**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 (± 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.

**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.

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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.
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.

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
**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=.17, 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.

**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.
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.

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.
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% (på‰²0.0001) 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.

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 0 Â°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, I2 =58%). For S. pneumoniae the weighted prevalence with very low heterogeneity (Cochrane Q=3.57, p=0.83, I2 =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.
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.

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.
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.

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 dycrasias, 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.
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.

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.
**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 was available 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.

**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 effect 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.
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.

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.
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.

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 â€“ 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.
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.

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.
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.

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.
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.

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

Lymphangioleiomyomatosis (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-Carribean 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.
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 participant. 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.
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; R²=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.

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.
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.

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.
**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 catherization 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.

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**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.
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 need 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.

Alveolar type II cell LRPI 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 LRPI shRNA (LRP1 KD), while cells stably transfected with scrambled shRNA were used as control cell line. We also generated tamoxifen-inducible T2C-specific LRPI knockout mice (SPC-LRP1-/-). Knockout was induced at 6 weeks of age, after completion of lung development.

Results: LRPI 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 LRPI in T2C regulates pulmonary function through surfactant lipid metabolism and plays a role in extrapulmonary metabolic homeostasis.
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.

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.
**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 leukocytes 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.

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**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 (R2 7.4%), Mitral Valve (MV) E/A ratio (R2 15.2%), Tricuspid regurgitation maximum velocity (TR max vel) [R2 15.2%], and MV E/e’ ratio (27.7%), with age correlated with MV E/A ratio (β-coefficient -0.017, p<0.001), Hgb correlated with LAV index (β-coefficient 2.74, p=0.003), and age and Hgb both correlated with TR max vel (age β-coefficient 0.737, p=0.044, Hgb β-coefficient -14.4, p<0.001) and MV E/e’ (age β-coefficient 0.063, p=0.03, Hgb β-coefficient -0.711, p<.001). Furthermore, LV and LA structural and physiologic parameters were correlated with LAV index (R2 70.7%), TR max vel (R2 13.0%), and MV E/e’ ratio (25.2%), with LV diastolic diameter correlated with LAV index (β-coefficient -4.492, p=0.003), and LV systolic diameter correlated with TR max vel (β-coefficient 27.356, p=0.003) and MV E/e’ ratio (β-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.
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-1β 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.

Case Report and Literature Review: Posterior Mediastinal Paraganglioma

Paragangioma 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 36.4Â°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 or 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 indicated 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.

**Results:** Our 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, 0.14]; 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 (Epv) (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.
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 Neo-Intimal 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.
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 FEV0.05/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.

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 (â‡’ 14%); FEV1 pre 0.96, post 1.34 lit (â‡’ 39.6%); VC pre 2.41, post 2.64 lit. (â‡’ 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.
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.

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.
Early Post-transplant Weight Gain In Inner-city Kidney Transplant Recipients (ktr's) 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 (X2= 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.

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 ± 15.2 yrs. CAR pts had lower nut lit (1.34 ± 1.6 vs 3.0 ± 1.9 p< 0.001), but better HEI (60.7 ± 12.9 vs 53.8 ± 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 ± 0.25 vs 0.758 ± 0.24 p=0.023), lower intake of yogurt (0 ± 0 vs 0.071 ± 0.04 p=0.02), and cheese (0.162 ± 0.058 vs 0.415 ± 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.
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 outpatients, 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.

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

Jonathan Leong

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 â‰¤2.3g 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 between 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±14.1yrs; 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 b/w 2 groups (LoNa 3.75±0.88 vs NoAns 3.8±0.8, p=NS), nor did intake of Na (LoNa 2.51±0.96g vs NoAns 2.59±1.3g, 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 b/w 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 at high risk over the long term as they also lack social and financial support to help deal with their chronic illness.
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±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.
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.

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Oluwatosin Akintola

**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.
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, ethnoracial culture, 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.

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.
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.

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.
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.

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.
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 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).

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.