200,000 cells. Spectral analysis reveals that about 20% of the cells expressed a single-colored transgene, whereas about 80% had 2 or more multi-colored transgenes stochastically arrayed.

Alexander Choi

Advisor(s): Ivan Hernandez

Evidence for decreased nucleolar PARP-1 as an early marker of cognitive impairment

Poly(ADP-ribose) polymerase-1 (PARP-1) is a nuclear protein that regulates gene expression through poly(ADP)-ribosylation, resulting in the loosening of chromatin structure. PARP-1 enzymatic activity has been shown to be necessary for the expression of several genes required for memory formation and consolidation. Previously, we showed that nucleolar PARP-1 is significantly decreased in hippocampal pyramidal cells in Alzheimer's disease (AD). We proposed that the displacement of PARP-1 from the nucleolus results in downregulation of new rRNA expression and ribosome biogenesis, leading to cognitive impairment. To further investigate the relationship between nucleolar PARP-1 and memory impairment, we examined PARP-1 expression in the hippocampus of individuals with mild cognitive impairment (MCI) compared to control and AD cases. We used immunohistochemical techniques to examine the nuclear distribution of PARP-1 in the Cornu Ammonis (CA region) of the hippocampus. PARP-1 positive cells were then scored for the presence or absence of PARP-1 in the nucleolus. We found a significant decrease of PARP-1 staining in the nucleolar compartment of hippocampal pyramidal cells in MCI compared with Control and AD. When the four CA (CA1-4) regions were considered separately, only the CA1 region showed significant differences in nucleolar PARP-1 with Control > AD > MCI cases. In addition, measurements of the diameter of nucleolar PARP-1 positive cells in CA4 shows Control > MCI. Thus, MCI cases have lower percentage of PARP-1 nucleolar positive cells and smaller nucleolar diameter in CA1 and CA4 respectively, compared to Control and AD. Our data suggests that disruption of nucleolar form and function is an early and important step in the progression of cognitive impairment.

Yang Liu

Advisor(s): Lina Hu

Histologic features of a rare disease, sialodochitis fibrinosa and its differentials

Kussmaul reported first case of sialodochitis fibrinosa in 1879, also known as Kussmaul Disease. The characteristic features of the disease are recurrent major salivary gland swelling, eosinophil-rich mucus plugs, and intense periductal eosinophilic infiltrate with peripheral blood eosinophilia. The patients often have atopic disease such as asthma, eczema, or seasonal allergy. Although over a century passed, due to lack consistent diagnostic terminology and uniform diagnostic criteria, there are only limited cases reported in English literature. A recent review recommended to use "eosinophilic sialodochitis" as diagnostic terminology to replace "allergic parotitis", 'sialodochitis fibrinosa' and many other terminologies that may have been used in literature to designate the same condition such as chronic sialodochitis with eosinophilia, sialodochitis with eosinophilic inflammation, idiopathic bilateral salivary megacanal, idiopathic eosinophilic parotitis and Kausmal disease. In view of these heterogeneous names, likely reflect that the condition may be underrecognized. Due to rarity of the disease and surgical removal of gland is not primary choice of treatment modality, detailed pathologic studies are sparse. We happen to receive a specimen of right submandibular gland resection in a patient meets newly proposed diagnostic criteria for eosinophilic sialodochitis and are able to have detailed histologic picture of the condition. This case is presented as below.

Donghai Wang

Advisor(s): Raavi Gupta

KRAS Mutation, But Not Mismatch Repair Deficiency, Occurs with Increased Frequency in African American Patients with Colorectal Cancer and Predicts Poor Disease-Free Survival

The incidence and mortality of colorectal cancer (CRC) are higher in African American (AA) patients than white patients. Although socioeconomic factors are involved in this racial disparity, biological differences in CRC in different racial groups remain unelucidated. Deficient Mismatch Repair (dMMR) function has been linked to a better prognosis in CRC. KRAS mutation, another biomarker, predicts a poor response to EGFR inhibitor therapy. Here we compared profiles of KRAS mutation and MMR status in AA and white patients, and evaluated their prognostic value in CRC. All CRC cases tested for MMR (n=75) or KRAS mutation (n=110) from 2009 to 2017 at our institution were included in this study. Clinicopathologic variables were recorded for these cases. Chi-square test was used to analyze MMR status and KRAS mutations in different racial groups. Univariate survival analysis was performed with Kaplan-Meier method. Multivariate Cox regression was used to predict hazard ratio (HR) of MMR status and KRAS mutations. Due to limited size of white patient group in our study, we also utilized published data of white patients. There is no significant difference in MMR status between AA and white patients. dMMR is associated with better disease-free survival (DFS) in AA patients with CRC by univariate analysis (p=0.05). However, after adjusting for other factors by multivariate analysis, DFS in AA was not affected. Frequency of KRAS mutation was higher in AA than white patients (57% vs. 21%, p<0.001). Amongst subtypes of KRAS tested, codon 12 mutation was more frequent in AA (85% vs. 69%, p=0.02). KRAS mutation is a significant predictor of poor DFS in both AA (HR=4.67, p<0.001) and other racial groups (HR=4.18, p=0.001). KRAS mutation is strongly associated with poor DFS in CRC in all racial groups. Since frequency of KRAS mutations is higher in AA than white patients, it most likely contributes to their increased mortality.

Khadijah Al-Dahwah

Advisor(s): Renee Bargman

A case of a child with coexisting growth hormone deficiency and hypophosphatasia: a therapeutic dilemma

Introduction: While growth hormone deficient-short stature is not an uncommon childhood-disorder, hypophosphatasia (HPP) is a very rare inborn-error-of-metabolism. HPP is characterized by abnormal mineralization of bone and dental tissues, caused by loss-of-function mutation(s) in the gene that encodes the tissue-nonspecific isozyme of alkaline phosphatase. Childhood HPP is widely variable clinically ranging from isolated premature shedding of deciduous teeth to physical and radiographic evidence of low bone mass, rickets and musculoskeletal manifestations. Enzyme replacement therapy (ERT) has been proven very effective in the treatment of patients with perinatal and infantile forms of HPP.

Case report: A twelve-year-old, male presented at the age of nine years with short stature. Growth hormone (GH) stimulation test was performed with the highest peak of 3 ng/ml, consistent with GH deficiency. Additionally, he was found to have consistently low serum alkaline phosphatase levels, and high serum vitamin B6. Plain x-rays of long bones showed undermineralization; however, he had no past history of rickets, non-traumatic bone fractures, or dental problems. Past history was significant for well controlled celiac disease and traumatic fracture of the right small middle phalanx after a high-impact sports injury. Family history is significant for asymptomatic low serum level of ALP and high serum level of vitamin B6 in his mother. He was started on growth hormone replacement with improvement in growth velocity and increased serum levels of ALP and vitamin B6.

Conclusion: After review of current literature, HPP in a patient with GH deficiency has not been reported before. Treatment with GH replacement in a patient with co-existing bone mineralization defect raises the concern of potential orthopedic side effects. It is unclear whether ERT should be considered in this case given that, currently, he is growing at a normal percentile and does not exhibit any symptoms of HP

Sumeet Arora

Advisor(s): Vivian Chin

Diabetes distress is associated with diabetes control in minority adolescents

Diabetes Distress (DD) describes emotional stress and difficulties coping with the daily burden of diabetes due to frequent blood sugar monitoring, administering insulin, pump use and carbohydrate counting. We aimed to determine the risk of DD in adolescents with diabetes (type 1 and 2) in our population and determine its association with glycated hemoglobin (A1C). We screened for DD in patients, 11-21 years old, with diabetes for more than 1 year, requiring insulin. A validated screening tool for DD, PAID-T[®] for ages >12 years or PAID-C[®] for ages 11-12 years was given to patients at their regularly scheduled endocrinology follow-up. Patients with positive scores of ≥ 44 on PAID-T or ≥ 44.6 on PAID-C were referred to mental health specialists for counseling. A1C was measured every 3 months. The groups were divided into positive distress (PD) and negative distress (ND). Statistical analysis included t-tests, Spearman correlation and linear regression modeling. A total of 34 patients were enrolled. Fifty percent of the group had DD. Baseline characteristics were similar between the two groups (age, ethnicity, diabetes type, pump vs MDI use, A1C). The mean (SD) DD score was 58.5 (9.37) in PD vs 27.3 (9.7) in ND ($p < 0.005$). Mean A1C was 11.7% (2.85) in PD vs 10.3% (2.23) in ND ($p = 0.11$). The correlation between DD and A1C was statistically significant ($r = 0.36$, $p = 0.03$) which was even more significant after eliminating outliers ($r = 0.52$, $p = 0.002$). Linear regression analysis to predict A1C using DD score was significant (beta coefficient = 0.05). We found 50% of our group of minority adolescents with insulin dependent diabetes had DD. A significant positive correlation was found between DD score and A1C. Routine screening for DD with validated screening tools and early referral for counseling could potentially improve glycemic control of those having significant distress.

Morgan Drucker

Advisor(s): Yaoping Zhang

The Effect of Hydroxyurea on Hemoglobin A2 (HbA2) Concentration in Children with Sickle Cell Disease

Background: Sickle cell disease is due to a single mutation in the beta-globin gene that results in the production of sickle hemoglobin (HbS). In settings of low oxygen tension, HbS polymerizes, causing a change in the red blood cell (RBC) shape known as “sickling.” Sickling of RBCs is a major contributor to the sequelae of this disease, including chronic hemolytic anemia, vaso-occlusive crises, vasculopathy, and damage to organs. In 2017, Hydroxyurea (HU) received approval from the FDA to treat sickle cell disease (HbSS) in the pediatric population. Hydroxyurea increases the concentration of fetal hemoglobin (HbF), which inhibits HbS polymerization. Hemoglobin A2 (HbA2) also inhibits the polymerization of deoxy-HbS and, unlike HbF, and is present in all erythrocytes.

Objectives: To compare HbA2 levels in pediatric patients with HbSS and HbS/beta0thalassemia pre- and post-HU therapy, and to determine whether elevated HbA2 is correlated with changes in other hematologic parameters.

Methods: A retrospective cohort study of 46 children aged 9 months to 21 years with HbSS or HbS/beta0 thalassemia who were on HU for more than 6 months. Data were collected from UHB and KCHC. We used paired t-test to analyze HbA2 level concentration pre-HU therapy and post-HU therapy when the therapeutic goal had been achieved (defined as HbF \geq 15% with ANC 1.5-4K/ul and/or ARC 100-200K/ul). Spearman correlation coefficients were used to determine the associations of HbA2 levels with hematologic parameters of hemoglobin (Hb), MCV, WBC, ANC, and HbF.

Results: There was a significant increase in HbA2 levels after treatment with HU ($p=0.006$). However, this elevated HbA2 level did not significantly correlate with changes in the other hematologic parameters examined.

Conclusions: Hydroxyurea increases HbA2 in addition to HbF in children with sickle cell disease. Elevation of HbA2 provides another explanation as to how hydroxyurea attenuates the complications seen in sickle cell disease.

Dee-Anne Cush

Advisor(s): Virginia Anderson

Placental Abnormalities Affect Fetal Development Dee-Anne Cush, CUNY John Jay College; Hongjie Li, MD, Ph.D.; Virginia M. Anderson, M.D.,

Introduction Fetal loss causes complicated grief. Understanding the cause for miscarriage helps families, and provides guidance for future pregnancies. Placental insufficiency leads to a failed pregnancy often complicated by rupture of the fetal membrane or placental abruption. Dysmorphic features of the fetus and chorionic villi reflect a genetic problem as the root cause for the perinatal loss. Retroplacental hemorrhage occurs in abruption. Normal villi occur with abruption, funisitis, or chorioamnionitis. **Objectives** Fetal dysmorphic features and placental abnormalities occur in pregnancy loss. An under-perfused placenta with abnormal chorionic villi occurs in genetic disease. The root cause of perinatal loss requires careful dissection of the fetus, placenta and medical record review.

Methods Fetal weight, placental weight, gross malformations and placental abnormalities were analyzed in 34 fetopsies. Large hydropic dysmorphic avascular villi, trophoblastic inclusion cysts, and caps within villi were associated with malformations. **Results** 34 fetopsies, 23 had large hydropic dysmorphic avascular villi, 10 had trophoblastic inclusion cysts and 3 had caps. Fetal findings included 15 with gross malformations of the midface, hands and feet. Ten fetuses had normal placentas; 7 with normal midface, hands or feet; 3 fetuses had facial abnormalities. Brain growth reflects facial development. Five nuchal blebs were seen with dysmorphic villi. 70% of the fetuses were either too small or too large suggests placental based fetal growth failure in small for date cases, or fetal hydrops in large fetuses.

Conclusion Abnormalities identified early in pregnancy relayed to the parents influences clinical decision making. Nuchal bleb is associated with hydropic dysmorphic villi. Facial abnormalities reflect brain development. Fetal expected weights vary drastically from normal weights in abnormal fetuses.

Prabhavathi Gummalla

Advisor(s): Sule Doymaz

Intravenous Methylprednisolone vs Intravenous Methylprednisolone combined with inhaled Budesonide in Acute Severe Asthma in Children

Rationale for the study: Previous studies suggested that budesonide nebulization along with oral Prednisolone was effective in reducing admission rates in acute wheezing episodes in preschool children. Hence, we wanted to study for similar effects of use of inhaled budesonide in children admitted to pediatric intensive care. Hypothesis: Adding inhaled Budesonide to systemic steroids will lead to a reduction in the duration of continuous β -2 inhalation therapy, need for mechanical ventilation, pediatric intensive care (PICU) hours, and overall length of stay in children aged 1-18 yrs admitted with acute severe asthma. Study design: In a randomized controlled trial, we enrolled children aged 1-18 years who were admitted to PICU for acute severe asthma. Children with cardiovascular disease, neurological disease, neoplastic disease, renal disease or pregnancy were excluded from the study. Patients were randomized for treatment allocation into two groups using block randomization of 2. Group-A received only intravenous Methylprednisolone 2mg/kg/day (IV MP) and Group-B received Budesonide nebulization 0.5 mg/kg every 12 hrs as well as IV MP. Results: We enrolled 25 patients in each group. There was no statistical difference between the two groups in relation to prior use of inhaled corticosteroids, maximum oxygen requirement and need for mechanical ventilation. Number of past hospitalizations was higher in Group A (mean 4.1 vs 1.92, P-0.004). The mean duration of hours of continuous albuterol treatment in PICU (42.28 vs 33.56 P-0.24), length in hours of PICU stay (58 vs 43.6, P- 0.07) and total length of stay in hours (82 vs 71.2, P-0.06) was lower in Group B but was not statistically different. Conclusions: In our study, addition of inhaled steroids to systemic steroids in acute severe asthma showed a trend towards reduction in the mean duration of hospital and PICU stay, but not statistically different. Larger studies are recommended.

Amy Johnson

Advisor(s): Harris Huberman

The Effectiveness and Challenges of the ASD Screening Program in the SUNY Downstate Pediatrics Clinic

Rationale: According to the CDC, 1 in 59 children are identified with Autism Spectrum Disorder (ASD) by 8 years of age. Given the high prevalence, the AAP recommends ASD screening at 18 and 24 months for early detection and intervention. The Modified Checklist for Autism in Toddlers (MCHAT) is a validated screening tool distributed at primary care visits in Downstate's pediatrics clinic. The goal of this QI project is to evaluate the effectiveness and challenges of the screening program in place. Methods: 342 children were screened with the MCHAT between 7/1/16-6/30/17. Children with positive MCHATs are referred for further evaluation. Phone calls are made to evaluation sites to monitor if children received an evaluation, an ASD diagnosis and/or services. Results: 24 of the 342 children (7%) screened positive on the MCHAT. Of the 24 positives, 4 had already received a diagnosis of ASD. Of the 20 remaining positive MCHATs (de novo identification of possible ASD), 18 were referred, 1 was asked to follow up for a repeat MCHAT and did not return, and 1 was not referred due to history of prior evaluation for delays (no ASD evaluation was completed). Of the 18 referred, 7 (39%) were evaluated for ASD. Challenges impeding ASD evaluation included difficulties communicating between referring and evaluation sites regarding the type of evaluation needed (4), delayed follow up by parent and child "aged out" (1), no show to intake appointment (1), no show to evaluation appointment (3), parent's denial of concerns (2), administrative delays (1), and unable to contact parent for follow up (1). Of the 7 evaluated for ASD, 2 were diagnosed. Discussion: These preliminary results outline the value of screening for ASD and the significant challenges that lie between a child screening positive and receiving a formal ASD evaluation. Future directions involve using the results to implement improvements to the program, and long-term follow up for children who screened positive.

Ernesto Mejia

Advisor(s): Meseret Tena

Benign or Pathologic? Implementation of a Modified AUC criteria as a New Cost-Effective model of managing Pediatric murmurs in General Pediatric Practice. A Quality Improvement Project.

Introduction: In Pediatrics, up to 50% of children have an innocent heart murmur during childhood, but only 1% of newborns have a structural heart defect. This Quality Improvement project aimed to improve identification of innocent murmurs and implement our Modified Appropriate Use Criteria at SUNY Downstate Medical Center Pediatric Resident Continuity Clinic, and therefore decrease the amount of new referrals for innocent murmurs to the Cardiology Department.

Methods: A retrospective chart review was done of all Cardiology referrals from 2014 - 2017 in patients aged 0 - 24 months with an isolated finding of a new onset murmur. As an intervention, pediatric residents and attendings from our general pediatrics continuity clinic attended an educational session reviewing murmurs, cardiac exam, and our modified appropriate use criteria for referral. The data 6 months prior to the intervention was compared to 6 months after, to identify improvement in identification and referral rates, and data was analyzed for statistical and clinical significance.

Results: From 2014 - 2017, there were 57 referrals that met criteria, and 95% (54/57) were benign murmurs, as only 3 patients had a pathologic murmur. 6 months pre-intervention referrals were 100% (15/15) benign and 6 months post-intervention referrals were 86% (13/15) benign.

Conclusion: While our study did not yield statistical significance due to low power and small sample size, we believe our results to be clinically significant. Our study also reinforces that Pediatricians have a high rate of Cardiology referral for benign murmurs, though improvement can be made with continuing educational review and practice. Overall, during residency training education is needed to minimize negative effects of unnecessary Cardiology referrals in the future. This may also lead to decreased financial stress for the medical system and avoiding emotional stress for families.

Jordana Schmidt-Swartz

Advisor(s): Paul Harris

Patient Safety Concerns as a Result of Poor Documentation in the Adolescent Primary Care Setting

The prevalence and incidence of depression has increased in recent years in the United States. Over 11% of adolescents suffer from major depressive episodes in 2014. With regard to adolescents, the U.S. Preventive Services Task Force recommends screening in clinical practices that are able to provide accurate diagnosis, effective treatment, and follow-up. The Patient Health Questionnaire (PHQ)-9 is a validated screening tool that is often used, with a sensitivity of 61% sensitivity and a specificity of 94%. As of July 1, 2019, Downstate Medical Center required the PHQ-9 be administered to all adolescents at their well child visit. A chart review was conducted of all well child visits to Downstate Medical Center Suite D of adolescents ages 12-19 from July 1, 2019 to August 1, 2019 to determine the success of PHQ-9 documentation. In the month of July, 58 visits were accessed through HealthBridge. Over two-thirds of the visits did not have a PHQ-9 value documented. Of the two-thirds, 7.7% had documented "PHQ WNL" and 7.7% had documented "PHQ neg" within the note, but a numerical number was not documented. Of the nearly 57% who did not have the PHQ-9 value documented and had no mention of it in the physician note, 12% had a history of suicide attempt and 3% had a diagnosed mental illness. This study shows that the PHQ-9 is not being documented in an overwhelming majority of adolescent well child visits in the first month of the indoctrination of its requirement.

Furthermore, it demonstrates that the PHQ-9 is not being documented in high-risk patients, such as those with previous suicide attempts and those with diagnosed mental illness. The findings of this study suggest the need for a root cause analysis to look into the reason for the poor documentation to ensure adolescents with depression are being identified through screening and provided with the proper resources for treatment and follow-up

Vivek Shukla

Advisor(s): Sukhvinder Ranu

Empiric Antibiotic Therapy in Late Onset Sepsis in Preterm Infants- An Inner-City Hospital Experience

Background: Late onset neonatal sepsis (LOS) has been associated with increased mortality & morbidities in preterm infants. Prevalence & distribution of pathogens causing sepsis vary with time & location of neonatal intensive care unit. Given the difficulty of diagnosis & the potential consequences of missed diagnosis, empiric antibiotics are most frequently used in preterm infants.

Objective: To determine the incidence of late onset sepsis in preterm infants, distribution of pathogens & susceptibility pattern to help us in identification of appropriate empiric antibiotic therapy.

Methods: All preterm infants (< 34 weeks gestation age) admitted from January 2013 to December 2018 at Kings County Hospital, who were evaluated for LOS & received empiric antibiotics were eligible for the study. Retrospective chart review of the patient medical records was done & de-identified data was collected on pre-specified study questionnaire.

Results: Blood culture confirmed LOS was seen in 45(29.4%) of the total 153 neonates with clinically suspected LOS. LOS incidence was 8.6%. The major organisms causing LOS in order of frequency were coagulase negative staphylococcus 17(37.8%), escherichia coli 6(13.3%), klebsiella pneumoniae 6(13.3%), staphylococcus aureus 4(8.9%), candida 4(8.9%), pseudomonas 2(4.4%), & streptococcus viridans 2(4.4%). The gram-positive organisms displayed a high resistance to most penicillins, cephalosporins, oxacillin & fluoroquinolones but were sensitive to vancomycin & rifampin. High resistance was noted with ampicillin & gentamicin amongst most gram negative organisms, whereas amikacin, most cephalosporins, fluoroquinolones & carbapenems were effective in most cases.

Conclusion: Based on our findings, Vancomycin & Amikacin can be an appropriate relatively narrow spectrum empiric antibiotic regimen for preterm infants with suspected late onset sepsis. But ongoing surveillance for antibiotic susceptibility will help to safeguard proper empirical therapy.

Loretta Cinquepalmi

Advisor(s): Sule Doymaz

The Effect of an Educational Intervention Teaching the Systematic Approach to the Critically Ill or Injured Child on Pediatric Residents' Knowledge Retention.

Objective: We aimed to determine the effect of an educational intervention teaching the systematic approach algorithm from the American Heart Association (AHA) Pediatric Advanced Life Support (PALS) on pediatric residents' knowledge retention of the systematic approach steps over time.

Methods and Materials: We recruited residents from our pediatric residency program and randomized into two groups, intervention group and control group. Pre-intervention survey delineating resident demographics, experience and confidence level were collected at the beginning of the study. Along with the survey, residents also completed a baseline knowledge assessment survey adapted from the AHA PALS systematic approach algorithm with nineteen fill-in-the-blank questions. The intervention group completed the post-intervention knowledge assessment and survey 1 month from the educational session. The control group completed the knowledge assessment and survey 1 month from their initial knowledge assessment. We used two way ANOVA for statistical analysis.

Results: 70 residents were enrolled in the study (31 intervention group, 39 no intervention). Comparing the difference in score before and after intervention among the three PGY levels, the assessment score significantly improved after intervention ($p = 0.034$). PGY level was not associated with difference in scores between pre and post intervention. ($p = 0.82$)

Conclusion: Receiving educational interventions on the systematic approach algorithm may be beneficial to increase pediatric residents' knowledge in assessing critically ill patients and identifying the need to resuscitate.

Sule Doymaz

Advisor(s): Sule Doymaz

Comparison of Different Types of Intravenous Corticosteroids in the Treatment of Acute Severe Pediatric Asthma

Objective: Various intravenous steroids are available for acute severe asthma treatment, however the choice of intravenous (IV) steroids varies broadly and depends on institution, country, or physician preferences. In this study, we compared the efficacy of IV dexamethasone, methylprednisolone, and hydrocortisone in acute severe pediatric asthma during the PICU admission.

Methods: This was a prospective randomized clinical trial. Patients aged 1-21 years were included and randomized into 3 groups. Patients in Group A received iv Methylprednisolone 2mg/kg/day, Group B received IV Hydrocortisone, 5 mg/kg/day and Group C received IV Dexamethasone 0.6mg/kg/day every 6 hours. All patients received continuous beta-2 agonist treatment and ipratropium bromide nebulization every 6 hours Duration of continuous beta-2 agonist treatment, maximum dose of beta-2 agonist, need for mechanical ventilation, PICU and hospital length of stay (PLOS/HLOS) were collected.

Kruskal-Wallis test by ranks was used to compare the three groups of treatment.

Results: 48 pediatric patients were enrolled in the study. Mean age was 7 (SD 4). 2 patients (4%) were newly diagnosed asthma, 25 (51%) were intermittent, 9 (18%) mild persistent, 11 (22%) moderate persistent and 2 (4%) severe persistent asthma.

Comparing the three treatment groups. Median durations for beta-2-agonist treatment was 24 (IQR 17-31), 36 (IQR 18-42), 30 (IQR 16.5-43.5) days respectively (p-value 0.6). Median PICU stay was 24.5 (IQR18.75-36), 44 (IQR 34-62), 36 (IQR 33-48.5) days respectively (p-value 0.019). Median total hospital stay was 51.5 (37.5-95.5), 75 (53-98), 72.5 (51.5-102) days respectively (p-value 0.26).

Conclusion: PLOS was significantly less for iv Methylprednisolone group compared to iv Hydrocortisone group. All three iv steroids were similarly effective in the treatment.

Sylvia Horne

Advisor(s): Stacy Blain

Use of Nanoparticles to Deliver ALT as a Novel Mechanism to Enhance Beta-Galactosidase Activity and Decrease Proliferation in Triple Negative Breast Cancer Cells Lacking Retinoblastoma Protein

In vitro and in vivo studies have shown that an alternatively spliced variant of Breast Tumor-Related Kinase (ALT) is able to inhibit phosphorylation of the Y88 residue on p27Kip1. This hinders p27's ability to activate cyclin D-cdk4 and cyclin E-cdk2, which play key roles in cell cycle progression. It has been demonstrated that ALT can be packaged into lipid nanoparticles (NP-ALT) and delivered to cells in vitro, where it's been shown to decrease proliferation in various breast cancer cell lines.

Palbociclib (PD) is an FDA-approved small-molecule inhibitor of cdk4 and is the standard of care treatment for metastatic ER+, HER2- breast cancer. Patients with triple-negative breast cancer (TNBC), defined as ER-, PR-, and HER2-, respond poorly to current therapies and often develop resistance to agents including PD. One hypothesis is that growth in these cells is driven predominantly by cdk2 rather than cdk4. TNBC cells that are retinoblastoma (Rb) negative can be particularly impervious to treatment, warranting the need to develop more targeted approaches. The Rb-, TNBC cell lines, BT549 and MDA-MB-468, were treated with PD, NP-ALT, or a combination of both. Rates of proliferation were significantly decreased in TNBC cells treated with NP-ALT alone or combined with PD compared to vehicle-treated cells. Additionally, cdk2 activity was inhibited as measured by immunoblot analysis using cdk2T160 antibodies. Cell survival was not affected by 48 and 72 hours of treatment, while Beta-galactosidase (β -gal) levels were significantly enhanced. Our results demonstrate that NP-ALT is effective at reducing proliferation and increasing levels of senescence in these PD-resistant cells, and induction of β -gal. activity, a well-established marker of senescence, suggests that ALT treatment causes a permanent cell exit. These data suggest that ALT may provide a novel mechanism to target TNBCs and may expand the repertoire of anti-cancer drugs for treating these patients.

Ahmed Badran

Advisor(s): Vivian Chin

Two cases of hypoparathyroidism due to activating calcium sensing receptor mutation

Introduction: The extracellular calcium-sensing receptor (CaSR) located throughout the body plays an important role in calcium (Ca²⁺) metabolism through regulation of parathyroid hormone (PTH) secretion in the parathyroid gland and Ca²⁺ reabsorption in the kidney. It is located on chromosome 3q.

Activating mutations of CaSR can lead to hypoparathyroidism. Constitutively activated CaSR receptors lower PTH release leading to hypocalcemia and hyperphosphatemia. Hypocalcemic symptoms include paresthesia, muscle spasms, cramps, tetany and even seizures in severe cases.

Case 1: A 14 year old male presented with hypocalcemia and hyperphosphatemia on routine blood work. Physical examination showed positive Chvostek sign. Lab results revealed low Ca²⁺ (8.1 mg/dl), high phosphorus (6 mg/dl), inappropriately normal PTH (26.8 pg/ml) and Ca/Cr ratio 0.19. He is stable on Calcium carbonate and Calcitriol. FISH was negative for 22q11 deletion, and autoimmune polyglandular syndrome 1 was ruled out. Gene testing showed heterozygous CaSR gene mutation I822T, variant of uncertain significance. Given that his father with primary hypoparathyroidism also tested positive for the same mutation, this is likely a pathogenic mutation.

Case 2: A 1 day old 32 week preterm female found during NICU admission to have hypocalcemia 6.1 mg/dl, inappropriately normal PTH (18.5 pg/dl), high phosphorus (8.8 mg/dl) and normal renal function. There were no symptoms of hypocalcemia and her examination was unrevealing. FISH was negative. She is maintained on ergocalciferol, calcitriol and sevelamer. Genetic testing showed a variant in CaSR I832T.

Conclusion: Hypoparathyroidism due to activating CaSR gene mutation should be considered in patients who present with hypoparathyroidism.

Abin Sajan

Advisor(s): Robert DiRaimo

Surgical Anatomy of the Carotid: Stenting vs Endarterectomy vs Transcarotid Artery Revascularization

Objectives: To prevent stroke in at-risk patients, the surgeon may choose to treat the accumulation of atheromatous plaque in the carotid arteries from an open or endovascular approach. The height of the carotid bifurcation (HCB) is classically defined in relation to the cervical vertebral levels and it is an important operative tool that influences the decision between carotid endarterectomy (CEA) vs stenting vs transcarotid artery revascularization (TCAR). The current anatomical definitions are of limited practicality during open operative procedures because the cervical spine is not readily accessible in the surgical field. Thus, we devised a novel cadaveric approach to evaluate the best carotid surgical approach.

Methods: Neck dissections were performed on ten carotid regions and the following structures studied: common carotid bifurcation (CCB), superior thyroid artery (STA), facial vein (FV), CN IX, CN XII, and superior laryngeal nerve (SLN). The distance measures from the medial border of the clavicle (MBC) to the above structures were divided by the MBC to mastoid process distance to generate individual ratios and then compared between the right vs. left.

Results: The ratio of the distance from MBC to CCB, MBC to STA origin, and the MBC to FV origin ratio was significantly greater on the left than the right side with 0.74 vs 0.64 (p = .008), 0.70 vs 0.64 (p = .02), and 0.69 vs 0.61 (p = .004), respectively. The MBC to CN XII and STA origin to CN XII was also significantly greater on the left side than the right with 0.77 vs 0.66 (p = .003) and 0.08 vs. 0.05 (p = .02), respectively.

Conclusions: Our results suggest that the superior left CCB is a more difficult dissection and stenting or TCAR should be considered on the left given the longer common carotid. Additionally, surgeons should approach the left CCB cautiously and consider stenting or TCAR for the left if a high CCB is initially encountered on the right side.

Abin Sajan

Advisor(s): James Walsh

Geniculate Artery Embolization: A new Geniculate Artery Classification System

Purpose: Geniculate Artery Embolization has demonstrated efficacy in alleviating knee pain associated with osteoarthritis. A thorough understanding of the classical anatomy and variations in branch patterns are essential in order to optimize target therapeutic selective embolization. We plan to anatomically review the geniculate arteries (GA) as there is a lack of detailed anatomy in the literature most notably at the cadaveric level.

Materials and methods: 102 cadaveric limbs were dissected for gross anatomical appearance and the presence of the descending genicular artery off the femoral artery and all 5 main branches off the popliteal artery including the superior lateral genicular artery, superior medial genicular artery, middle genicular artery, inferior lateral genicular artery and inferior medial genicular artery. The location of origin, diameter of vessels and variation in patterns of the GA were reviewed.

Results: 96 limbs were adequately preserved and reviewed. There was minimal variation in the descending genicular artery. 7 variations were observed with 3 branching patterns previously not described in the literature. Based on these observations we propose a new classification system for the branching patterns of the GA.

Conclusion: During Geniculate Artery Embolization, knowledge of the most common vascular anatomy and variations in branching is essential for safe embolization, good clinical practice, and optimal outcomes. After a detailed review of the cadaveric anatomy, we propose a new classification system for the branching patterns GA.

Tashzna Jones

Advisor(s): Robert Diraimo

The Effect of Implementing an Integrated Medical School Curriculum on Student Surgery Shelf Performance

Introduction: Recent trends in curriculum development have seen many medical schools shift to a systems-based curriculum. Although many studies have evaluated various facets of these curriculum changes, few have specifically looked at the effects on performance in clinical rotations. The surgical clerkship in particular may be affected by the integration of anatomy in the pre-clinical curriculum.

Methods: Data was collected from a single medical school that recently transitioned from a traditional to a systems-based curriculum. NBME Surgery shelf raw scores and percentiles from students two years prior to and after curriculum change were analyzed. T-Test analysis was used to compare raw scores and percentiles between the two curricula.

Results: There was no significant difference in the raw scores for the traditional (M=76.88, SD=7.96) and the new (M=76.07, SD=7.56) curricula; $t(866)=1.53$, $p = 0.13$. There was a significant difference in the percentiles for the old (M=57.54, SD=27.72) and the new (M=72.62, SD=20.72) curricula; $t(846)=9.14$, $p = 4.49 \times 10^{-19}$.

Conclusion: The implementation of a systems-based curriculum improved percentile performance on the surgery NBME. The curriculum change did not significantly impact the mean scores on the exam, suggesting both curricula are comparable in preparing students. The difference in percentiles could indicate there was a change in the difficulty of the exam over the same time period. It could also be representative of a nation-wide decline in performance on the exam compared to students who were exposed to the integrated curriculum. This would explain the difference in only the percentiles. This study shows the value of education reform but also calls for more work to examine the effects of these changes on medical school education.

Jessica Chumsky

Advisor(s): Joanne Katz

Evaluation of Rater Reliability using the Neurodevelopmental Infant Screening Tool

The Neurodevelopmental Infant Screening Tool (NIST) was developed with the purpose of identifying any developmental delays in the first year of life. The modalities tested were social-emotional behavior, receptive language, expressive language, feeding, visual/fine motor-problem solving, sensory integration, extremity tone, axial alignment and function, and gross motor examination. If any deficits are found, this would allow the child to receive early intervention and to catch up to their peers. In this study, inter- and intra-rater reliability was tested using 13 healthy controls between the ages of one month and twelve months in order to determine whether this tool can be reliably applied to the health care setting. We found that students trained in using the NIST obtained similar scores with Pearson r values >0.99 when rating the same child multiple times and when compared to one another. This shows that this screening tool is reliable and can be applied to the healthcare setting without concern of variability in scores due to rater differences.

Jihoon Ha

Advisor(s): Michael Garrett

Impact of adjunct psychotherapy in adult patient with treatment-resistant Major Depressive Disorder and concurrent congenital HIV

Major Depressive Disorder (MDD) is 2-3 times more prevalent in patients suffering from co-morbid HIV compared to the general public. Despite multiple studies disclosing the vulnerability of this patient population, clear treatment guidelines are currently lacking. In this case report, we bring attention to the effectiveness of adjunct psychotherapy for MDD in patient suffering from congenital HIV.

This is a 30 year old Guianese American male patient with a psychiatric history of MDD and medical history of congenital HIV, compliant with HAART since birth, presents to SUNY Evening Training Service (SETS) to receive adjunct psychotherapy for his treatment-resistant MDD (failing more than two adequate trials of different anti-depressant medications). At the time of presentation, patient reported feeling depressed, hopeless, anhedonia, low energy, and psychomotor retardation. Due to depression, patient declined function in social and occupational settings. Patient's medication regimen at the time of presentation was Duloxetine 30mg PO BID for more than 3 months with no clinical improvement. This medication regimen remained constant throughout the duration of therapy. Patient received weekly eclectic psychotherapy. We focused on patient gaining insight into his cognitive distortions of excessive shame. We also explored where these cognitive distortions are stemming from via recognizing patterns within his life. After 6 months of psychotherapy, patient denied anhedonia, hopelessness, and psychomotor retardation; he also reported improvement in mood and energy. Patient also showed improvement in romantic relationships and occupational endeavors.

In this case, patient with treatment-resistant MDD with congenital HIV showed tremendous improvement through adjunct psychotherapy for 6 months after failing multiple anti-depressant medication trials. This case highlights importance of psychotherapy in this vulnerable patient populations.

Tia Mansouri

Advisor(s): Michael Myers

Burnout in Resident and Fellow Physicians at SUNY Downstate

Introduction: Burnout is a psychological syndrome characterized by feelings of exhaustion, detachment, and reduced personal efficacy. Physician burnout is a topic both of increasing concern and widespread effects for physicians, their families, their patients, and society. We aimed to measure burnout among a diverse group of trainees at SUNY Downstate, an academic training center in Brooklyn, New York.

Methods: The study was a cross-sectional survey in which residents/fellows were asked to complete a survey of demographic information (age, sex, PGY level, subspecialty type, average weekly duty hours) and were asked to take the Oldenburg Burnout Inventory (OLBI) a 16-item survey that covers 2 areas of burnout, exhaustion and disengagement. Average scores on OLBI were compared between male and females, those under 30 and those over 31, junior level and senior level residents/fellows, surgical and nonsurgical subspecialties, and among different self-reported duty hour quartiles.

Results: Of the 960 possible residents and fellows, 235 agreed to begin the survey (24.5%) and 203 completed the OLBI (21%). Independent t-test and one-way Analysis of Variance (ANOVA) were used to compare the mean Disengagement and Exhaustion levels between different groups. There was a significant difference between females and males in the mean levels of Exhaustion ($p=0.0009$) and Disengagement ($p=0.01$), with females scoring higher on average for both disengagement (Mean (M)=2.58, Standard Deviation (SD)=0.55) and exhaustion (M=2.81, SD=0.52) compared to male counterparts' scores for disengagement (M=2.38, SD=0.53) and exhaustion (M=2.54, SD= 0.58). There was a significant difference in the mean levels of Exhaustion for the groups based on the number of reported duty hours ($p=0.0001$). The group with duty hours <50 had significantly lower mean for the Exhaustion subscale compared to the groups reporting 51-60, 61-70 and 71+ hours. No significant differences were found between the other groups.

Rishab Gupta

Advisor(s): Scot McAfee

An interesting case of Late-onset Gambling Disorder

Gambling Disorder (GD) is characterized by a compulsion to engage in a short-term rewarding, gambling behavior that may engender persistence despite knowledge of severe adverse consequences. Past-year prevalence rate of GD is about 0.2%-0.3% in the general population. It is an emergent public health issue, but often goes undiagnosed in the clinics because of lack of awareness among clinicians and embarrassment among patients.

We present a case of Ms. B, a 55-year-old African American woman who presented to our adult psychiatry outpatient clinic for the management of depressive symptoms and gambling behavior. On assessment, we noticed prominent depressive symptoms, and intermittent suicidal ideas, along with an urge to buy scratch lottery tickets. History of gambling behavior revealed that she first started buying scratch tickets three years ago. Over next one and half years, she started spending increasing amount of money on purchasing scratch tickets. She felt intense desire to buy and scratch the tickets and would remain preoccupied with the thoughts of winning a big prize. She accumulated a huge debt due to her habit. She kept going back to the store despite losing money. She had been trying to stop her behavior as she felt guilty, but without any success. She lied to her family about her behavior due to shame and embarrassment. She also reported that she gambled to lift her sad mood. Based on DSM-5 criteria, she was diagnosed with Gambling Disorder, severe. She had poor adherence to treatment; she refused to take treatment for GD. With motivational interviewing, she felt encouraged to attend Gamblers Anonymous (GA) meetings.

Based on the existing literature and present case study, we recommend routine screening for GD as a part of the psychiatric intake evaluation in the clinics. Its early detection may prevent significant morbidity and financial loss among patients.

Arashinder Dhaliwal

Advisor(s): Michele Pato

"An update on role of virtual reality based treatments in child mental illness"

Last decade has been the age of computers. The ability to modulate our senses with the use of technology has grown tremendously. Virtual reality has been a part of our everyday life from looking at a computer screen or a TV to immersive experiences like Oculus Rift and HTC Vive. Tele-psychiatry offers the ability to reach patients in corners of the world where physical presence of a physician may not be possible, virtual reality offers the same but overcomes certain limitations tele-psychiatry might have and gives a sense of physical presence. Virtual reality is already a well-established modality for treatment in PTSD and specific phobias. Numerous trials are on the way regarding its role in treatment of anxiety disorders with promising results from initial evidence. Another area of interest and exciting new research has been the use of Virtual reality in social skills training both in autism spectrum and cognitively limited domains of patients. The potential role virtual reality might play in understanding and eventually modulating altered perceptual experiences is also being explored. The ability to alter physical environment offers an opportunity to develop newer tools and screens for improving our diagnostic accuracy and tailoring treatment to the individual needs of the patient. Traditionally psychiatry has always relied on patient and family reports, virtual reality offers an opportunity to clinically examine patients' reports by simulating virtual environments. For example, a patient report of having difficulty traveling in a subway could be followed up by a 5-minute virtual subway ride in your office. One of the initiatives that we plan on doing in our clinic is using an app-based intervention with one of the patients in our clinic and comparing it to routine therapy based on the patient report. This presentation will explore the ongoing research and far-reaching implications virtual reality may have in the field of child psychiatry.

Mohamed ElSayed

Advisor(s): Susan Whitley

Diagnosis, medical and psychosocial management of opioid use disorder: where do we stand?

Opioid use disorder is diagnosed using the DSM-5 criteria. The severity is based on the number of criteria a person fulfills out of a total of 11: 2-3 is mild, 4-5 is moderate, and 6 or more is severe. Screening tools such as the Drug Abuse Screen Test (DAST-10) or the Screening to Brief Intervention (S2BI) can be used in the clinic to determine whether further assessment is needed. Opioid use disorder has a variety of medical treatment options. Depending on the approach, an opioid detox program may be warranted for which the withdrawal process is treated by opioid or non-opioid interventions followed by maintenance therapy. These Medication Assisted Treatments (MAT) include methadone, buprenorphine and naltrexone, each having its advantages and limitations. While MAT is the main intervention, several psychosocial interventions have been identified for the treatment of opioid use disorder, with varying degrees of evidence supporting their efficacy. These include brief intervention, referral to treatment, office-based counselling, motivational interviewing, cognitive behavioral therapy, contingency management, harm reduction, mindfulness, yoga, and technology-assisted therapies (e.g. text messaging, video-conferencing and video games). Some of these measures can be delivered in primary care facilities, while others may require more intensive substance use specialized programs for implementation. In this poster, we review the updates in diagnosis, medical and psychosocial management of opioid use disorder.

Gayatri Gupta

Advisor(s): Patrick Geraghty

Airway resistance caused by sphingomyelin synthase 2 insufficiency in response to cigarette smoke

Rationale: The effects of cigarette smoke exposure on ceramide, a major sphingolipid, has been extensively studied in pulmonary diseases but its subsequent impact on sphingomyelins (SGM), the second most abundant phospholipid in mammalian plasma, remains elusive. SGM synthase (SGMS) is an enzyme responsible for the production of sphingomyelin from ceramide. Here, we examine the effect of chronic cigarette smoke exposure on SGMS activity and evaluate the impact of one isoforms of mammalian SGMS, Sgms2, deficiency on pulmonary function.

Methods: Sgms2 knockout and wild type control mice were exposed to cigarette smoke for 6 months and pulmonary function testing was performed. SGMS2-dependent signaling was investigated in these mice and in human monocyte derived macrophages (MDM) from nonsmokers and human bronchial epithelial (HBE) cells isolated from healthy nonsmokers and chronic obstructive pulmonary disease (COPD) subjects.

Results: Here, we demonstrate that chronic cigarette smoke reduces SGMS activity and SGMS2 gene expression in mouse lungs. Sgms2 deficient mice exhibited enhanced airway resistance following chronic cigarette smoke exposure, but have similar levels of emphysema compared to smoke exposed wild type mice. Sgms2^{-/-} mice had greater AKT phosphorylation and protease activity in their lungs following smoke inhalation. Similarly, we identified reduced SGMS2 expression and enhanced phosphorylation of AKT and protease production in HBE cells isolated from COPD subjects. Selective inhibition of AKT activity or overexpression of SGMS2 reduced production of several matrix metalloproteases in HBE cells and MDM cells.

Conclusions: Our study establishes that smoke-regulated Sgms2 gene expression influences airway resistance, AKT signaling and protease production. Modulating SMS activity and its downstream pathway may represent a therapeutic approach in smoke induced lung disease.

Guerrier Clerger

Advisor(s): Aaliza Burza

Dyspnea in a Patient with Sarcoidosis.

Lungs and lymph nodes are involved in more than 90% of patients with sarcoidosis with obstructive and restrictive disease pattern being the most common pulmonary manifestations. Although pulmonary hypertension, pulmonary muscle weakness and fibrotic lung are other pulmonary manifestation, however it is not common to consider pulmonary embolism (PE) among the pulmonary manifestations of sarcoidosis. We report a 64 year old male with no significant past medical history, no known risk factor who came to the emergency department for shortness of breath and cough with productive thin white sputum for two weeks leading to the new diagnosis of sarcoidosis and concomitant PE. Unprovoked thrombosis in patients with sarcoidosis has been reported by some studies. The mechanism responsible for the occurrence of venous thromboembolism is not well described and seems to be multifactorial. Hasday JD reported that the BAL fluid from patients with pulmonary sarcoidosis possesses procoagulant activity. Alveolar macrophages from patients with sarcoidosis exhibit greater tissue factor activity than do macrophages from healthy control subjects. Circulating and BAL levels of fibrin degradation products have also been found by investigators to be elevated in patients with pulmonary sarcoidosis. Thus, sarcoidosis, via inflammatory or other biochemical mechanisms, likely predisposes to PE therefore PE should be considered while evaluating a case of sarcoidosis flare.

Carl Swanson

Advisor(s): Robert Foronjy

S-Nitrosylation of Hemoglobin: A Potential Biomarker in Sepsis

Sepsis, defined as life threatening organ dysfunction caused by a dysregulated host response to an infection, causes millions of deaths globally a year. Yet despite this prevalence relatively few biomarkers and clinical scores exist to assist with diagnosis, assessing severity, monitoring treatment response, with no consensus on a gold standard. Considering the pathophysiology of sepsis, we wanted to look at S-Nitrosylation as a potential biomarker. We took blood samples from 25 patients presenting with sepsis and 25 healthy controls, as well as repeating bloodwork from the 25 subjects after resolution of sepsis. A Cayman biotin switch assay was used to detect S-Nitrosylation on a Western Blot. We see that S-Nitrosylation levels are higher in septic subjects as compared to resolved subjects and controls, indicating that S-Nitrosylation may indeed serve as a biomarker in sepsis, potentially assisting with diagnosis and monitoring response to treatment.

Jane Moon

Advisor(s): Robert Foronjy

Expression and Impact of Protein Phosphatase 2A (PP2A) B Subunit in COPD

Introduction: Protein phosphatase 2A (PP2A) is the primary serine-threonine phosphatase of eukaryotic cells and changes in its activity play a major role in the regulation of airway inflammation and protease responses. PP2A consists of a dimeric core enzyme composed of a structural A and catalytic C subunit, and a variable regulatory B subunit. While C and A subunit sequences are conservative, the regulatory B subunits are more heterogeneous and their expression in the airways are not characterized. The aim of this study was to characterize the B subunit expression profiles in epithelial cells from COPD and healthy subjects and document the subsequent changes on cigarette smoke-induced responses.

Methods: Primary human small airway epithelial (SAE) cells from healthy and COPD subjects were used to screen and characterize the B subunit expression profile. Cells were exposed to cigarette smoke extract (CSE) and B subunit genes were characterized for expression. B subunit genes were silenced to examine their effect on PP2A activity and their subsequent impact on inflammation.

Results: Gene expression profiles were characterized for all the PP2A B subunits in SAE cells from healthy and COPD subjects. Expression of PPP2R2B and PPP2R2C were decreased in COPD cells in comparison to healthy cells; while expression of PPP2R5D and PPP2R5E were increased in COPD cells. Similarly, exposure to CSE reduced PPP2R2B and increased PPP2R5D gene expression in healthy cells. Importantly, loss of PPP2R5D influenced airway PP2A activity by increasing CSE-induced IL-6, caspase-3, MAPK, and NF-kappaB activities.

Conclusions: This data supports a distinct PP2A regulatory subunit profile in COPD that acts upon the activity of PP2A, which impacts the immune and proteolytic responses in cigarette smoke mediated diseases.

Panid Borhanjoo

Advisor(s): Robert Foronjy

Immune System And Diagnosis of Sepsis: Promising New Biomarkers

Despite being one of the leading causes of morbidity and mortality within our healthcare system, Sepsis remains a diagnostic and therapeutic dilemma. One of the difficulties in the diagnosis of sepsis is that a major underlying pathophysiologic mechanism of sepsis revolves around host immune system activation and dysregulated response involving many biomarkers. Despite this overwhelming burden on healthcare and besides a few scoring systems, there is no consensus on a gold standard diagnostic biomarker. Focusing on the host immune dysregulation, we looked at various inflammatory biomarkers during sepsis. Samples of 16 subjects presenting with sepsis before and after treatment/resolution of sepsis were compared to healthy controls using a human cytokine 29-plex panel chemokine and cytokine assay. We found that Interleukin-8 (IL-8), interferon-induced protein 10 (IP-10), and monocyte chemoattractant protein 1 (MCP-1) levels were significantly elevated in the serum of sepsis patients as compared to controls indicating their potential as biomarkers in the diagnosis of sepsis. We also found that MCP-1 levels were significantly decreased in the serum after sepsis resolution. This implies the potential for MCP-1 to be useful as a biomarker in both diagnosis and monitoring response to therapeutic interventions.

Nikita Malakhov

Advisor(s): David Schreiber

Patterns of Care and Outcomes of Adjuvant Chemoradiation for Node-Positive Pancreatic Adenocarcinoma

Background: The superiority of adjuvant chemoradiation (aCRT) over adjuvant chemotherapy (aC) for resected node-positive (N1) pancreatic cancer (PC) has been debated. Both options are in the NCCN guidelines. We aimed to compare the two treatments using the National Cancer Database (NCDB).

Methods: For the years 2006-2014, patients (pts) with resected N1 PC and negative margins treated with aC or aCRT were identified in the NCDB. Radiation therapy dose was limited to 4500-5400cGy and the cohort excluded those who lived <3 months or received any neoadjuvant therapy. Multiple factors were compared between those who received aC vs aCRT. Univariable and multivariable logistic regression was performed to assess for predictors of aCRT use. The Kaplan-Meier method was used to assess overall survival (OS) and univariable and multivariable Cox regression was used to assess impact of covariables on OS.

Results: 3,609 pts met study criteria; 2,988 (82.8%) received aC and 621 (17.2%) aCRT. Median follow-up for living pts was 33.8 months (IQR 22-51). 2-year OS was 44.9% vs 42.6% for aC vs aCRT (p=0.169). On multivariable analysis, pts were less likely to receive aCRT over aC if they were treated at an academic facility (p<0.001), had more recent years of diagnosis 2009-2014 (p<0.001) and had the highest median income quartile (p=0.009). Pts treated in the South were more likely to receive aCRT (p=0.002). On multivariable OS analysis, age group ≥ 60 (p=0.021), Black race (p=0.034), and Charlson-Deyo comorbidity score ≥ 1 (p<0.05) were associated with worse OS. Treatment at an academic facility (p<0.001), highest median income quartile (p=0.010) and more recent years of diagnosis 2009-2014 (p<0.05) were associated with improved OS. The treatment variable of interest was not associated with any differences in OS.

Conclusions: aC alone following surgery for PDAC is the predominant treatment of choice among US hospitals. There was no OS benefit noted in those who were treated with aCRT.

Joshua Lavian

Advisor(s): James Walsh

Comparing Perioperative Outcomes of Uterine Fibroid Embolization and Hysterectomy: A Retrospective, Multi-center Database Study

Purpose: This study sought to identify the 30-day readmission, 15-day complication, and minimum 1-year surveillance time reintervention rates of patients undergoing uterine fibroid embolization (UFE) or hysterectomy (H) for uterine leiomyoma. **Material and methods:** Patients from the New York State's Statewide Planning and Research Cooperative System database admitted from 2009-2013 that were over 18 years old, diagnosed with uterine leiomyoma, and who underwent non-radical hysterectomy or UFE were retrospectively reviewed. 1:1 propensity match was carried out, followed by a univariate analysis comparing demographics, complications, readmissions, and reintervention rates. Multivariate binary stepwise logistic regression models identified independent predictors of outcomes.

Results: 682 patients were identified (H: n=341; UFE: n=341). No significant differences were identified between H and UFE demographics, complication (2.90% H vs 2.60% UFE, p=0.816) or readmission rates (4.40% H vs. 3.80% UFE, p=0.700). 0.3% of UFE patients had a reintervention UFE and 2.60% of UFE patients had reintervention hysterectomy. H patients had a significantly longer average length of stay (2.42 vs 1.63 days, p<0.001). For UFE, Deyo score (OR: 18.25 [95% CI: 1.496 – 222.576], p=0.023) and obesity (OR: 4.294 [95% CI: 1.228 – 15.013], p=0.022) positively predicted readmission within 30 days. Deyo score (OR: 94.571 [95% CI: 7.651 – 1168.911], p<0.001) also positively predicted complications for UFE.

Conclusion: Patients undergoing hysterectomy had significantly longer hospital stays. For UFE patients, Deyo score and obesity positively predicted readmission within 30 days, and Deyo score positively predicted complications. Our findings support the safety and efficacy of both hysterectomy and UFE for uterine leiomyoma.

Milena Rodriguez-Alvarez

Advisor(s): Lissette Delgado-Cruzata

Hypomethylation of the Dual Specificity Phosphatase (DUSP22) promoter in cell-free DNA (cf-DNA) is associated with rheumatoid arthritis, joint narrowing and neuropathic pain in Hispanic individuals.

Objective: Ethnic and racial health disparities have been observed in rheumatoid arthritis (RA), but limited studies have investigated biomarkers in minority populations in RA. DUSP22 regulates intracellular pathways that underly inflammation and pain sensitization. Dysregulation of these pathways is described in seropositive RA. Previous studies uncovered an association between DUSP22 DNA methylation changes in peripheral mononuclear cells (PMC) and erosive RA disease. We conducted a pilot study to investigate plasma cell-free DNA (cfDNA) DNA methylation in DUSP22 of Hispanic RA patients and healthy controls. We also investigate DUSP22 DNA methylation associations with RA clinical characteristics. **Methods:** DNA was isolated from plasma from 27 RA patients who satisfied the ACR criteria, and 18 healthy controls. DUSP22 DNA methylation was determined by pyrosequencing. Statistical analysis identified group differences and associations with RA clinical measures. **Results:** RA patients had lower cfDNA DUSP22 DNA methylation when compared to controls (36.47±16.17% vs. 47.05±10.28%, p=0.025). Loss of DNA methylation at a specific site in DUSP22 was correlated with increased joint narrowing (p=0.04). For seronegative RA patients, lower DUSP22 DNA methylation was significantly correlated with an increase in neuropathic pain (p=0.02) and likelihood of neuropathy (p=0.04). **Conclusion:** Our pilot study is the first to investigate DNA methylation biomarkers in Hispanic RA patients, suggesting that cfDNA hypomethylation might be an important biomarker. This hypomethylation correlates with joint space narrowing in RA, and among seronegative patients, correlates with increased neuropathic pain and likelihood of having peripheral neuropathy. Further studies are needed to compare DUSP22 DNA methylation from cfDNA to traditional methods (ie. PMC); and to explore its feasibility as a biomarker of prognostic value in RA.

Monsoon Rashid

Advisor(s): Yamen Homsy

Disseminated Invasive Aspergillosis in Patient With SLE

Introduction: Opportunistic infection including invasive aspergillosis is a major cause of mortality in patients with SLE who are immunocompromised. High index of suspicion, early diagnosis and treatment is the key for better outcome of patient with IA. **Case presentation:** A 41 yr. old woman PMH of SLE on Mycophenolate, H/O IV Methylprednisolone and Cyclophosphamide for nephritis presented to the ER for SOB and hemoptysis. Initially she was hemodynamically stable but became hypoxic, spiked fever, AMS and intubation. The patient was given IV prednisone in suspicion of SLE flare and antibiotic in concern of sepsis. But her condition deteriorated. Culture of CSF, blood, urine and sputum were negative. Galactomannan test was positive. MRI brain showed diffusion restriction. She was started on caspofungin but she failed all the treatment and expired. Autopsy revealed severe disseminated invasive in the multiple organs.

Discussion: Patient with SLE are prone to develop for IA for the disease process and immunosuppressive drugs. Patient may present with non specific symptoms such as fever, cough, chest pain, hemoptysis. They may be treated for SLE flare or bacterial infection. For diagnosis we can do tissue biopsy for histopathological diagnosis or culture to grow fungal hyphae. But most of the time the result is inconclusive. So high suspicion should be there when patient continue to deteriorate with antibiotic. We can do HRCT chest, galactomannan or beta D glucan test. If the result is suggestive of IA empiric antifungal should be initiated.

Conclusion: Our patient was immunocompromised due to SLE and the medication. She presented with non specific symptoms. But initiation of antifungal treatment was delayed and we ultimately faced fatal outcome. When an immunocompromised patient presents with nonspecific symptoms which are not responding to antibiotics, empiric antifungal should be initiated if suspicion is high with suggestive radiological feature and positive galactomannan.

Brittany Van Dover

Advisor(s): Maria Rosario-Sim

The Use of Medical Cannabis for Treatment of Chronic Neuropathic Pain: An Integrative Research Review (IRR)

Rationale: Chronic neuropathic pain is a common problem that affects patients globally and treatment includes a substantial use of opioids. With the growing epidemic, alternative options are being sought. Medical cannabis use as treatment for chronic pain is increasing in popularity as an alternative for opioids. The purpose of this IRR was to explore the efficacy of medical cannabis for chronic neuropathic pain treatment.

Methods: An Integrative Research Review. Included in the IRR were articles published in 2010 to 2018 in the US, Canada, and Australia. Subjects were 18 years and older. Ten articles were included: four systematic reviews of randomized controlled trials, one randomized-controlled trial, two cross-sectional observational studies, one secondary data analysis, one prospective cohort study, and one historical cohort study. PubMed and Google Scholar were used for literature search engines. Keywords used were efficacy, medical cannabis, medical marijuana, non-cancer chronic pain, neuropathic pain, opioids, substitution, and treatment. Pain was measured by the Visual Analog Scale (VAS), Descriptor Differential Scale (DDS), numerical rating scale, Brief Pain Inventory (BPI), and/or quality of life.

Data analysis: Results from the 10 articles in the IRR indicated that cannabis was associated with opioid use reduction/cessation in the US and Canadian articles, prescribing patterns and in Medicare enrollees' spending in states where medical cannabis laws were implemented. Cannabis adverse effects found were short-term neurocognitive decline and psychiatric illness worsening.

Implications: Medical cannabis was an effective treatment for chronic neuropathic pain and increased quality of life, except for an Australian prospective cohort study. Clinical practice should include medical cannabis as a treatment option for long-term management of chronic neuropathic pain in countries with medical cannabis laws.

Eric Persaud

Advisor(s): Paul Landsbergis

Risk Perceptions and Knowledge of Fentanyl Exposure among New York State First Responders

Background: The current opioid epidemic and abuse of fentanyl in the United States has led to an increased risk of exposure to first responders. Law enforcement, fire, and emergency medical services are receiving misinformation on fentanyl health and safety risks and have led to miscommunication. Understanding the risk perceptions and knowledge of first responders regarding fentanyl can help identify training gaps.

Methods: A 15-item 6-point Likert scale online questionnaire was developed by researchers at John Jay College and SUNY Downstate, and distributed to firefighters, police officers, and emergency medical technicians, regarding perceptions of fentanyl exposure, and additional questions concerning knowledge. The link to the online questionnaire was sent to 15 associations and agencies of national and New York State first responders with 3 associations acknowledging and distributing the survey. Each association was sent a mailed and emailed letter. Flyers were posted in the two lead authors' universities.

Results: Of the 245 participants, 185 served New York State. 90 worked in law enforcement, and the other 95 worked in either fire, emergency medical service, or a dual role. 147 of the respondents selected slightly agree, agree, or strongly agree that briefly touching fentanyl could be deadly. 92 respondents selected that they did not have appropriate access to personal protective equipment to address hazards to fentanyl exposure versus 75 that selected that they did. 18 of the responses indicated they were unsure.

Conclusion: New York State first responders generally agreed with expert risk perceptions in the pilot study. However, items pertaining to using hand sanitizer, selecting glove type, and dermal exposure to fentanyl did not align with expert beliefs. Larger sample studies are needed to validate these findings and should be expanded nationally. Risk perceptions and knowledge could be used to evaluate fentanyl response training among first responders.

Alyson Clarke

Advisor(s): Leconte Dill

Health disparities in gentrified communities: The ongoing fight for health equality and social justice of minority residents in Harlem

Historically marginalized communities of color in New York City, such as Harlem, continue to experience rapid social changes as a result of gentrification. This process leads to adverse health outcomes for the community, including increased rates of diabetes, asthma, cardiovascular disease, and obesity. Such health outcomes suggest that gentrification is indeed a social determinant of health and must be addressed as a public health issue. Community zoning often results in the displacement of longtime residents or limited access to imperative resources and services. The affected neighborhood experiences a shift in characteristics, leading to increasingly poor health outcomes for residents that often are not provided for within standard health promotion and disease prevention services. Efforts to combat these resulting inequities would benefit from an interdisciplinary approach, one that includes a partnership with residents and local activist groups, such as Right to the City and Take Action NYC. With at least 15 New York City communities currently being gentrified, public health officials must seek to protect and provide for those who still reside in these communities but cannot afford to live comfortable, healthy lives. Using neighborhood observations and an adapted PhotoVoice approach, we will identify the risk and protective factors related to these visible health inequities, assess concerns and perspectives of current Harlem residents, discuss previous and current efforts made by activists and other community entities in the fight for health equity and social justice in Harlem, and identify next steps for public health officials that link social justice and health equity.

Nicholas Taklalsingh

Advisor(s): John Muthu

Hemoglobin Level and Left Ventricular Structural and Physiologic Findings in Hemoglobin SC Disease with Diastolic Dysfunction

Background: Anemia is associated with changes in left ventricular (LV) morphologic and physiologic changes, including eccentric hypertrophy and systolic dysfunction. In sickle cell anemia (HbSS), there is prominent diastolic dysfunction accompanying LV dilation. Less is known about diastolic dysfunction in hemoglobin SC disease (HbSC), and the predictive value of age, Hgb, and underlying structural and physiologic parameters.

Methods: A retrospective cross-sectional study was performed in adult patients with HbSC. Clinical and hematologic data was obtained based on date of echocardiography. Stepwise linear regression analysis was used to assess associations between age, Hgb and Hgb subtype level, and LA and LV size and physiologic parameters and LV diastolic dysfunction.

Results: Among patients with HbSC (n=82), age and hematologic parameters were correlated with Mitral Valve (MV) E/A ratio (R² 24.9%) and Tricuspid regurgitation maximum velocity (TR max vel) [R² 12.6%], with age correlated with MV E/A ratio ($\hat{\rho}$ -coefficient -0.014, p<0.001) and TR max vel ($\hat{\rho}$ -coefficient 1.29, p=0.003). Furthermore, LV and left atrial (LA) structural and physiologic parameters were correlated with LA volume (LAV) index (R² 93.4%), TR max vel (R² 16.1%), and MV E/e' ratio (R² 38.0%), with LA diameter correlated with LAV index ($\hat{\rho}$ -coefficient 3.378, p=0.001), LV systolic diameter correlated with TR max vel ($\hat{\rho}$ -coefficient 42.9, p=0.038) and MV E/e' ratio ($\hat{\rho}$ -coefficient -63.98, p=0.018).

Conclusions: Patients with HbSC disease display age associated diastolic dysfunction, with changes in diastolic function associated with chambers in left-heart chamber size. This data indicates the importance of concrete echocardiographic screening guidelines in HbSC disease for longitudinal cardiac surveillance.

Aleksandra Walasek

Advisor(s): Eugene Pietzak

Next-generation Sequencing of Bacille Calmette-Guerin (BCG) Unresponsive Tumors Identifies Actionable Alterations for Potential Targeted Therapy in Non-Muscle Invasive Bladder Cancer

Intravesical BCG remains standard of care for patients with intermediate- and high-risk non-muscle invasive bladder cancer (NMIBC). Although most patients initially respond to therapy, there is a group of patients who will experience recurrence and subsequent progression to invasive disease. There are limited treatment options for patients with BCG-unresponsive bladder cancer and alternative therapeutic strategies are needed. Next-generation sequencing helps identify and prioritize therapeutic opportunities for clinical trial of novel targeted agents.

DNA from BCG treated, chemotherapy naive, secondary MIBC tumors and matched normal DNA underwent targeted exome capture sequencing or whole exome sequencing. Potentially actionable genomic alterations were defined according to OncoKB (OncoKB.com).

The cohort was comprised of 77 secondary MIBC specimens, each from a unique patient. RTK/MAPK pathway alterations, most commonly FGFR3 (18%) and ERBB2 (15%), were seen in 42% of patients. PIK3CA mutations, seen in 21%, often co-occurred with RTK/MAPK alterations potentially representing a resistance mechanism to FGFR or ERBB2 directed monotherapy. CDKN2A loss, hypothesized to be a driver of progression in FGFR3 mutated tumors, occurred in 10% of the samples. Alterations in cell cycle regulators were seen in 65% of specimens, of which 40% also had an intact RB gene and could potentially be vulnerable to CDK4/6 inhibitors. Inactivating mutations in CREBBP or EP300 occurred in 17% of specimens that might confer sensitivity to HDAC inhibitors. Truncating mutations in KDM6A and ARID1A were seen in 19% and 33% of samples respectively. These might be sensitizing to EZH2 inhibitors.

Genomic profiling identified several actionable alterations which offer potential therapeutic strategies for management of BCG-unresponsive disease. Targeted therapy for NMIBC patients warrants further investigation as further advances are made in development of more selective systemic inhibitors.

Samuel Gold

Advisor(s): Andrew Winer

Evaluation of Preoperative Prostate Magnetic Resonance Imaging for Cancer Control and Neurovascular Tissue Preservation During Robotic Radical Prostatectomy

Introduction: Prostate multiparametric magnetic resonance imaging (mpMRI) can precisely depict prostate cancer (PCa) location and adverse pathologic features. Surgeons can utilize this information to maximize sparing of the neurovascular bundles (NVBs) during radical prostatectomy (RP) while avoiding a positive surgical margin (PSM). We detail the technique of using preoperative mpMRI to quantify its effect regarding nerve-sparing and rates of PSMs.

Methods: A prospectively maintained database was queried for robotic-assisted RPs (RARPs) with preoperative mpMRI between 2007-2017. Imaging margin risk factors (iMRF) were defined on mpMRI as frank extraprostatic extension (EPE), possible EPE, and capsular irregularity (capsular bulge, lesion-capsule contact, or lesion adjacency to the neurovascular bundles). Surgical adjustments to nerve-sparing technique were made based on these findings.

Results: Five hundred thirty-two patients comprising 1041 prostate sides were included for analysis. Overall, PSM rate was found in 80/1041 (7.7%) sides of the prostate. iMRF were seen in 313/1041 (30.1%) prostate sides, for which adjustments were made in 244/313 (78.0%) of these. In the 69/244 (22.0%) cases where full nerve-sparing was performed despite iMRF, PSM rate was 20/69 (29%) compared to 33/244 (13.5%), $p = 0.002$. MRI-guided surgical adjustments decreased PSM risk by 68% and 15% in pT3 and pT2 cases, respectively. On multivariable analysis, logPSA (OR 4.06, [95% CI 2.40-12.3], $p < 0.001$) and iMRF (OR 1.78, [95% CI 1.01-3.16], $p = 0.047$) were significantly associated with PSM while nerve-sparing adjustment was significantly associated with decreased risk of PSM (OR 0.38 [95% CI 0.22-0.66], $p = 0.001$).

Conclusions: MRI effectively detects risks for PSM and guides surgical adjustments to decrease PSM rates. As prostate MRI is more frequently acquired for PCa screening and biopsy, this may have additional value for RP planning and potentially improve outcomes.

Eric Li

Advisor(s): Jerry Blaivas

Overactive Bladder Phenotypes: Development and Preliminary Data

Aim: The purpose of this study is to develop overactive bladder (OAB) phenotypes that can be used to develop OAB diagnostic and treatment pathways.

Methods: An expert panel was convened to develop an overactive bladder (OAB) phenotype classification system. The panel considered disease driven, mathematical modeling and clustering methodology but decided on using physiologic variables derived from a bladder diary, max uroflow (Qmax) and post-void residual urine (PVR) to construct the phenotype system. Three main phenotypes emerged based on the 24-hour voided volume (24HV) –normal, polyuria, and oliguria – which were divided by bladder capacity into normal, large, and small and then subdivided by max voided volume (MVV), Qmax and PVR. This is a retrospective, multicenter, observational study of patients from 6 clinical urology and urogynecology sites. We queried a database for patients with persistent lower urinary tract symptoms (LUTS) who completed the LUTS questionnaire and a 24-hour bladder diary (24HBD) on a mobile app, website, or paper. This group also had a contemporaneous Q and PVR measurement. Those with an overactive bladder symptom sub-score (OABSS) ≥ 8 were included and phenotyped.

Results: Variables selected for inclusion: 24HV, MVV, Qmax, and PVR. Subjects were divided into three phenotypes based on the 24HV –polyuria (24HV > 2.5 L), normal (24 HV = 1.0 – 2.5 L), and oliguria (24HV < 1.0 L).

Five hundred thirty-three patients (348 men and 185 women), completed the LUTS questionnaire and 24HBD, and 399 (75%) patients had a diagnosis of OAB (261 men and 138 women). The primary phenotypes had the following incidences: polyuria (25%), normal (63%), and oliguria (11%). The prevalence of each of the 18 phenotypes is presented in Figure 1.

Conclusion: Classification of OAB variants into phenotypes based on 24HV, MVV, Qmax, and PVR provides the substrate for further research into the etiology of OAB and more precise diagnostic and treatment algorithms.

Justin Capasso

Advisor(s): Eve Faber

Informational Flyers in Patient and Physician Areas Failed to Increase CRC Screening Rates but Improved Rates of Physician Documentation

Background: Excluding skin cancers, Colorectal Cancer (CRC) is the third most common cancer in men and women. The American Cancer Society estimated there were 97,220 new cases of colon cancer and 43,030 new cases of rectal cancer in 2018. A 2016 survey in NYC showed that only 68% of patients aged 50-75 underwent CRC screening.

Objectives: 1) Increase the rate of screening to above the NYC rate of 68% by promoting awareness throughout the clinic. 2) Increase discussion and documentation of CRC screening.

Methods: 63 charts were reviewed for appropriate CRC screening. In those without documentation of screening, charts were reviewed to determine potential barriers to screening. A 30-day intervention involving flyers placed in both patient and physician areas of Suite B was conducted. The aim was to remind both the patient and providers to discuss CRC screening.

Results: Screening rates were 61% both pre- and post-intervention. The number of charts showing documentation of discussion regarding screening in those who have not been screened increased from 14% to 33% post intervention.

Discussion: The increase in discussion documentation accompanied by the decrease in tests ordered but not done might show that tests were being ordered without adequate discussion and that patients were deciding, after the order was written, to not do the test. This demonstrates that with the intervention, and more discussions, those who did not want screening were more accurately identified. Perhaps with longer follow up more patients might have had CRC screening performed.

Conclusion: 1) CRC screening rates are below the NYC screening rates, and the primary goal of increasing the screening rate in our clinic was not achieved. 2) The intervention achieved the secondary objective of increasing discussion and documentation of CRC screening. 3) Further investigation with longer follow up would help determine if provider-patient discussions around CRC screening increases screening

Evanna LeRouge

Advisor(s): Madhavi Gavini

Which patients are not receiving PCV13 or PPSV 23 vaccinations in concordance with CDC recommendations?

Purpose: Variations in CDC recommendations for pneumococcal vaccine based on age and medical conditions make it difficult for providers to determine if either pneumococcal conjugate (PCV13) or the polysaccharide vaccine (PPSV23) is indicated. The purpose of this study to evaluate the concordance of PCV13 and PPSV23 vaccination administration with the CDC recommendations in adult patients based on age, available medical history and underlying medical conditions in a family medicine clinic.

Methods: After receiving IRB approval, a retrospective chart review was conducted on adult patients who received either PCV13 and/or PPSV23 between January 1st 2017 and December 31st 2017 at a family medicine clinic. Data was compiled in tables; the percentage was calculated and the confidence interval was determined for the prevalence rate.

Results: Three of the 251 (1.2%) PCV13 and PPSV23 vaccinations administered to patients were found to be in discordance with the CDC recommendations based on age, documented medical history and underlying medical conditions. A 95% Agresti-Coull CI [0.24%, 3.62%] was seen.

Conclusion: Majority of the patients in the family medicine clinic received the pneumococcal vaccinations in concordance with CDC recommendations.

Cindy Tsui

Advisor(s): Orlando Sola

Identifying Opportunities for Patient Education About Hypertension

Background: 4.9mil New Yorkers have hypertension (HTN), an 11% increase in the last decade. HTN is a modifiable risk factor for multiple conditions with substantial social and financial burdens. Identifying deficiencies in understanding of HTN can help focus patient education efforts.

Methods: Prospective, cross-sectional, multi-center cohort study included hypertensive adult patients at University Hospital Brooklyn (UHB) and Richmond University Medical Center (RUMC). Demographics and HTN knowledge (BP goals, risk factors, complications, lifestyle modifications) were obtained via 5th-grade reading level questionnaire. Two-tailed t-tests compared HTN literacy at UHB vs RUMC.

Results: Of the 43 subjects, 22 (51.2%) were Black and 26 (60.5%) female. Ethnicity and sex significantly differed between the sites: 19 (95%) UHB pts were Black vs 3 (13%) at RUMC ($p < 0.0001$). At UHB, 16 (80%) were female vs 10 (43.5%) at RUMC ($p = 0.014$). Mean age was 63.4 \pm 12.9 yrs and similar between the sites. HTN complications were the only significant knowledge difference in the two sites. Significantly more RUMC pts knew heart disease was a complication than at UHB ($p = 0.0241$). At both sites, most pts identified stroke, kidney disease, and vascular disease as complications, with the largest knowledge deficiency in kidney disease (11 patients, 25.6%). Twenty-three (53.5%) patients knew only some or none of their HTN medications. Most patients knew diet, lack of exercise, and smoking were risk factors; 36 (83.7%) made lifestyle changes for BP control including 13 (30.2%) using both diet and exercise. Patient-reported BP goals varied between 120/80-150/90; 34 (79.1%) were inconsistent with JNC8 guidelines.

Conclusions: Multiple patient education opportunities were identified. When discussing HTN, raise patient awareness of JNC8 target BP guidelines, advise carrying their medication list, and teach about kidney disease as a HTN complication. At UHB, also teach heart disease as a complication.

Cuong Le

Advisor(s): Richard Sadovsky

Measuring and Improving Hepatitis C Screening Rates In Suite B Clinic

Hepatitis C (HCV) is the leading cause of liver related morbidity and mortality in the United States (a). HCV screening is recommended for all patients born between 1945-1965. Our Suite B clinic HCV screening rate was 46%. This study attempts to increase the screening rate by placing a physician awareness posters in exam rooms. After doing this, our screening rates of eligible patients increased slightly, but not statistically significant.

Nishith Shah

Advisor(s): Richard Sadovsky

Reducing an Outpatient No Show Rate Using Earlier Reminders

Background: The average outpatient no show ranges from 1%-28% and costs the healthcare industry \$150 billion+ annually. No shows also lead to inefficient use of resources. Missed appointment is a strong predictor of future no shows. Research indicates that forgotten appointments is a common reason for no shows. We decided to use earlier reminders to try and decrease forgotten appointments. **Purpose:** To reduce Suite B no show appointments by 20% over a 4-week intervention period by implementing pre-appointment phone calls 3 to 7 days prior to the appointments in addition to the usual 24-hour appointment call.

Methodology: No show rate was calculated for September 2017. Over a 4-week invention in September 2018, 156 patients from the resident panel were called 3 to 7 days prior to their scheduled visit in addition to the routine 24 hours pre-appointment reminder. Patient data was tracked to determine no show rate during the intervention month of September 2018. **Results:** Pre-intervention no show rate was 52%. During the intervention, 16% were not reached at all, 41% reached only via voicemail, 32% reached once in person, and 3% had been reach twice. Of 156 patients contacted, 18% rescheduled and the no show rate was 29%. **Discussion:** The vast majority of patients in the intervention group were able to be reached 3-7 days before the appointment. Through increasing the number of times a patient was contacted, including an earlier reminder calls, the no show rate was reduced nearly half. Many patients used the earlier call as opportunity to reschedule. This probably ultimately reduced the no show rate. **Limitations** include small numbers over a brief intervention period. **Conclusion:** Pre-appointment reminder phone calls in addition to a 24-hour reminders can be a cost effective method to combat missed appointments by reminding patients to cancel, reschedule, or confirm the appointment. These results should be confirmed in a larger study with a more diverse population.

Robert Wang

Advisor(s): Richard Sadovsky

Multimodal Reminders Improve Abdominal Aortic Aneurysm Screening Rates

The US Preventive Services Task Force (USPSTF) recommends one-time abdominal aortic aneurysm (AAA) ultrasound screening for men aged 65 to 75 who have ever smoked. Rates of appropriate AAA screening has varied greatly across the United States. In 2015, 1.4% of eligible Medicare enrollees were screened for AAA. In 2012, the Cleveland Clinic reported an AAA ultrasound screening rate of 9.2%; VA Connecticut in 2009 reported a 26% screening rate; and University of Pittsburgh reported a 40.3% screening rate from 2013 to 2014. The objective of this study is to assess the current AAA screening rate at SUNY Downstate Medical Center Suite B Clinic and implement a quality improvement intervention to increase this rate.

Chrisitan Bosquet

Advisor(s): Richard Sadovsky

Hotspotting ED visits over 1 year for patients in two Family Medicine Clinics

Purpose: Over utilization of the emergency department is a burden on the health care system both financially and physically on medical staff.² High cost patients are called hot-spotters defined as patients who visit an emergency department (ED) four or more times in a year.¹ This study focused on family medicine patients from two clinics in central Brooklyn who were found to have the most ED visits in the practice. The purpose of the study was to explore the factors around their ED presentations and propose possible interventions to decrease avoidable ED visits.

Method: Retrospective analysis of 1885 patients from Suite B and Suite O, two SUNY Downstate Family Medicine clinics, who had 1 or more ED visits from January 2018 to December 2018 using data from the EMR. Focused on the top 35 patients with the most ED visits, looking at their last 5 visits. These visits were further characterized by demographics, chief complaint, ED interventions, and need for inpatient admission.

Results: Of all the visits we reviewed, only 13% resulted in admission to the hospital, and 86% were discharged from the ED. Of all the patients discharged from the ED, 35% of them need no interventions. Another 27% of discharges only needed one intervention from IV, medications, imaging, specialist consult, to labs.

Discussion: The data shows that many of our visits to the ED were for non-essential services that could have been managed as an outpatient. This suggests that many of these visits were unnecessary and it would relieve strain on the hospital system to prevent these visits. Based on the data, we propose the following possible interventions to decrease avoidable ED visits: (1) increased patient education of common ED visit reasons, (2) a provider-run phone triage system available to patients, (3) increased walk-in capabilities, and (4) dedicated prenatal nursing staff. Many of these interventions could decrease the patient burden on the ED and save the system from costly expenses.

Tambetta Ojong

Advisor(s): Richard Sadovsky

Chlamydia Screening Rates Among Women 16-24 years at our Family Practice Center

Intro: Chlamydia trachoma's infection is the most common bacterial sexually transmitted disease in the US affecting > 2 million people. The USPSTF recommends a one time screening in all sexually active women between ages of 16-24 years. According to the CDC the overall screening rate for this age group is 50% and in New York it is 62% from 2105 data. To address barriers primary care offices have: Toprovided chlamydia education specific training and computer prompts for PCP. Educational posters/brochures for patients to inquire about testing.

Objectives: To determine current rate of chlamydia screening among age 16-24 years old women at our clinic. To create an intervention that provides clinician awareness of the need for chlamydia screening. To re-evaluate chlamydia screening rates post interventions.

Methods: The intervention consisted of placement of educational posters for patients and sending a quick reminder to PCP about the guidelines. We reviewed 100 charts between April-July 2018 pre-intervention and 85 charts between October-January 2019 post-intervention of women between the age of 16-24 years at our clinic. We noted whether or not they were sexually active and if chlamydia screening was done.

Results: Pre intervention screening rate was 75% which is higher than the national average rate of 50%. Post intervention screening rate changed insignificantly from 75% to 68%. Documentation of sexual activity status improved in the intended group of women.

Conclusion

Our rate of chlamydia screening is higher than the national average. The intervention did not improve the rate of screening in the studied population. There was an improvement in documentation of sexual activity status of young women that were properly identified as the group who did not require screening.