Medical Student Knowledge and Awareness of Vascular Surgery: A Survey Study

**Introduction:** Vascular surgery and several other surgical specialties have implemented integrated residency programs to fill specialist shortfalls with quality applicants. These integrated residency programs are highly competitive and often require substantial specialty-specific research experience for serious consideration. An online survey was used to better define whether medical students obtain an adequate knowledge of vascular surgery early enough in their education to thoughtfully consider the specialty as a career and to eventually accrue the research and experience crucial for a successful application to an integrated residency program.

**Methods:** Second and third year students (MS2s and MS3s) at a single medical school were asked in an online questionnaire to evaluate the degree of familiarity with vascular surgery and general surgery procedures. A total of 210 students responded (99 MS2s, 110 MS3s). A scale was used to assess knowledge of procedures performed and comfort with explaining various surgical procedures.

**Results:** MS3’s felt more confident explaining the purpose of procedures than MS2’s (p value= 0.04). However, both MS2s and MS3s were overall less confident about explaining vascular procedures compared to general surgery. 61% of respondents had no exposure to surgery prior to starting medical school, and 74% had no additional surgery experience aside from the mandated surgical clerkship. A majority of the students reported a lack of appropriate mentorship.

**Conclusion:** These findings suggest that most medical students have an inadequate exposure to vascular surgery that may impact career choices and limit competitiveness for the expanding number of integrated residency programs. Medical schools may consider working closely with vascular surgery departments to devise a curriculum that both exposes students to the specialty early after matriculation and then also provides expanded opportunities for clinical experience and research for those interested.

Ground Level Falls in the Elderly and Alcohol

With a growing geriatric population, ground level falls have been identified as a major cause of mortality in the elderly population. We examined outcomes from ground level falls in the elderly with alcohol association. We performed a retrospective analysis of the National Trauma Data Bank (NTDB) research data set (2011). Geriatric patients ages 65-89 who suffered ground level fall (E Code 880.1-886.00) that tested for alcohol and negative for drugs. Primary outcome of interest was mortality and secondary outcomes consisted of injury, complication (ARDS, pneumonia, DVT, acute renal failure, cardiac arrest, sepsis) and disposition. Chi squared, t-test were performed to compare patient characteristics and logistic regression analysis was performed. 73,020 geriatric patients were identified that suffered from ground level falls. Of those, 3043 were tested for ethanol and drugs. After we excluded drug positive patients, 2402 (70.6%) remained. 1187 (49.4%) of patients were admitted to ICU or stepdown level of care. 370 (15.4%) patients tested positive for alcohol. There were no significant differences between age, comorbidities, ISS score, and mechanism of injury. On univariate analysis, ethanol negative patients had more serious injuries such as spinal fracture (15.2% vs 10.5%, p=0.02), and lower extremity fractures (11.9% vs 8.1%, p=0.03). They were more likely to be discharged to a skilled nursing facility (27.1 vs 16.8% p<0.001), and had higher rate of inpatient death (8.5% vs 4.0%, p=0.003). Logistic regression did not demonstrate a relationship between alcohol and inpatient complications including death. Patients testing positive for alcohol more likely to suffer concussions (OR 2, CI 1.4-2.8), and be discharged without need for home services (OR 2, CI 1.6-2.7). Ground level falls in elderly pose a significant issue, with almost half the patients requiring higher care. In contrast to previous studies, we saw no differences in complications with alcohol.
Reducing Melanoma Lethality and Disparities Through Universal Early Detection

**Introduction:** Melanoma is the deadliest form of skin cancer, and acral lentiginous melanoma (ALM)—a type that manifests on the palms, soles and nails—makes up 2-3% of melanomas. ALM incidence is 1.8 per 1,000,000 for both non-Hispanic whites and blacks, however ALM comprises 36% of all melanomas in blacks. The purpose of this study was to determine the incidence of ALM in our community; we also sought to better understand participant’s knowledge of skin cancer and their self-screening practices.

**Methodology:** This study ran from April 2015 to January 2017. A 12-question survey was created, and community events in Brooklyn, New York, were identified as screening sites. Participants older than 18 volunteered to be screened by dermatologists. Each participant was examined using visual inspection and dermoscopy. Those with suspicious lesions were referred to clinic for biopsy.

**Results:** A total of 632 people were interviewed and examined at 21 screenings, with 51.4% identifying as black, and 3.3% as white. Only 29.4% of respondents said they examined their skin for melanocytic lesions. Five people (0.8%) reported a past history of skin cancer—2 had melanoma, 2 basal cell carcinoma, and 1 unknown. 3.3% had a family history of skin cancer; and 6.9% said they knew a friend or co-worker with skin cancer. Nine participants had suspicious lesions; 3 came to clinic and 6 were lost to follow-up. In clinic, one person was deemed to have a benign lesion after re-evaluation. Two people had biopsies and both were benign.

**Conclusion:** The incidence of ALM was 0% in our population. Approximately one-third of our participants reported examining their skin for melanocytic lesions, yet, anecdotally, no participant expressed prior knowledge of ALM. A personal history of skin cancer was found in less than 1% of our population. About 3% of participants reported a family history of skin cancer, and just under 7% said they knew a coworker or friend who had skin cancer.

Early Peanut Introduction- Impact of Targeted Educational Intervention on the Knowledge and Practices of Pediatric Residents and Pediatric Attending Physicians

**Rationale:** Peanut allergy affects approximately 2% of the pediatric population and is the leading cause of death from food-induced anaphylaxis. The objective of this study is to assess and enhance knowledge and practices of pediatricians regarding peanut allergy evaluation in order to reduce unnecessary allergy testing and encourage early peanut introduction in patients when appropriate. We hypothesize that educating pediatricians at Pediatric Grand Rounds lecture at SUNY Downstate Medical Center has a positive impact on their knowledge and practices in this subject.

**Methods:** Dr. Maria-Anna Vastardi presented a powerpoint lecture “Peanut Allergy – is it preventable?” on 12/13/17 at Pediatric Grand Rounds at SUNY Downstate Medical Center. The presentation reviewed the current literature and new guideline on peanut allergy prevention. A paper survey was distributed before the lecture and immediately after the lecture to pediatric residents and pediatric attending physicians. The survey contained demographic questions, questions on individual practices on allergy management, and knowledge questions based on case scenarios on peanut allergy. Participation was voluntary, and the responses were anonymous.

**Results:** Out of 44 participants who filled out the survey, there were 29 residents and 9 attendings. Two participants did not disclose level of training. 63% of participants encountered food allergy in their clinic once every other month to monthly. 48% of participants have ordered allergy food panel. 10% have ordered peanut specific IgE. 43% of participants heard of the landmark Learning Early About Peanut Allergy trial. 23% heard of the new guideline for peanut allergy prevention. The percent of correct of knowledge questions was 51% pre-lecture and 74% immediately post-lecture (p&lt;0.01).

**Conclusion:** A teaching intervention was successful in improving knowledge of prevention of peanut allergy among pediatricians. Data from the survey three months post-lecture is pending.
Prevalence and Risk Factors for Burnout of Pediatric Emergency Medicine Fellows

**Background:** Burnout among Emergency Medicine (EM) physicians (57%) is significantly greater than Pediatricians (39%). Pediatric Emergency Medicine (PEM) providers are a unique population in that the majority have a prior pediatric training and then complete a fellowship focused on the emergency management. We sought to evaluate the prevalence and risk factors for burnout in PEM fellows.

**Methods:** An e-mail survey was sent to US PEM fellowship programs. The Maslach Burnout Inventory (MBI) grades burnout with 22 items. Anonymous surveys were scored using the MBI subscales of emotional exhaustion (EE) and depersonalization (DP). Scores of moderate to high in both EE and DP were considered to have burnout. The data were compared to demographic information including fellowship year, gender and relationship status. Participants were also asked to list items in their life they felt were burnout contributors. The burnout rate was reported as a percentage with 95% confidence intervals (95% CI), based on the Agresti-Coull method. Associations between categorical variables and burnout were tested with Fisher’s exact test, alpha = 0.05 (two tails).

**Results:** Of 463 PEM fellows, 146 responses were received (30% response rate) and 139 surveys were scored. Over half of respondents were female. The burnout prevalence of PEM fellows was 30.9% (95% CI, 24%-39%). The burnout rate was significantly (p=0.002) lower for males than for females. Fellows who were single (50%) or divorced (66.7%) had significantly (p=0.008) higher rates of burnout compared to married (27%) fellows. Major contributors to burnout were work environment, academic responsibilities of fellowship, schedule, work life balance and career stress.

**Conclusions:** Women were more likely to suffer from burnout as well as fellows who were single or divorced. By addressing factors that contribute to burnout, such as work environment and academic responsibilities during fellowship, one may be able to lessen burnout rates.

Diagnostic Modalities to Determine Ventriculoperitoneal Shunt Malfunction: A Systematic Review and Meta-analysis

Background: Ventriculoperitoneal (VP) shunt malfunction in children with hydrocephalus is an emergency. Timely diagnosis can be challenging for physicians because kids often present with symptoms that mimic other common pediatric conditions. In the evaluation of a shunt malfunction, radiographic imaging is commonly used, exposing children to high levels of radiation through their childhood. Methods: We performed a systematic review and meta-analysis to determine if any one of the imaging modalities that are commonly used; Magnetic resonance imaging (MRI), Computed Tomography (CT), X-ray Shunt series or Optic Nerve Sheath Diameter (ONSD) ultrasound, are superior in the evaluation of a shunt malfunction. Studies eligible for inclusion were those that described patients with the maximum age of 21 years presenting symptoms of shunt malfunction or infection. We used the Quality Assessment Tool for Diagnostic Accuracy Studies (QUADAS-2) to evaluate the risk of bias and applicability of the included studies. We attempted to compute the pooled sensitivity, specificity, Likelihood Ratios (LR+, LR-) using a random-effects model with MetaDiSc software. Results: Eight studies were included encompassing 1,906 patients. The weighted prevalence of VP shunt malfunction was 29.3% (95% CI 27.3-31.4%). Studies had variable quality. Shunt series had a sensitivity of 14-53%, pooled specificity of 99%, pooled LR+ of 23.16, and LR- ranging from 0.47-0.87. The operating characteristics of CT scan were: sensitivity 53%-100%, specificity 27%-98%, LR+ 1.34-22.87 and pooled LR- of 0.37. MRI had pooled sensitivity of 57%, specificity of 93%, LR+ of 7.66, and LR- 0.49. ONSD had a pooled sensitivity of 64%, specificity 22-68%, LR+ ranging from 4.41 - 8.72, and pooled LR- of 0.93. A positive shunt series, CT scan, MRI, or ONSD results in a post-test probability of 23-84%. A Normal shunt series, CT scan, MRI, or ONSD results in a post-test probability of 7-31%. A positive shunt series results in a post-tes
Utility of 2-Pyridine Aldoxime Methyl Chloride (2-PAM) for Acute Organophosphate Poisoning: A Systematic Review and Meta-Analysis

Organophosphates (OP) account for the majority of pesticide-related unintentional or intentional poisonings in lower- and middle-income countries. The therapeutic role of atropine is well-established for patients with acute OP poisoning. The benefit of adding 2-pyridine aldoxime methyl chloride (2-PAM), however, is controversial. We performed a systematic review and meta-analysis of available randomized controlled trials (RCT) to compare 2-PAM plus atropine in comparison to atropine alone for acute OP poisoning. We searched PubMed, EMBASE, and SCOPUS up to March 2017. The Cochrane review handbook was used to assess the risk of bias. Data were abstracted and risk ratios (RR) were calculated for mortality, rate of intubation, duration of intubation, intermediate syndrome, and complications such as hospital-acquired infections, dysrhythmias, and pulmonary edema. We found five studies comprising 586 patients with varying risks of bias. The risk of death (RR = 1.5, 95% CI 0.9–2.5); intubation (RR = 1.3, 95% CI 1.0–1.6); intermediate syndrome (RR = 1.6, 95% CI 1.0–2.6); complications (RR = 1.2, 95% CI 0.8–1.8); and the duration of intubation (mean difference 0.0, 95% CI –1.6–1.6) were not significantly different between the atropine plus 2-PAM and atropine alone. Based on our meta-analysis of the available RCTs, 2-PAM was not shown to improve outcomes in patients with acute OP poisoning.

Utilization of Patient Portal in an Urban University Based Primary Care Clinic

Background: Greater emphasis is being placed on the meaningful use of electronic health records. Personal health records (PHR) are becoming increasingly important and the standard of care. PHR increase health care quality, efficiency, and facilitate the triple aim of reducing costs, improving health outcomes for populations, and improving the experience and access of care for patients and their families. Our clinic population constitutes a broad range of ethnically, economically, and linguistically diverse patients. A PHR would benefit our patient population and improve health outcomes. We hypothesize that our patient PHR use has increased during 2017 but has slow uptake and our patients do not have a high awareness of the PHR.

Methods: PHR utilization data was obtained from IT for 2017. 40 patients ages 21-90 who have not used the PHR were surveyed. Patients were asked about electronic communication use and access, awareness of the PHR, interest in learning more about the PHR, and if no interest potential barriers to PHR use.

Results: PHR usage numbers (monthly initial patient login to PHR) between 1/2017-12/2017 for Family Practice clinical sites (Suite B & O) showed a total of 61 logins at Suite B and 55 logins for Suite O. Combined site Monthly Initial Login Rate varied between 0%-35% (average of 8.33%). The highest rates were yearend; Oct, Nov, and Dec 2017. Survey results showed that 65% regularly use a device for online electronic communications, 82.50% have easy access to the internet, 5% were aware of PHR, and 67.5% want to learn more about the PHR.

Conclusion: We found low PHR login numbers at our clinics. The majority of patients surveyed were not aware of the PHR, regularly use and had access to the internet, and wanted to learn more about the PHR. These findings are encouraging and show potential to increase PHR use at our clinics. Further studies can evaluate interventions to increase PHR use and further explore barriers.
Evaluating the Rate of PPSV23 Administration Among Diabetic Patients in a Family Practice Clinic

**Background:** Pneumococcal pneumonia is an infectious disease of the lower respiratory tract that can carry high morbidity and mortality in certain patients. This condition can be prevented with the assistance of vaccinations, namely, the PCV13 (Prevnar) and the PPSV23 (Pneumovax). The CDC has recommended that the elderly (patients older than 65 years old) and high-risk patients who are ages 2-64 years receive these vaccinations. High-risk patients include those with diabetes mellitus, chronic lung conditions, chronic kidney disease, and those with immunocompromising conditions.

**Methods:** We performed a retrospective study focused on the Pneumovax administration rate for diabetic patients ages 19-64 who had at least one visit at Family Health Services from 2014-2017. We looked for documentation of patients having a diagnosis of Diabetes Mellitus and identified whether or not a patient had received Pneumovax. We used the data to assess the rate of vaccination.

**Results:** A review of 100 patients who met inclusion criteria showed a Pneumovax administration rate of 25%. This was above the national average vaccination rate of 23.0%, but below the goal of 60%. This study shows the need to improve vaccination practices for diabetic patients ages 19-64. Futures studies can be performed to identify areas of improvement and identify interventions that can be tested to improve Pneumovax administration rates.

Adenoma Detection Rate in Index Screening Colonoscopy in Predominantly Immigrant Urban Black Population in Brooklyn, NY: A Retrospective Study

**Background:** The incidence and mortality of colorectal adenocarcinoma in black populations in the US is high compared to other races. The baseline adenoma detection rate (ADR) in screening index colonoscopy in Brooklyn’s large immigrant black population has never been reported. We aim to study the baseline ADR in this population and look at different variables that can influence ADR.

**Methods:** Retrospective chart review was done in all patients undergoing colonoscopies at University Hospital and Kings County Hospital Center from January 1 to December 31, 2012. Inclusion criteria were African-American, African-Caribbean or African race, between 45-75 years, undergoing screening index colonoscopies. Exclusion criteria were previous colonoscopies or other racial backgrounds. We also collected demographics, past medical/social history, and pathology data. Primary aim was calculation of baseline ADR in this population. Secondary endpoints were sex specific ADR and whether fellow participation improves ADR.

**Results:** 1692 patients met the inclusion criteria (mean age=59.3, 68.2% females, 31.8% males). Baseline total ADR was 18.7%. ADR for black males was 21.3% and black females was 17.3%. There was a significant improvement in ADR with fellow participation for female patients (23.2% with fellows, 16.4% without fellows, p=0.027), however this effect was not significant in males (22.9% with fellows, 21.7% without fellows, p=0.51). Patients with Type 2 Diabetes Mellitus had higher risk of adenomas (OR=1.33 [1.033 to 1.72]) whereas aspirin or metformin use were not associated with decreased risk.

**Conclusion:** This is the first study looking at baseline ADR in this predominantly immigrant black population in Brooklyn, NY. Our cohort was 2/3rd females which may potentially explain slightly lower overall ADR. Fellow participation improved ADR in female patients. Larger studies are needed to confirm if our baseline ADR is consistently lower compared to the national average ADR.
Impact of Diabetes Mellitus on Prevalence of Adenomas at Three Disparate Institutions

Racial disparities persist in the incidence and mortality of colorectal cancer (CRC) despite the availability of screening tools. The risk of CRC and adenomas has been associated with diabetes mellitus (DM) in some studies. This study seeks to evaluate the effect of DM on adenoma prevalence at 3 disparate institutions. A retrospective chart review was conducted on initial average risk screening colonoscopies on patients between 45-75 years at an Urban Safety Net Hospital (USNH), an Urban University Hospital (UUH) and a Suburban University Hospital (SUH) in 2012. Patients were excluded if they had a history of CRC, polyps, alarm symptoms, incomplete screening or poor prep. Data points included sex, age, race, insurance, BMI, smoking status, DM status and attending provider. Univariate analysis was done comparing adenoma detection rate (ADR) using Graph Pad Prism. 2225 patients met the inclusion criteria. Patients at the USNH and UUH were more likely to be African-American (93% and 88% vs 7%, p<0.0001) and Diabetic (29.7% and 29.8% vs 12%, p<0.0001) than at the SUH. When compared with the UUH or SUH, patients at the USNH were less likely to be current smokers (5.8% vs 11.9% and 12.8%, p<0.0001). The ADR was significantly lower in patients at the USNH compared to both the UUH and SUH (17% vs 30% and 26%, p<0.0001). ADR has since improved to 29% at the USNH in 2017. Overall, the ADR was higher in diabetics compared with non-diabetics (26% vs 18%, OR 1.6 95% CI 1.3-2.0, p<0.0001). This trend was noticed in the UUH p=0.055 and was significantly different at the USNH and the SUH (p<0.0003 and p=0.019). DM is associated with increased prevalence of adenomas across all 3 institutions despite differences in race, smoking status and baseline ADR. Patients should be advised on this risk so that early measures can be initiated to reduce the impact of DM on CRC risk. Further prospective studies are needed to validate these findings.

Obstructive Jaundice heralding the diagnosis of Non-Hodgkin's Lymphoma

Obstructive jaundice is a late manifestation in NHL, most commonly due to extrahepatic biliary obstruction. Here is a patient with obstructive jaundice as the first presentation of diffuse large b-cell lymphoma (DLBCL), a rare finding associated with a high mortality.

A 68 y/o man presented with weight loss, jaundice, pale stools and dark urine; denied medication, alcohol use or family history of cancer. Exam: icteric sclera & hepatomegaly. Labs: T bilirubin 27mg/dl, creat. 1.87mg/dl, AST/ALT 95/130 U/L, ALP 496U/L & LDH 1070 U/L; HBsAg neg., HBsAb/HBeAb pos., HBeAg/Ab neg., HBV DNA neg., HCV Ab neg. CT: 11.9x9.8x10.9cm mass originating from the caudate lobe of the liver with mass effect on the IVC, intrahepatic biliary duct dilatation, retroperitoneal and pericardial lymphadenopathy, suspicious for mets. Biopsy of the mass: DLCBL, germinal-cell type, bcl2 & MYC negative. Bone marrow biopsy: neg. for lymphoma. Biliary stent did not relieve the obstruction. Debulking therapy with prednisone, rituximab (R), gemcitabine and carboplatin was given. Tenofovir was added. His hospital course was complicated by ARF requiring HD, TLS and UGIB. After stabilization, received dose-adjusted R-CHOP (cyclophosphamide, doxorubicin, vincristine and prednisone). He declined prophylactic IT chemotherapy. Recurrent C. difficile colitis and neutropenic fever complicated courses. He had a decline in functional status with only a modest decrease in size of abdominal mass. He continues to be monitored in the hematology clinic.

Whether the use of chemotherapy alone or biliary decompression prior to chemotherapy improves patient outcome remains undetermined. The high associated mortality may be related to age, high LDH, B symptoms, performance status and HBV co-infection. Despite having resolved HBV infection, this patient is still at risk for reactivation of HBV, with rates up to 70% after rituximab-based chemotherapy and mortality rate of 13%, which emphasizes the need to confirm viral status.
Using Nailfold Capillaroscopy to study Sickle Cell Anemia as a Cardiovascular Disorder

**Rationale:** Sickle cell anemia (SCA) is an inherited disorder that causes an abnormality in the oxygen-carrying protein hemoglobin in red blood cells. Aberrant hemoglobin induces the sickle or croissant shape of the characteristically, diseased red blood cells of SCA. SCA has been considered a disorder of red blood cells, but in recent years SCA patients have been diagnosed with cardiovascular-associated disorders, resulting in the classification of SCA as a cardiovascular disorder. The focus of this study is to determine if SCA is directly detrimental to the cardiovascular system, apart from changing the morphology of red blood cells.

**Methods:** Thirty-six participants were recruited from Kings County Medical Center’s Sickle Cell Clinic. The variables that were analyzed were the mean capillary number, mean capillary size, quality of capillaries, the number of microhemorrhages present, and the number of capillaries that underwent angiogenesis. We conducted an independent variable t-test for continuous dependent variables and a chi-square test of association for categorical differences.

**Major Results:** Capillary density was lower in patients with SCA compared to the control group. Total number of giant and ectasia was higher in SCA patients. However, there was no relation between capillary quality and disease. Capillary number was used to evaluate capillary dropout, while quality was used to evaluate both morphology and density.

**Conclusion/Significance:** Indicated by the significant difference in density and size of capillaries between SCA patients and non-SCA patients, SCA has the potential to be categorized as a vascular disorder. NFC is an effective tool to study capillary dropout and understand SCA. Our findings were aligned to what is already known in the literature, however further research with a larger sample size is required to fully understand the nature of SCA as a vascular disorder.

Pilot Evaluation of Parents As Teachers and Healers (PATH): A Childhood Obesity Intervention Program

**Rationale:** Childhood obesity occurs when a child is significantly overweight for his or her age and sex. It is a growing epidemic in the United States, tripling in the last four decades, and disproportionately affecting minority and low socioeconomic status neighborhoods. Parents As Teachers and Healers (PATH) is a 6-week family-based healthy lifestyle research intervention program designed for parents with obese children ages 5-12 years. PATH’s goal is to provide educational resources to the parents while measuring their ability to model and instill long-term healthy habits in their children as measured by diet, sedentary behavior and BMI.

**Methods:** Eighteen parents were recruited by phone calls, or in-person from various health clinics in Brooklyn from fall 2015 to spring 2017. Parents completed a 30 question survey on two occasions which measured their knowledge of healthy living and their child’s behavior before and after participating in PATH. We conducted the McNemar and the Wilcoxon Sign Rank Test to analyze these assessment questionnaires.

**Major Results:** Three variables had significant increases: the child’s water intake, p-value of 0.019; parent’s knowledge of BMI, p-value of 0.002; and parents’ frequency of exercise, p-value of 0.007.

**Conclusion/Significance:** PATH parents increased their knowledge of BMI and exercise frequency, and their children drank more water. However, important healthy behaviors did not show significant results such as the child’s consumption of soda, fruits and vegetables and exercise. Nonsignificant variables were due to the small sample size. PATH is a pilot study that is continuously redesigned to increase its impact. Recommendations for future research include also surveying older youth directly about their behavior and using incentives to get more parents and children do the follow-up post-survey.
Using Nailfold Capillaroscopy to Examine Peripheral Capillary Abnormalities in Patients with Dilated Cardiomyopathy

Rationale: In the United States one third of the people that suffer from a weakened heart are diagnosed with dilated cardiomyopathy (DCM). DCM is a cardiovascular condition in which the heart becomes enlarged and cannot pump blood efficiently. This disease might be associated with abnormal microscopic vessels and low ejection fractions. This research compared capillary abnormalities in patients with DCM to healthy patients using nailfold capillaroscopy (NFC). Our study examined if NFC could be used to diagnose DCM inpatients without any blood vessel obstruction. Methods: Participants in this study had either DCM or were healthy controls. The variables that were analyzed were the mean capillary number, mean capillary size, quality of capillaries, the number of microhemorrhages present, and the number of capillaries that underwent angiogenesis. An independent variable t-test and a Fisher Exact test were used to test for statistical difference between the two groups. Major Results: We found that there was a statistically significant difference between capillary final score in healthy controls versus participants that had DCM (p=0.038). All other data did not produce significant results. Conclusion: Our hypothesis, that patients with DCM would have a lower capillary density than normal patients, was supported. Our results also indicated that healthy patients had a greater distribution of capillary number per finger compared to DCM patients, who are constantly undergoing rarefaction. Based on our results, we conclude that NFC may be an efficient tool in diagnosing patients with DCM.
HIV Stigma and Transmission Knowledge Among Heterosexual Black Men: A review of Barbershop Talks with Brothers' Data

**Rationale**: Human Immunodeficiency Virus (HIV) is a retrovirus that weakens the body's defenses against disease. African Americans account for 45% of HIV diagnosis, yet make up 13% of the US population. Barbershop Talk with Brothers (BTWB) was created as a community-based intervention to reduce the high HIV rates among heterosexual black males. Two factors that affect HIV risk reduction are stigma (negative views of those with HIV) and HIV transmission knowledge. High levels of stigma may lead to low levels of accurate knowledge, thus influencing prevention, acquisition and treatment of HIV. Explore which factors correlate to stigma and HIV transmission knowledge among heterosexual Black men.

**Methods**: This research used data from BTWB’s study of 859 men recruited from barber shops in East Flatbush, Flatbush, and Bed Stuyvesant. Eligible participants had to identify as Black/African American men and be sexually active in the prior three months with more than one female partner. They completed the Audio Computer Assisted Interview. Independent sample t-test determined statistically significant differences in mean and knowledge for each binary categorical characteristic.

**Major Results**: More accurate HIV transmission knowledge was significantly correlated for several factors including: US born (M=11.099, SD= 2.151), those with a high school education, or higher (M=11.009 SD= 8.765), and men who did not have protected sex (M=10.296 SD=2.944). Stigma towards those with HIV was high among men who are foreign born (M=25.547, SD=9.224), participants who did not complete high school (M=26.084, SD=9.092), and men who had been incarcerated (M=22.467, SD=8.481).

**Conclusion/Significance**: Overall, several factors contribute to HIV stigma and HIV transmission knowledge. Education outreach can focus on increasing rates of HIV transmission knowledge. Limitations included self-reported information regarding participant’s sexual behavior, and the use of baseline assessment data.

Comparing the Impact of Elderly Age on Outcomes Following Cervical Spinal Fusion: A Statewide Analysis with Two-Year Follow-Up

Cervical spinal fusion is employed for treating degenerative spine diseases, which are age-related conditions. Despite the age-dependent nature of these conditions, there is little data comparing the outcomes of elderly adults to active adults. Patient age may have a significant effect on postoperative outcomes and we hypothesized that elderly patients will experience poorer outcomes compared to younger adults after cervical spinal fusion.

**Methods**: The NY Statewide Planning and Research Cooperative System (SPARCS) database was used to identify all elective cervical spinal fusions performed from 2009 to 2011 in patients by ICD-9-CM code. Demographics and 2-year postoperative complication, reoperation, and readmission rates were determined for two age groups. These two groups were then compared with univariate analysis. Regression models were developed to identify potential predictive factors for two-year postoperative outcomes.

**Results**: A total of 14,578 patients were included with 96.6% 45-64 years (Younger) and 3.4% ≥ 80 years (Older) old at time of surgery. Older patients had higher complication (23.1 vs 4.7%, p<0.001) and reoperation (24.1 vs 13.3%, p<0.001) rates, but lower readmission (5.6 vs 13.2%, p<0.001) rates. Additionally, Older patients had higher rates of specific complications, including anemia (5.6 vs 0.7%, p<0.001), ARDS (3.8 vs 0.7%, p<0.001), and DVT (3.6 vs 0.3%, p<0.001). Regression analysis showed that patient age was a significant predictor for higher two-year complication (OR 1.063, p<0.001) and revision (OR 1.020, p<0.001) rates.

**Conclusion**: This study compared outcomes between Older and Younger patients following cervical spinal fusion. The Older patient group had higher two-year complication and reoperation rates, and age was a significant predictor for complication and revision rates. This study should assist spine surgeons preoperatively in risk-stratifying and counseling patients for postoperative outcomes after cervical spinal fusion.
Systematic handoffs to improve patient outcomes and resident satisfaction: a quality improvement study

**Background:** Studies have shown that an increase in patient handoffs is directly contributing to increased adverse medical events. Residents are at the forefront of patient care in many healthcare institutions and thus become an integral part of ensuring safe and efficient handoffs. Implementation of an innovative standardized handoff procedure has been shown to minimize medical errors without significantly disrupting workflow. The purpose of this study was to prospectively assess the effect of a standardized handoff procedure at our institution on patient outcomes, adverse events, and resident satisfaction.

**Methods:** Baseline data was collected on resident satisfaction with the quality of handoffs received using the current handoff procedure at our institution. Resident satisfaction was collected using a 3-question survey of satisfaction as rated on a 5-point Likert scale. Residents were also asked to track non-lethal adverse events, that could have been prevented with a more efficient handoff, i.e. an inappropriate altered mental status workup on a patient with known dementia that was not documented and not conferred in the handoff. A standardized handoff procedure was then created that best served the unique needs of our residency program. Following this baseline data collection, all residents were trained in the new handoff procedure and we again collected data on resident satisfaction and adverse events.

**Results:** After initiation of a standardized handoff method, residents are more satisfied with the quality of patient handoffs while covering teams feel more confident managing patients. Non-lethal adverse events were reduced pertaining to more efficient communication regarding patients’ baseline status, illness severity, or action list.

**Conclusion:** Our work underscores the importance of a thoughtful and deliberate effort to standardize the handoff procedure. Doing so improves not only resident satisfaction, but also reduces non-lethal adverse events.

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Should Routine CBCs be Routine? Lessons Learned in an Urban Resident Primary Care Clinic

**Background:** The complete blood count (CBC) is one of the most frequently ordered tests by internists. Many order a “routine CBC” without proven mortality benefit for routinely screening asymptomatic adults. We seek to understand the frequency at which CBCs are regularly ordered by internal medicine residents in the primary care setting and to determine the yield of this routine practice in our patient population.

**Methods:** A retrospective chart review was conducted on 99 patients seen in the resident primary care practice. Patients were stratified based on whether or not a CBC was performed. Documentation of symptoms or signs of anemia, history suggestive of bleeding, disorders of coagulation, features of sepsis, inflammation, hematologic malignancy or a history of unresolved abnormalities in at least one of the components of the CBC were tracked.

**Results:** The mean age of patients in the study was 53.3 years with a female predominance (67.5%). Of the 99 patient visits, 59 patients had CBCs performed. Of all patients who had a CBC ordered, 4 (6.7%) were symptomatic - 3 had symptoms of anemia and 1, suspicion for sepsis. The remaining 55 cases had no features suggesting a CBC would change medical management. Of the symptomatic patients, 3 (75%) had an abnormality in the expected parameter. Of the asymptomatic patients, 6 (13.6%) had anemia that did not require additional workup.

**Discussion:** Physicians are trained to listen to and examine patients before ordering lab tests. We supplement this with routine screening based on established preventative health guidelines. Although there are no such guidelines for the use of a screening CBC, it is widespread. Residents routinely order CBCs despite the low yield of the test in predominantly asymptomatic populations. Routine laboratory testing has become an epidemic within the healthcare system. In order to reduce unnecessary healthcare costs, physicians should choose wisely to provide quality care for patients.
Radiographic Efficacy of Middle Meningeal Artery Embolization in Treatment of Chronic Subdural Hematoma

**Introduction:** Chronic subdural hematoma (cSDH) can be associated with slow cognitive decline, co-ordination symptoms and rarely motor-sensory deficits. Open surgical treatment may or may not be always effective or indicated. Some far east operators have studied hypertrophy of Middle Meningeal Artery (MMA) and its embolization for treatment of such recalcitrant lesions. We present our experience of MMA embolization as an early-adoptive technique for treatment for poor or failed surgical candidates.

**Methods:** 10 patients diagnosed with unilateral or bilateral cSDH underwent MMA embolization. Size of SDH volume and densities were measured from time of initial discovery on imaging to pre-operative, immediate post-operative, and long-term follow-up. Time between procedure to obliteration was also measured based on follow-up imaging. Results Out of 10 patients, 5 patients were diagnosed with recurrent cSDH, and 5 with primary cSDH. 7 patients had bilateral cSDH, and 3 unilateral cSDH. Average volume on admission and pre-operatively were 20.7 and 20.6 cc, respectively. MMA embolization was on average performed of 26 days post symptoms onset. Immediate post-op CT was performed an average of 46 hours and showed enhancement of the subdural in 40% cases. This was associated with greater visualization of their extent with average increase in SDH volume to 21.2 cc. Follow-up CT imaging for these patients was done at an average of 128 days post-procedure. Average volume was down to 13.13 cc with mean reduction of 45% from presentation. 3 patients were determined to have complete obliteration after 1 year.

**Conclusions:** MMA Embolization has been shown to have a marked reduction in SDH volume post-operatively and can be used as a curative measure for patients who fail conservative medical management and neurosurgical intervention.
B23: Tarik Al-Bermani
Advisor(s): Andrew Chang, Melissa Lee, Yakira David

Use of Fundoscopy Clinic in Diabetic Retinopathy Screening

**Introduction:** In urban underserved safety net institutions, resources are limited, and patients have high socioeconomic barriers that prevent timely retinopathy screening. Traditionally, Kings County Hospital Adult Primary Care Clinic (KCHC) patients have been referred to ophthalmology clinic for retinal screening. Patients often have multiple comorbidities, and another clinic referral creates added burden and results in delay of proper and timely diabetic eye exams. Fundoscopic screening using onsite retinal imaging which is later reviewed by ophthalmologists was implemented KCHC in 2017 to reduce barriers to screening and optimize ophthalmology clinic utilization.

**Methods:** A chart review was performed on randomly selected patients in the 2nd/3rd year resident clinic diabetes registry who required annual retinopathy screening without primary ocular pathology or symptoms. Two groups were compared using July 1st, 2017 as the cutoff date when fundoscopy imaging was implemented in Adult Primary Care. Patients with primary ocular pathology or who were following with ophthalmology clinic were excluded.

**Results:** Of the 154 reviewed charts, 59 patients were referred to ophthalmology clinic prior to July 1st, 2017 (pre intervention), and a total of 23 patients were referred to either ophthalmology or fundoscopy photograph after July 1st 2017 (post intervention) in reviewed charts. Implementation of fundoscopic screening was associated with a 71 day decrease referral order to screening time (108 days v. 37 days respectively). However, 47% of referral orders resulted in a clinic visit prior to 7/1/17, versus 30% of referrals following 7/1/17. Only 4 charts of 23 reviewed were referred to fundoscopy screening (17%).

**Discussion:** Findings suggest that implementation of fundoscopic imaging screening in primary care has shown a marked improvement in any retinopathy screening referral time to completion.

B24: Naila Shereen
Advisor(s): Aaliya Burza and Patrick Geraghty

An audit of supplemental oxygen prescribing practices in an inpatient setting and its financial burden.

**Introduction:** Health care cost is 17.6% of GDP in the USA and 8%, is lost due to unnecessary services. In a resource-limited world, significant emphasis should be on prudent and practical use without wastage. Supplemental oxygen is very frequently prescribed, improperly monitored and poorly titrated, especially in the inpatient setting. Overuse of supplemental oxygen causes airway dryness and potential harm in addition to being an added financial burden. Evidence on how frequently supplemental oxygen is overprescribed and insufficiently monitored in an underserved community is lacking.

**Methods:** 1161 inpatients in a Brooklyn state hospital were reviewed prospectively and patients on supplemental oxygen via nasal cannula were identified. Patients on supplemental oxygen were examined and EMR was reviewed for an indication of use(Objectively and subjectively).

**Results:** Of all 1161 patients reviewed, 121 (10.4%) were on supplemental oxygen. Among the 121 patients, only 23 (19%) had a clear indication for oxygen supplementation. Among the 121 patients on supplemental oxygen 64 (53%) had no active order for supplementation while 69 (57%) had no continuous bedside pulse oximetry monitoring. The mean dose of supplemental oxygen was 2.5 L/min.

**Conclusion:** In our hospital, 1 in 10 inpatients are on supplemental oxygen and 80% of oxygen supplementation is without a clear indication. For an average use of 2.5 liters/min of supplemental oxygen for 24hrs the projected financial implication is to the tune of $250. These issues can be addressed and potentially decreased by education of healthcare professionals as well as improved auditing of oxygen supplementation.
Association Between Plasma Annexins & Vascular Function in African American Diabetic Patients

**Background:** Diabetes mellitus is characterized by dysfunctional hemostasis associated with stimulated coagulation process, disorder of platelet function and decreased fibrinolytic activity. Annexin A5 (ANX5) and Annexin A2 (ANX2) have been linked to increased risk of thrombotic events. We aimed to assess plasma levels of ANX5 and ANX2, and to investigate their relationship with vascular function in African American diabetic patients.

**Methods:** 125 diabetic patients were enrolled over 6 month period. Plasma ANX5 and ANX2 and were analyzed by enzyme-linked immunosorbent assay (ELISA). Microvascular function was assessed by the vascular reactivity index (VRI), which assess changes in digital temperature before and after release of arterial cuff occlusion. Large artery stiffness was assessed by carotid-femoral pulse wave velocity (PWV) using applanation tonometry. Carotid intima-media thickness (CIMT) was assessed by B-mode ultrasound image analysis.

**Results:** Patient population was categorized into two groups by glycosylated hemoglobin (HbA1c): ≤ 7% (well controlled) and > 7% (poorly controlled). Mean patient age was 60±8 years (female 64%), mean HbA1c levels were 8.1±2.2%. 80% had hypertension, 90% had dyslipidemia and 15% had chronic kidney disease. Pearson correlation analysis indicated that ANX2 was negatively correlated to ANX5 (r= -0.18, p<0.05). Univariate analysis showed a trend towards an association between ANX2 and VRI in well-controlled patients (HbA1c ≤ 7.0; β=0.007, p=0.06). Multi-regression analysis showed that ANX2, but not ANX5, was independently associated with VRI after adjusting for traditional cardiovascular risk factors (β=0.013, p=0.02; r²=0.41 for model).

**Conclusion:** Circulating ANX2 is associated with the development of subclinical microvascular dysfunction in diabetic patients. ANX2 can be a potential marker of early microvascular dysfunction in this population. Larger more prospective studies are needed to clarify this relationship.

Associations between Circulating Levels of Plasma of Proprotein Convertase Subtilisin/Kexin Type 9 and Vascular Outcomes in African American Diabetic Patients

**Background:** Studies showed conflicting results for the association of plasma PCSK9 with glycemic parameters and risk of type 2 diabetes. Whether plasma levels of PCSK9 could directly influence vascular function is still unclear. The present study aims to explore the relationship between circulating plasma PCSK9 and vascular function in African American diabetic patients.

**Methods:** 146 patients with type 2 diabetes were enrolled over a 6 month period. Mean patient age was 60±8 years (female 64%). 80% had hypertension, 90% had dyslipidemia and 15% had chronic kidney disease. Mean HbA1c levels were 8.1±2.2%. PCSK9 levels were measured by enzyme-linked immunosorbent assay (ELISA). Microvascular function was assessed by the vascular reactivity index (VRI), which assess changes in digital temperature before and after release of arterial cuff occlusion. Large artery stiffness was assessed by carotid-femoral pulse wave velocity (PWV) using applanation tonometry.

**Results:** In total population, PCSK9 levels were independently associated with VRI but not with PWV (r²= -0.001, p=0.031, r²= 0.389). PCSK9 levels were negatively correlated with VRI (Spearman's rho= -0.231, p= 0.044) and positively correlated with total cholesterol (Spearman's rho= 0.229, p= 0.045) in patients with acceptable glycemic control (HbA1c ≤7.5%) but not in poorly-controlled patients (HbA1c &gt;7.5%). Multiple linear regression analysis showed that PCSK9 was independently associated with VRI in patients with acceptable glycemic control (r²= -0.001, p=0.028, r²= 0.316) after adjustment for other independent variables such as age, gender, BMI, dyslipidemia, duration of diabetes, total cholesterol, LDLc, HDLc, creatinine, and triglycerides.

**Conclusion:** In this cohort, plasma PCSK9 levels significantly correlated with subclinical microvascular changes especially in patients with acceptable glycemic control. PCSK9 may be considered a target for early prevention of vascular disease in diabetes.
Electrocardiographic Findings in Upper Airway Obstruction

Upper airway obstruction (UAO) may be life threatening, and occurs in conditions such as laryngospasm, Sudden Infant Death Syndrome, and sleep apnea. In a rat model that permitted cardiovascular and respiratory monitoring, our group showed laryngospasm contributes to the pathogenesis of Sudden Unexplained Death in Epilepsy. Recordings from peripheral nerves and measures of airway inspiratory pressures demonstrated seizure-induced laryngospasm resulting in UAO. Also during UAO observed were distinct electrical deflections in the baseline of the electrocardiogram (ECG) that were proportional to the increased inspiratory effort. Similar findings in humans might serve as a marker of UAO. The Mueller maneuver (MM) is a technique that simulates UAO by inspiration against a fixed resistance, performed by inspiration through a tube with a fixed resistance applied. The MM evokes a number of adverse cardio-respiratory changes due to negative intra-thoracic pressure. Thus, the MM simulates UAO and can serve as a model to study the ECG in UAO.

Objectives: to determine if the MM will elicit ECG findings that are similar to those observed in the rat model, and whether the magnitude of the electrical signals correlates to respiratory effort.

Methods: We enrolled 20 healthy participants (24±4 yrs). The MM was performed three separate times against low, moderate and high resistance via a tube mechanism for 20 seconds while an ECG was recorded.

Results: The maximal amplitude of the ECG deflections significantly increased during low, intermediate and high resistance inspiration (p<.05). The magnitude of the increase in baseline amplitude at high inspiratory effort was greater than for the intermediate and low efforts. There were no significant changes in QRS amplitude.

Conclusion: UAO results in baseline ECG deflections in humans and is proportional to the degree of obstruction. The ECG may be a useful tool to detect and measure the degree of UAO in humans.

Nailfold Capillaroscopic Findings In Patients With Dilated Cardiomyopathy

Non-ischemic dilated cardiomyopathy (DCM) is characterized by the absence of epicardial coronary disease in the setting of depressed left ventricular (LV) function. Despite the absence of macrovascular disease, microvascular ischemia has been implicated in the pathogenesis of LV dysfunction. Post-mortem and cardiac biopsy studies have shown capillary loss within the myocardium, which may be systemic. Nailfold capillaroscopy (NFC) is a noninvasive technique used in rheumatology to evaluate Raynaud’s phenomena. NFC uses a hand held videomicroscope to visualize capillaries lying proximal to the fingernail since they are aligned parallel rather than perpendicular to the plane of the skin. Since NFC can be used to assess capillary morphology and density, it has been used to assess microvascular injury in patients with cardiovascular risk factors including hypertension and diabetes. To date, NFC has not been utilized in the setting of DCMP. The objectives of this study were to determine whether dilated cardiomyopathy (DCMP) is associated with NFC abnormalities and to determine whether abnormalities are related to disease severity. NFC was performed on 20 DCMP patients and 20 controls using a hand held digital microscope (Dinolite; California USA). As compared to controls, DCMP group had fewer capillaries (7.3±1.6 vs 8.7±1.3, p=.003), a higher final score (drop out (p=.001) and more regions with neovascularization (2.3±2.5 vs .85±1.2, p=.027) and ectasias (2.9±3.2 vs 1.2±1.2, p=.036). The SCD had significantly lower mean capillary number, higher final score, more dilated capillaries, (>50um) and a higher number of neovascularization areas. The number of micro-hemorrhages was similar between the two groups. In conclusion, DCMP is associated with reduced capillary density, as well as higher numbers of dilated capillaries and more regions of neovascularization. The prognostic implications of NFC findings merits further study.
Low Ankle Brachial Indices Reflect Left Ventricular Systolic Dysfunction: A Meta-analysis

Introduction: Peripheral artery disease (PAD) is a growing health concern in the United States due to its rising prevalence, negative impact on functional ability and increased risk for cardiovascular and cerebrovascular events. Multiple reasons may account for co-existing PAD and congestive heart failure including the prevalence of each disorder rising with age and sharing common risk factors and metabolic disturbances. In addition, while ankle brachial index (ABI) testing has long been the primary modality used to detect PAD, our group previously reported ABI values directly correlate with left ventricular (LV) systolic ejection fraction (EF). Since our initial report, other studies have found ABI related to LVEF.

Objective: To further evaluate the ABI - LVEF relationship using meta-analysis of relevant publications. Methods: A meta-analysis was performed. Identified publications from various databases were obtained and reviewed. Among 5 eligible studies containing 482 cases were included in the meta-analysis.

Results: The pooled correlation coefficient between LV EF and ABI was \( r = 0.37 \) (0.29-0.45). Heterogeneity among the studies was not significant, and publication bias was not found.

Conclusion: Although low ABI values are generally deemed to be indicative of PAD, there is ample evidence to support that ABI values are significantly correlated with LVEF. Low ABI values may reflect LV systolic dysfunction as well as PAD. The predictive value of low ABI values for cardiovascular events and mortality may in part relate to depressed LV systolic function rather than atherosclerosis alone. Accordingly, ABI values should be interpreted in the context of LV systolic function.

Application of Fractal Dimension to Human Coronary Arteries

Introduction: Coronary angiography is a commonly performed diagnostic procedure interpreted as normal in the absence of right (RCA) and left (LCA) coronary stenoses. However, patients with normal coronary angiograms may have abnormalities of the coronary microvasculature. Fractal geometry is a branch of mathematics used to characterize the complexity of vascular networks that deals with repeated patterns of self-similarity over increasingly smaller scales. Greater self-similarity may be quantified by the fractal dimension (FD) measure (the higher the FD, the more complex). FD is used to characterize the complexity of the retinal arterial bed.

Objective: This aim of this study was to develop methodology to characterize coronary using FD and to assess factors affecting FD coronary angiogram measurements.

Methods: We studied the coronary angiograms of 75 patients (60 ± 11 years) with normal coronary arteries. Images were digitally processed using Adobe Photoshop and GIMP (GNU Image Manipulation Program) and analyzed via the FracLac plugin of Image J (NIH). Results: FD of the LCA was higher than the RCA (1.58 ± 0.05 vs. 1.47 ± 0.05). RCA FD correlated with age and arterial pulse pressure and inversely with body mass index. There was a trend towards higher RCA FD values in females than in males. Stepwise digital subtraction of coronary branches found a diminution in FD for each branch subtracted. Images rotated clockwise in 45 degree increments showed a sinusoidal pattern with FD first increasing and then decreasing.

Conclusion: FD may be calculated for the coronary tree and may reflect small vessel branching. Values of FD appear related to several clinical variables. Meticulous attention to image orientation and standardization of image processing are essential to optimize reproducibility. These results are the basis for future studies that aim to evaluate the FD of the coronary arteries.
Simulation training to prepare residents to lead end-of-life discussions

Background: Among challenges medicine residents face are end-of-life discussions with patients and families. This was a prospective analysis of simulation-based medical education (SBME) as a tool for teaching residents how to discuss goals of care for dying patients.

Methods: 18 PGY-1, 2, and 3 internal medicine residents were selected at random to participate in this study and split into three groups. Each group had a standardized simulated family meeting at the beginning and end of the study to assess competency in leading a discussion of goals of care at the end of life. A palliative care attending blinded to the participant group assessed the performance based on the Family Meeting Behavioral Skills Checklist (FMBSC).

The control group received no instruction or intervention between the assessments. The Passive Learning Group received reading materials regarding leading end of life discussions. The Active Learning Group engaged in a simulation-based learning session, receiving one-on-one training by a palliative care attending.

Results: After the intervention, the active learning group had a significant increase in perceived ability to lead end-of-life discussions. Neither the control nor passive learning group had a difference in skills assessments, however the active learning group had an overall improved mean score that nearly reached statistical significance (p=0.055)

Discussion: The purpose of our study was to compare the use of simulation training for palliative care education to the traditional model of passive learning. Our results showed that both our residents’ skills and their confidence in leading an end of life discussion improve with SBME. Despite its small sample size our study supports the use of SBME and role play in palliative care education.

ATR inhibition is a promising radiosensitizing strategy for chemotherapy-resistant triple negative breast cancer

Purpose: Triple negative breast cancer (TNBC) represents an aggressive subtype. Patients with residual TNBC after neoadjuvant chemotherapy have a particularly high risk of locoregional recurrence despite aggressive subsequent local therapies, including radiotherapy. New radiosensitizers that address residual TNBC (i.e chemoresistant disease) are needed. TNBC is characterized by features such as high levels of oncogene induced replication stress, G1 checkpoint loss, and homologous recombination deficiency that increase dependence on ATR pathway signaling. We hypothesized that VX-970, a selective inhibitor of ATR, would radiosensitize TNBC.

Methods: Normal breast epithelial and TNBC cell lines were investigated in clonogenic survival, cell cycle, and DNA damage signaling and repair assays. In addition, patient derived xenograft (PDX) models generated prospectively from baseline and chemoresistant residual disease surgical specimens after neoadjuvant chemotherapy of patients in the Breast Cancer Genome Guided Therapy Study were analyzed for sensitivity to fractionated radiotherapy, VX-970, or the combination. Exome sequencing of the corresponding patient tumors was assessed for germ-line and/or somatic alterations in HR genes and an ex-vivo RAD51 foci formation assay was applied to determine the functional status of homologous recombination in each model.

Results: VX-970 preferentially inhibited ATR-Chk1-CDC25a signaling, abrogated the radiotherapy-induced G2/M checkpoint, delayed resolution of DNA double strand breaks and reduced colony formation in TNBC cells relative to normal epithelial cells after radiotherapy. In vivo, VX-970 did not exhibit single agent activity at the dose administered but markedly sensitized TNBC PDXs to radiotherapy, suggesting that VX-970 could overcome chemoresistant TNBC biology. Combination therapy was effective in both homologous recombination proficient and deficient models.
Eliciting Deep Dive Reflex in Sprague Dawley Rats Using 10 Second Mist and Water Interventions

Studies have been performed to learn more about an inherent drowning physiologic response called the Deep Dive Reflex (DDR) (Joost J. L. M. Bierens, 2016). Eliciting DDR involves using a cold water source to induce a vagal parasympathetic response which causes bradycardia and lower respiratory frequency. In theory, DDR decreases use of respiratory and cardiac muscles and therefore conserves oxygen. Our lab aims to show that the oxygen work saved from provoking DDR could be used to buoy oxygen saturation and survival in epileptic and central apnea patients. We began with the goal of eliciting DDR in Sprague Dawley rats using a cold water source to induce the response and that further studies with DDR can continue to yield new promising findings for central apneic patients.

Rats were anesthetized with urethane and a T-tube was inserted into the trachea to allow measurement of tracheal pressure transduction. EKG leads were attached to 3 limbs to record heart rate. O2 saturation was measured via a spO2 receiver on the left leg. Rats then received a trial of cold water or mist via nasopharynx for 10 seconds. Mist intervention led to bradycardia by showing a significant increase of 65% +/- 17% for RR interval when comparing pre-intervention to intervention (one tailed paired t-test; n=4; t=0.0022, Holm p-value = 0.0167). Additionally, respiratory frequency fell to 25% +/- 18% of original frequency over the same period (one tailed paired t-test; n=4; t=0.0018, Holm p=0.025). O2 Saturation for 10s mist dropped 5.3% +/- 3.5% (one tailed paired t-test; n=4; t=0.027, Holm p-value = 0.05). Trial runs with water instead of mist demonstrated similar results albeit with less dramatic measurement changes.

Our work demonstrates substantial bradycardia and respiratory rate decreases in the rat model while using mist intervention. We conclude that DDR can be elicited in the rat model with mist intervention and that further studies with DDR can continue to yield new promising findings for central apneic patients.

The effect of SMS gene family deficiency on lipid metabolism

Phosphatidylcholine-specific phospholipase C (PC-PLC) plays an important role in lipid signaling and cell membrane structure formation. However, so far, the gene(s) which is(are) responsible for PC-PLC activity is unknown. Based on the information of a predrug, D609, which can inhibit both PC-PLC and sphingomyelin synthase (SMS) activities, we speculate that the SMS gene family members have both PC-PLC and SMS activities. SMS family has three members: SMS1, SMS2, and SMSr, among them both SMS1 and SMS2 have SMS activity, while SMSr’s function is still mostly unknown. Utilizing both cell lines and specific knock-out mouse models, we indicate that SMSr seems to have PC-PLC activity by thin layer chromatography (TLC). Furthermore, SMS1/SMS2/SMSr triple deficiency on plasma tend to pull up phospholipid level, whereas to extremely decrease sphingolipid level. Thus, at least, SMSr gene seems to be responsible for PC-PLC activity. Moreover, SMS triple deficiency on plasma is able to affect the distribution of phospholipid and sphingolipids.
Response Of Liver Enzymes To Increasing Episodes Of Intermittent Hypoxia In Neonatal Rats

**Objective:** We examined the hypothesis that increasing episodes of intermittent hypoxia (IH) during hyperoxia influences the secretion of alkaline phosphatase (ALP), lactate dehydrogenase (LDH), and total bilirubin (TBL) in neonatal rats, analogous to a situation that may occur in the neonatal ICU.

**Materials/Methods:** At birth (P0), rats were exposed to: 1) 50% O2 with increasing brief hypoxia (12% O2) episodes per day; 2) 50% O2 with no IH episodes; or 3) room air (RA). Animals were exposed to IH or hyperoxia from P0-P7 or P0-P14. Pups were studied at P7, P14 or placed in RA from P7-P21 or P14-P21 to recover from IH (IHR). Plasma levels of LDH, ALP, and TBL were determined at P7, P14 and P21.

**Results:** ALP was elevated with hyperoxia but declined significantly in all IH groups (2-12 episodes) at P7 and P14. This effect remained during IHR. Elevations in LDH with hyperoxia and reductions in LDH occurred with 4-12 IH episodes in the P7 IH groups and during IHR with 6-12 IH episodes. In contrast, TBL was decreased with hyperoxia and elevated in the P7 IH groups exposed to 10 and 12 IH episodes and in the P14 IH groups exposed to 4-12 IH episodes. The levels remained elevated during IHR.

**Conclusions:** Data suggest opposing effects of hyperoxia and IH on biomarkers of liver function with IH being more detrimental. IH reductions in ALP and LDH may reflect adverse effects on growth, while IH-induced hyperbilirubinemia suggests liver injury. Early identification of infants who experience frequent IH episodes may lead to establishment of an effective timeline for injury prevention.

**Relationship of Complementary Medicine (CAM), Health Beliefs, and Adherence in a Population of Inner-City Kidney Transplant Recipients (KTRs)**

In other populations, use of CAM has been associated with less reliance on external control and more non-adherence to allopathic medicine. Little is known about the impact in KTRs. 16 stable, long-term patients were randomly chosen from outpatient Transplant Clinic. Pts were interviewed in person. Adherence was assessed using a 5 point Likert scale using 2 questions regarding remembering or changing medications without informing a physician, as well as single questions relating to specific medications to test for internal validity. Health perception was assessed using the IPQ-R form. Views about the Transplant were assessed using a modified Health Beliefs Questionnaire. Mean age of the population was 50.5 yrs. There were 11 men (69%) and 5 women (31%). Mean months since transplant was 136.4±31.2, creatinine 2.02±0.26 mg/dl. 70% had completed high school, 40% had income <$20K/yr. CAM was defined as use of herbal products or non-medical supplements, chiropractic, massage or relaxation/meditation. Vitamins, prayer or special diet was not included. 56% (9) pts reported using from 1-3 CAMs. Pts who used CAM were younger (43.3±3.9 vs. 59.7±3.0, p=0.006), were more likely to agree with the statement “If I become sick I have the power to make myself well again” (r=−0.05, p=0.048) and more likely to agree with the statement “When I get sick I just have to let nature take its course” (r=−0.53, p=0.032) and less likely to agree that “Having a kidney transplant makes me feel anxious” (r=−0.62, p=0.011). Patients who used more than 1 CAM were more likely to be non-adherent (r=−0.57, p=0.028). In our population: 1. Pts who used CAM were younger. 2. Pts who used CAM had increased belief that they could affect their own health and that disease should be allowed to “run its course”. 3. Pts who used more than one CAM were more likely to change or forget their medications. 4. Questions about CAM use should be included in the well-transplant visit as they may suggest a risk for non-adherence.
**B37: Claudia Zmijewski**

**Advisor(s): Mariana Markell**

**Relationship Between Income and Emotional Well Being Regarding Personal Health in a Population of Inner City Kidney Transplant Recipients**

Lower SES has been linked to a higher prevalence of disease states in the general population. There has been insufficient data on the relationship between income and emotions regarding personal health, specifically in the post kidney transplant population.

29 patients more than 8 months post-transplant were randomly chosen and interviewed from the outpatient transplant clinic in East Flatbush, Brooklyn. Feelings and Thoughts about the Transplant were assessed using a Perceived Stress Scale Questionnaire. Personal views about the Transplant were assessed using a modified Health Beliefs Questionnaire.

Mean age was 49.31 yrs with 21 men (72.4%) and 8 women (27.6%), 79.3% African or African-American. Mean months since transplant ranged from 8 months to 311 months. 65.6% reported an income <$20K/year with only 17.2% reporting income >$40K. 51.7% reported supporting themselves through disability payments, 10.3% were employed part-time, 20.7% full time and the remaining subjects were retired or unemployed. Pts had a mean creatinine of 1.67±0.76 mg/dl.

Patients with higher incomes (>20K) were less likely to agree with the statements “There is very little that can be done to improve my kidney transplant function” (r=-.513, p=.004), “There is nothing that can help my kidney transplant” (r=-.549, p=.002), “When I think about my kidney transplant I get upset” (r=-.631, p=.00239), “My actions will have no effect on the outcome of my kidney transplant” (r=-.431, p=.019). Patients who had higher incomes were more likely to agree with the statement “The function of my kidney transplant depends on me”, (r=.351, p=.049).

Conclusions: 1. Patients with higher incomes were less likely to feel upset regarding their kidney transplant. 2. Patients with lower incomes had more negative views on the outcome of their kidney transplant. 3. Patients with higher incomes were more likely to feel like their actions affected the function of their kidney transplant.

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**B38: Joseph Thomas**

**Advisor(s): Jin Montclare**

**Engineered Super Charged Protein-Lipid Complexes or Lipoproteoplexes for Efficient Gene Delivery**

Gene therapy has the potential to treat various diseases of the skin, including chronic wounds associated with diabetes. However, a vehicle capable of delivering nucleic acids across the many layers of the skin does not currently exist. We recently developed a lipoproteoplex consisting of a super-charged coiled-coil protein and Lipofectamine 2000, that has the ability to condense nucleic acids and deliver them trans-dermally in-vivo. The protein component of the lipoproteoplex was refined by rational design from a previous construct based on the cartilage oligomeric matrix protein coiled-coil domain (COMPcc). Protein structure and function was probed using circular dichroism spectroscopy, dynamic light scattering, and electrophoretic mobility shift assay. A new CSP variant, known as N8, was able to maintain the alpha helical structure and properties of self-assembly of its parent protein while showing an increased ability to bind to siRNA. These results indicate that this new protein variant can be incorporated into the lipoproteoplex to improve its ability to act as an effective vehicle for gene delivery.
B39: Stephanie Grube  

**Investigating Medical Student Attitudes Towards Abortion Education at a Large Urban Medical Center**

**Purpose:** To assess medical student attitudes towards family planning, identify the optimal venue for abortion education, note barriers, and elicit gaps in knowledge.

**Background:** Nearly 1 in 4 women will have an abortion by age 45. These procedures are not only common, they are safe, with the risk of major complication requiring hospital care stated to be less than 0.05%. Despite these facts, institutions continue to struggle to incorporate the topic of abortion into their Medical Student Education Curriculum.

**Methods:** A survey was administered to students (n=115) upon completion of the Ob/Gyn clerkship from 11/2016 - 12/2017 at SUNY Downstate Medical Center. Responses where labeled only numerically in order to maintain student privacy.

**Results:** All respondents indicated abortion should be part of medical curriculum. Most students rely on the 3rd year clerkship for abortion knowledge. Across all intended specialties, abortion scored an average 7.1/10 in how relevant abortion was to intended specialty. 42% have witnessed stigma surrounding abortion during their training, and over 50% believe stigma surrounding abortion factors contribute to the limited abortion education in medical school.

**Discussion:** Medical students at our large urban center were noted to value abortion education within their curriculum, with all respondents agreeing abortion care should be part of the standard curriculum. Most students preferred the Ob/Gyn Clerkship or small group settings for abortion education. Notably, the majority of students indicate that they obtain most of their abortion knowledge from their clerkship, even in our facility with previously limited standard structure for abortion education within the Clerkship.

Consideration that should be taken when incorporating abortion into the curriculum to include special areas of interest for students including laws, ethics and patient logistics, all in addition to medical and physiologic process of pregnancy termination.

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B40: Sean Mooney  

**Deep Dive Reflex Modulation of Seizure Activity**

Status epilepticus is one of the most feared and deadly complications associated with chronic epilepsy. Current treatments include abortive therapy with benzodiazepines and barbiturates that carry inherent risks associated with powerful medications. This research extends previous findings that speculated that the deep dive reflex may resemble central apnea observed in status epilepticus and also serve to “reset” breathing during these events. Sprague-Dawley rats were anaesthetized then injected with kainic acid to provoke artificial status epilepticus. Subsequent measurements of EEG amplitude, RR interval, respiratory frequency and amplitude, and oxygen saturation were collected in response to nasopharynx irrigation with ice-cold water mist. Analysis of variance found significant (p<0.05) responses comparing pre-intervention, intervention, and post-intervention to one another for all physiologic parameters except for EEG amplitude and strength of inspiration. Post-hoc analysis confirmed significant physiologic changes for most comparisons, but most importantly a significant decrease in EEG amplitude (p=0.0124) and increase in RR interval (p=0.01243) in response to the deep dive reflex. These findings demonstrate the possible utilization of nasopharyngeal irrigation with water mist as virtually risk-free termination of status epilepticus.
B41: Tong Wooi Chng

Challenging Diagnosis of Thyroid Hormone Resistance Initially as Hashimoto's Thyroiditis

**Background**: Resistance to thyroid hormone (RTH) commonly presents with goiter, ADHD, short stature and tachycardia. Herein, we present a difficult clinical case initially diagnosed as Hashimoto’s thyroiditis but had evolved to RTH with confirmed mutation in THRβ gene.

**Clinical case**: 15-year-old female with ADHD was referred to endocrinology for oligomenorrhea. She denies hypothyroid and hyperthyroid symptoms other than headaches associated with nausea but no vomiting and syncopal episodes during which she fainted for 5-10 minutes with no precipitating factors. Family history is significant for hyperthyroidism in mother and maternal uncle. Exam reveals normal height, weight, vitals, with no goiter, exophthalmos, lid lag or tremor. Initial tests showed elevated TSH (50.5 uU/ml, N<4.8 uU/ml) with normal FT4 (1.6 ng/dl, N: 0.93-1.6 ng/dl) and normal FSH, LH, estradiol and prolactin. Labs were repeated, with improved TSH (5.1 uU/ml), mildly elevated FT4 (1.97 ng/dl), T3 (209 ng/dl, N: 86-192 ng/dl) and normal TT4 (11.5ug/dl, N: 4.9-14 ug/dl). TSI Ab was negative but TPO Ab was positive (572 IU/ml, N<9 IU/ml). Three months later, levothyroxine 100 mcg po daily was started for Hashimoto’s thyroiditis when TSH increased to 30.59 uU/ml, with mildly elevated T3 level (199 ng/dl) but decreasing FT4 (0.99 ng/dl). Her TSH level subsequently normalized but FT4 level was increased up to 2.41 ng/dl despite lowering the dose of levothyroxine. The medication was then discontinued and 3 months later, her FT4 (equilibrium dialysis) and T3 continued to be elevated with normal TSH level. Genetic testing for our patient found a rare heterozygous mutation in c803 C>G (p Ala 268 Gly) in THRβ gene confirming RTH.

**Conclusion**: Fluctuating thyroid function tests in addition to TPO Ab positivity complicated the diagnosis of RTH, initially diagnosed as Hashimoto’s thyroiditis. Our patient initially presented with normal FT4 (down trending), which to our knowledge is uncommon in RTH.

B42: Philip Rosen

Perianal Abscesses in the Inner City Safety Net Hospital: Should We Anticipate Methicillin-resistant Staphylococcus aureus (MRSA)?

**Title**: Safety Net Hospital Perianal Abscesses: Which Bacteria Should We Target If Choosing to Empirically Treat With Antibiotics?

**Introduction**: Perianal abscesses are frequently encountered by ED physicians and surgeons. Treatment is usually incision and drainage with or without antibiotics. Prior studies report Methicillin-resistant Staphylococcus aureus (MRSA) rates in up to one-third of cultures.

**Methods**: We conducted a retrospective chart review of all perianal abscesses which presented in an inner city safety net hospital Emergency Department over a 5 year period. International Classification of Diseases (ICD)-9 coding was used to identify patients within the hospital’s electronic medical record.

**Results**: 220 patient were identified. Mean age was 42 years, 71% male, 88% Black, 6% Hispanic, 0.9% White. 75.1% were cultured at the time of drainage. Of those, 29.9% grew non-MRSA skin flora, 25.5% grew gastrointestinal bacteria, 16.6% grew MRSA, 13.4% were mixed, and 14.6% demonstrated no growth. 93% of patients received antibiotics. Overall recurrence, as defined by returning to the hospital with the same diagnosis, was 19.7% within 1 year of follow up.

**Conclusion**: Despite widespread concern for MRSA when empirically choosing antibiotics, community acquired perianal abscesses in an inner city safety net hospital were less than half as likely to grow MRSA, as compared to the general population.
An Unusual Presentation of Duodenal Obstruction

**Background:** The duodenum is a common site of obstruction, and can be caused by duodenal atresia, stenosis, and annular pancreas and malrotation, and very rarely, preduodenal portal vein (PDPV). Malrotation is the most dangerous entity in as much as it can lead to volvulus with disastrous results. While finding two anomalies has been often reported in the literature, there are rare cases in which 4 coexist.

**Methods:** A 34 week premature infant was delivered by spontaneous vaginal delivery to a primigravida with morbid obesity, pregestational diabetes, and pre-eclampsia who went into preterm labor, with birthweight of 1865g and apgar scores of 3 and 6 at 1 and 5 minutes respectively. There was a history of polyhydramnios and ultrasonographic findings of a double bubble. 

**Results:** Exploratory laparotomy revealed malrotation with 360 degree volvulus which was reduced followed by a Ladd procedure. However postoperatively, the patient was unable to tolerate feedings, and repeat imaging, continued to show a double bubble for which an upper GI series was then performed. A repeat exploration showed the presence of a preduodenal portal vein and annular pancreas with duodenal stenosis for which a duodenoduodenostomy was performed. The postoperative course was uneventful. Almost three years later, the patient has no gastrointestinal problems.

**Conclusions:** Duodenal obstructions are not uncommonly encountered by pediatric surgeons. Diagnostic workup should include plain radiography and upper GI series to exclude anomalies other than duodenal atresia or stenosis. Failure of recovery after correction of one anomaly should lead one to suspect the presence of additional anomalies.

Modern Computed Tomography for Anterior Abdominal Stab Wounds: Still Flawed

**Background:** Despite the advent of new generation computed tomography (CT), the role of CT imaging in the setting of anterior abdominal stab wounds (AASW) remains controversial. We correlated CT findings to operative findings in a large single-institution series of anterior abdominal stab wounds.

**Methods:** We retrospectively reviewed the medical records of 235 consecutive patients with AASW presenting to the ED of Kings County Hospital during a six-year period (2010 - 2016). Most were men (83%) with a mean age of 32 years (range 15- 83 years). Details of their clinical evaluation and imaging were correlated with operative findings documented in the operative report. Findings were classified as injuries to the envelope (abdominal wall) vs. visceral content.

**Results:** A total of 182 were admitted for treatment. One of every two patients (91 of 182) underwent CT imaging using a spiral multi-slice scanner. The scan revealed injuries to both envelope and visceral content in 12 patients (13% of those scanned). Twenty-seven patients had evidence of envelope injury only. Patients with positive findings on CT were either admitted for observation (n=11, 40%) or underwent operative exploration (n=16, 60%). Almost one in five patients (20%) had small bowel injuries that were not demonstrated on CT imaging.

**Conclusion:** This study, the largest single-institution study to date, shows that despite advances in modern cross-sectional imaging technology, helical multi-slice abdominal CT scans cannot be relied upon to prove rule out abdominal hollow viscous injuries.
Disparities in pediatric gun shot wounds

**Introduction:** Gunshot wounds (GSW) are the third leading cause of death in children in the US. Our aim is to determine whether disparities in mortality and length of stay (LOS) exist in this vulnerable population.

**Methods:** We identified children (≤15 years) suffering GSWs using the NTDB 2007-2012. We stratified by age, sex, race, insurance status, transportation type, injury severity via the Trauma Mortality Prediction Model score (TMPM), vitals, neurosurgical, otolaryngological, cardiothoracic, abdominal, musculoskeletal, and/or vascular procedure performed within 24 hours of arrival, facility volume, ACS adult/pediatric level, ICU admission, mechanical ventilation (MV), and disposition. Outcomes were mortality and LOS for which logistic regression and negative binomial regression were performed respectively.

**Results:** 1,234 patients were identified. TMPM (OR 1.41, p<0.0001), unstable vitals (OR 3.11, p=0.0263), and MV (OR 3.79, p=0.006) were independently associated with mortality. Medicaid (IRR 1.20, p=0.021), Medicare (IRR 2.10, p=0.031), ICU admission (IRR 1.77, p<0.0001), MV (IRR 1.75, p<0.0001), neurologic (IRR 1.50, p=0.0096), abdominal (IRR 1.84, p<0.0001), and musculoskeletal (IRR 1.67, p<0.0001) procedures were associated with longer LOS. ACS level II status (IRR 0.77, p=0.0148), discharge home (IRR 0.52, p<0.0001), and death (IRR 0.13, p<0.0001) were associated with shorter LOS.

**Conclusions:** Trauma severity is associated with mortality yet medicaid/medicare status is independently associated with longer LOS in pediatric GSWs.

The role of Hexim1 in Chagas Disease associated cardiomyopathy

**Background:** Chagas disease is a prevalent condition in the Americas with a high mortality rate. 30% of Chagas patients developed cardiomyopathy with resulting heart failure. Hexim1 is a conserved mammalian transcription factor that plays an important compensatory role during cardiovascular stress. To this end, we studied Chagas induced cardiomyopathy (inflammatory model) in wild type and Hexim1 heterozygous mice.

**Study Design:** Transcriptome analysis indicated that Hexim1 heterozygocity triggers inflammatory response during pressure overload hypertrophy. In order to evaluate this finding further, we infected Hexim1 heterozygous mice with T. cruzi as an established pro-inflammatory model that triggers Chagas-associated-cardiomyopathy.

**Results:** Hexim1 heterozygous mice developed cardiomyopathy earlier than infected wild type mice, characterized by increased fibrosis and enhanced inflammatory response due to increased chemokines expression, activation of pro-inflammatory signaling pathways including Jak/Stat, NF kappa F, and TGF F. M-mode echocardiography revealed significant left ventricular remodeling. Confocal studies revealed co-localization /expression of chemokines and Hexim1 in human biopsies of Chagas cardiomyopathy sections.

**Conclusion:** We hypothesize that Hexim1 plays a cardio-protective role in the progression of heart failure and cardiomyopathy in animal models and humans as well, by functioning as an inhibitor of pro-inflammatory pathways that drives the progression and maintenance of Chagas induced cardiomyopathies.
Left Ventricular Assist Devices - Past, Present, and Future

Ever since the introduction of Implantable pulsatile MCS devices in the 1970’s and 1980’s, there has been a massive makeover in terms of device design and number of mobile parts, which has influenced the long-term durability of these devices while restricting the mechanical wear over time. Heartmate XVE (Thoratec Corp. Pleasonton CA) was the first implantable device approved for both BTT and DT, and has been used worldwide. Various clinical trials including the REMATCH trial showed significant survival and quality of life benefits favoring VAD versus optimal medical therapy. This discovery was followed by a generation of pneumatically powered devices available for implantation in Paracorporeal (PVAD) and Intracorporeal (IVAD) (Thoratec Corp.) versions that received FDA approval as BTT in 1995. Numerous other devices including Syncardia Cardio West, Total Artificial Heart (Syncardia System Inc. Tuscon, AZ) were known to breath life during the era of pulsatile circulatory device support. Major transition was achieved in this specialty with introduction and FDA approval of HeartMate II, the continuous flow LVAD’s in 2008. These axial and centrifugal flow LVAD’s had significant advantage of smaller size and being more durable than previous generation of volume displacement pulsatile pumps. BTT trial for these pumps demonstrated 68% survival rate at 1 year in initial study cohort. HeartWare (HVAD) was second in line centrifugal flow pump that was designed to be used as long term implantable device which had the potential of being used as Bi-VAD with separate pumps being implanted for right and left ventricular support. Lastly, Recent experiences with HeartMate III introduced clinically in 2014 have shown exciting and promising results pertaining to lack of pump thrombosis. Improved durability and reduced short and long-term morbidity associated with Mechanical Circulatory Support have decreased the need for urgent cardiac transplantation.

Caffeine and Ibuprofen Co-Administration Decreases Neonatal Intermittent Hypoxia-Induced Inflammatory Prostanoids, Oxidative Stress and DNA Damage in the Kidneys of Neonatal Rats

Preterm neonates are at risk of oxidative stress and renal damage due to intermittent hypoxia (IH) episodes. Both Caffeine (Caf) and Ibuprofen (Ibu) have antioxidant properties In the kidneys, cyclooxygenase (COX) plays a role in kidney development and function. We tested the hypotheses that: 1) neonatal IH induces renal oxidative stress and inflammatory prostanoids; and 2) Caf and Ibu co-administration mitigates oxidative stress and prevents IH-induced renal injury. Newborn rat pups (P0) were randomized to room air (RA), 50%O2 or IH (50% O2 with brief episodes of 12%O2), and received: 1) Cafcit loading on P0, maintenance from P1-P14; 2) Neoprofen loading on P0 and maintenance from P1-P2; 3) Cafcit+Neoprofen; or 4) equivalent volume sterile normal saline (NS) from P0-P14. Groups were studied at P14 or placed in RA from P14 to P21 for recovery (IHR). Control groups were raised in RA with equivalent treatments. Whole kidneys examined for histopathology, levels of 8-isoPGF2α (oxidative stress), 8-OHdG (oxidative DNA damage), prostanoids and their receptors, and COX expression. Results: IH induced significant pathological changes in the kidneys coincident with induced inflammatory prostanoids, oxidative stress and DNA damage. These responses were significantly decreased at P14 with Ibu and at P21 with Caff (p<0.01). The effect of Caff+Ibu co-administration was most predominant on DNA damage as early as P14. Both Caff, Ibu and their co-administration had suppressive effects on COX isoforms and prostanoid production (p<0.01) during and post treatment. Conclusions: Neonatal IH causes significant pathological changes in renal architecture induced by oxidative stress and DNA damage. Caff appears to potentiate suppressive effects of Ibu on renal COX and prostanoids suggesting synergism between the two drugs, and an overall risk reduction of complications due to neonatal IH. However the effects on COX-2 may have implications for renal vascular resistance.