DAILY EXPOSURE TO A HOUSEHOLD PROJECT LEADING TO SUBFERTILITY

Author: Dr. S. Mikhael

Introduction: A daily household product used by many on a regular basis has recently been brought to media attention as a probable carcinogen. Of note, styrene, an aromatic hydrocarbon is most commonly found in Styrofoam cups, plastic containers, and even home insulators. Despite possibly deeming a black box warning, little focus has been geared towards its effects on reproductive potential. The aim of our study was to demonstrate, at a single cell level, how styrene can alter oocyte quality, through alterations in chromosomal (CH) alignment and microtubule (MT) structure therefore possibly impacting future fertility. We hypothesize that styrene in fact deteriorates oocyte quality through a mechanism that involves the generation of reactive oxygen species (ROS).

Methods: In our current work, we investigated the effects of styrene on metaphase II mouse oocytes (n = 50) through exposure to increasing concentrations (0-25 μM) for 45 mins (time of maximum plasma peak toxin levels). Oocytes were fixed and subjected to indirect immunofluorescence for detecting changes in MT structure and CH alignment using a previously validated 1-4 scoring system. In addition, generation of ROS was evaluated using Cellular ROS Detection Assay Kit. Statistics used were Chi-square test using SPSS 21.0 (SPSS Inc., Chicago, IL, USA); p<0.05 was considered statistically significant.

Results: Collectively, treatment of oocytes with increasing concentrations of styrene showed a linear increase in poor scores for both MT structure and CH alignment, which plateaued at 5 μM indicating the biological relevance of this study. The treated oocytes showed significant enhancement in production of ROS when compared to controls (p<0.05), as demonstrated by the significant increase in the mean fluorescence index.

Conclusions: Investigating styrene and other related toxins that share a common ethylene group (-CH=CH2) along with determining the primary insult which is the generation of ROS will resolve the recent upheaval and expedite in removing such toxins from daily exposure thus preserving reproductive function along with preventing other diseases such as cancer.
ANALYSIS OF RESIDENT TEACHING ON GLENOHUMERAL SUBLUXATION TO HEMIPARETIC PATIENTS BEFORE AND AFTER PROVIDING AN EDUCATIONAL PAMPHLET

Author: Dr. A. Hussain

Glenohumeral subluxation (GHS) is defined as a partial or incomplete dislocation of the shoulder joint. GHS is a common and extensively-cited complication after stroke. Various sources have reported GHS to be present in 17 to 81 percent of hemiparetic patients. GHS has the potential to cause shoulder pain and/or altered upper extremity function and can lead to delays in achieving independence.

Currently at Beaumont Hospital-Taylor, there is no consistent protocol in place for educating hemiparetic patients on the implications and risks of GHS. This quality improvement (QI) project will aim to determine whether or not giving a patient an educational pamphlet along with a brief explanation will improve that patient’s knowledge of GHS and its associated risks.

The effectiveness of our QI project will be measured by calculating the score on a five item questionnaire administered before and after giving the patient the pamphlet. The degree of change/success will be measured by the change in score from the pre-educational questionnaire to the post-educational questionnaire.

At the time of submission of this abstract, we have enrolled roughly ten patients into our study and our goal is to have at least twenty by the end of our one month data gathering period. Thus far, results look promising. On average, patient scores on the post-educational questionnaire are higher than that on the pre-educational questionnaire.

These results thus far affirm our hypothesis that a simple educational pamphlet can serve to educate patient's about GHS. Patient understanding of a given disease process is important so that they may recognize the signs and symptoms they are experiencing and bring it up to their physician for appropriate interventions to be put into place. Our QI project serves as a template to implement an easy-to-use tool for providers to help educate patients about disease.
Comparing Risk of Primary Cesarean Section Rate and Body Mass Index Category in a Community-Based Michigan Hospital

Author: Dr. J. Scholey

Introduction: Obesity is a risk factor for delivery by cesarean section. A large proportion of patients at our community teaching hospital are obese; we suspect that this is the main factor contributing to high proportion of women who have primary cesarean sections.

Objectives: 1.) To determine if there is an association between body mass index (BMI) category and the likelihood of a primary cesarean section (c-section) in the patient in labor or the patient who is electively induced. 2.) To determine if maternal height, independent of weight, is associated with the likelihood of primary c-section.

Materials and Methods: We conducted a retrospective chart review of adult obstetric patients who delivered between 1/1/2014 - 6/30/2017. The patients were nulliparous with a singleton, term (≥ 37 weeks’ gestation) delivery, with the fetus in vertex presentation. Patients were excluded if their pregnancy was complicated by perinatal conditions (preeclampsia, gestational diabetes, oligohydramnios) or medical conditions (chronic hypertension, diabetes, thyroid disorder). Data were analyzed using the chi-squared test, Student’s t-test and logistic regression.

Results: Of 466 deliveries, 56% were c-sections. With each increasing BMI category, there was an increase in the proportion of deliveries by primary c-section (figure). Similar rates were seen for those presenting in labor or for elective induction of labor. The mean height of patients who delivered vaginally was 1.64 ± 0.07 m. vs. 1.63 ± 0.07 m. for c-section, p=0.009. From multivariable regression, after controlling for gestational age and maternal age, overweight/obese women were 2.6 (p=0.01) times more likely to have a c-section and Obese II/III women were 6.6 times more likely to have a c-section (p<0.0001) than normal weight women.

Conclusions: There was a significant linear trend showing that the likelihood of delivery by cesarean section increased with BMI category. This remained true if the patient presented in labor or for elective induction or labor.
Scheduled Outpatient Red Blood Cell Exchange (Rbcx) Reduces Admissions and Complications in Sickle Cell Disease

Background: Sickle cell disease (SCD) is one of the most common inherited genetic disorders. It is caused by a mutation in the beta globin chain that allows for polymerization, which causes the phenotypic sickle shape of the red blood cells (RBCs). SCD causes patients to suffer a number of complications such as pain crises, anemia, pulmonary hypertension, chronic kidney disease (CKD) and stroke. This leads to significant mortality, hospital admissions and lengthy stays. Many patients suffer from chronic pain and require significant amounts of opioids. Hydroxyurea works well for some patients but is not a cure. Many patients do not adhere to it well. For patients with persistent severe disease, our institution has offered scheduled outpatient red cell exchange (RBCX) to reduce complications from SCD.

Objectives: Our objective is to look at the effect of scheduled outpatient red cell exchange on sickle cell complications, specifically pain crisis and stroke. Sickle cell crisis result in significant morbidity for the patient and also increases health care costs in terms of recurrent admissions with prolonged length of stay. Patients with sickle cell disease are dependent on high opioid requirement everyday. We aim to assess the effect of RBCX in reducing the complications including recurrent stroke, number of pain crisis, hospital admissions and opioid requirement.

Methods: After obtaining IRB approval, we queried the procedure logs in our apheresis center to identify patients on the SCRX program from 1/1/2000 to 1/15/2016. We are doing a retrospective chart review of identified patients. Baseline demographics, indication for enrolling into RBCX, daily pain medication requirements (standardized to oral morphine equivalents (OME), history of DVT/PE, iron overload, Chronic Kidney Disease and pulmonary HTN. We are also evaluating compliance with RBCX, number of hospital admissions and length of stay (LOS) one year before and after enrolling in RBCX.

So far, we have analyzed data from 104 patients on our RBCX program with median age of 24 (15-62). 42% are male and 86% were HbSS. 35 patients were enrolled for pain and 54 for strokes. 66% patients had been on hydroxyurea prior to enrolling but only 13% continued on it while on RBCX. 86% used intermittent central venous catheters (CVC) as access for exchange. 54% of patients had documented iron overload with 87% of those on an iron chelator. Excellent compliance with SCRX was seen (92%). In the pain group, 18 (51%) were on hydroxyurea prior to enrolling to RBCX; only 7(20%) continued the drug while on the program. Median age in pain group was 27 (19-56), 17(49%) were males and 29(83%) HbSS. Mean HbA level on enrolling in pain group was 45.8%. The year prior to enrolling, median number of admits was 5, which dropped to 2 during first year on RBCX (decrease of 60%). Median length of hospital stay in 1 yr prior was 16 days vs 2 days for the year post starting RBCX (decrease of 87.5%). In the pain group, OME decreased by 21.5% from 370 to 290 mg/d. There were no cases of VTE associated with periodic CVC placement. Median ferritin level prior to RBCX in the stroke group was 2988 (56-11877) with 63% of patients receiving concurrent chelator therapy.

Conclusions: Sickle Cell Disease is a morbid condition with pain being a major reason for hospital admission and stays. We describe a single center experience with RBCX. In the patients enrolled for pain, we demonstrated a decrease in opioid use (21.6%), in hospital admissions, and in length of stay. In the stroke group, there was no recurrent stroke. Interestingly, there were no admissions for pain crisis or ACS in stroke group indicating RBCX is effective in preventing complications. Compliance was excellent in our program and complications, such as line associated VTE and infections, were not found in this initial group. Additional analyses of the rest of our population are underway. While this is a modest sample, we believe RBCX is a viable treatment option in a patient population with a complicated disease and limited therapies.
Improving Discharge Summary Documentation Quality with Anonymous Peer Auditing

Author: Dr. M. DeFreitas

Discharge summaries are valuable documents because they serve as essential tools for transition of care. Incomplete and inaccurate discharge summaries can cause gaps in communication between providers and negatively impact patient care. In this quality improvement project, we aimed to evaluate the effect of anonymous peer auditing on the quality of discharge summary documentation amongst residents.

Discharge summaries by transitional year residents were randomly selected, de-identified, randomized, and distributed to peers. The audit tool was an electronic questionnaire with discrete responses assessing for the presence and accuracy of key documentation elements. Since the academic year of 2014-2015, twelve transitional year residents performed quarterly audits on five discharge summaries by peers. A total of 180 discharge audits per academic year were completed. Scores from the audit questionnaire were used as a surrogate for discharge summary quality. Additionally, a survey was administered in 2018 to assess subjective perceptions of the efficacy of this intervention. The data was analyzed.

Each academic year since 2014-2015, 4th quarter audit scores were higher than 1st quarter audit scores by a statistically significant margin. In 2018, the survey of subjective perceptions achieved a 92% response rate, and 82% of survey responders indicated positive perceptions towards this intervention. These results support the use of anonymous peer auditing tools to improve the quality of discharge documentation. However, frequent audits may be impractical for many residents and other health professionals, and contribute to administrative fatigue. In order to make this model more accessible to other health professionals, we plan to reduce the total number of peer audits in future cycles, and analyze whether similar positive effects can be achieved.
**USE OF PRISM SCORING SYSTEM TO INITIATE PALLIATIVE CARE CONSULTS**

Author: Dr. S. Salamkeh

**Introduction:** Various scoring systems have been used to risk stratify patients for clinical conditions, outcomes and prognosis. These scores may be used to improve the quality of care and minimize healthcare costs for high risk patients near the end of life. Our hospital system uses PRISM (Placement Resource Indicator for Systems Management). Historically PRISM 1 patients have higher mortality (30% at 3 months, 60% at 6 months). Palliative care consults (PC) have shown to improve survival and lower healthcare costs at the end of life. Therefore, PRISM 1 patients may benefit from early PC intervention. Our QI project assesses the impact of PC for PRISM 1 patients.

**Methods:** Every PRISM 1 patient admitted to the GME service from 6/30/2017 to 12/29/2017 was evaluated for appropriateness of a PC. If appropriate, a PC was discussed with the patient, and placed if the patient agreed. ICU patients were not included. Statistical analysis using Chi square was performed to determine the role of PC on 30 day readmission, change in code status during hospitalization, discharge disposition. Additional subgroup analysis was performed.

**Results:** Of the encounters receiving PC consult, 101 were first-time PC consults. 47% were DNAR on admission and the remainder were Full Code. Previous PC encounters were more likely to reject PC compared to first-time PC (53% versus 27%, p=0.1032). Encounters DNAR on admission rejected more PC (41% versus 28%, p=0.04496). 30 Day readmission rates for encounters receiving PC was higher compared to those who did not, but not statistically significant (31% versus 20%, p=0.1420). This was consistent when limiting only to patients who did not previously receive PC (26% versus 17% p=0.2945). Encounters receiving PC were more likely be discharged to hospice (29% versus 7%, p=0.0031) and less likely to be discharged home without hospice (21% versus 46%, p=0.0031). More encounters who received PC died while in the hospital compared to those who did not receive PC (13% versus 8%, p=0.0031p=0.0). 14 patients changed their code status to comfort care while in the hospital, 8 of these had received PC (p=0.3954).

**Conclusion:** We performed a QI project by systematically offering PC consult to appropriate PRISM 1 patients. Significant percentage of patients who had previously interacted with PC or were DNAR on admission rejected PC consult. Patients who received PC were more likely to be discharged to hospice, switch code status to comfort care, and were more likely to die in the hospital. They also had more frequent 30-day re-admissions. This suggest that although patients with PC pursued less aggressive medical treatment, this strategy did not reduce 30-day re-admission rates It is also likely that those patients with more frequent hospitalizations were more open to a new PC consult.
DETERMINING DERMATOLOGIC CLINICIAN AND STAFF PREFERENCES REGARDING INTRAOPERATIVE ELECTROSURGICAL SMOKE DURING OUTPATIENT SURGERY

Author: Dr. B. Neill

Background:
During surgery, use of electrosurgical units causes thermal destruction of tissue and generates smoke that has been shown to contain harmful chemicals as well as live cellular material. Chemicals in electrosurgical smoke plumes include nitriles, benzenes, carbon monoxide, hydrogen cyanide, indoles, phenols, pyridine, pyrrole, styrene, toluene, and xylene. Animal model studies have shown pathologic changes to the lungs of rats exposed to surgical smoke in a dose-dependent manner. Diseases and symptoms linked to inhalation of electrosurgical smoke in humans include, anemia, eye irritation, hypoxia, dizziness, nasopharyngeal lesions, vomiting, sneezing, throat irritation, and weakness. Concerns exist among clinicians and staff that exposure to these substances may be harmful if inhaled. We seek to define staff attitudes toward the use of smoke evacuation and the potential impact of an outpatient smoke evacuation protocol on staff satisfaction.

Methods:
We developed a REDCap survey that was approved by the executive committees of the American College of Mohs Surgery (ACMS) and the American Society for Dermatologic Surgery (ASDS) for distribution to their memberships. Surveys were sent via email using the corresponding list serves. A total of 437 useable responses to the survey were collected. 401 were from physicians and 35 were from staff. The survey consisted of 16 questions. The first 12 survey questions ascertained pre-intervention perceptions of electrosurgical smoke followed by the intervention which requested that the remaining questions be answered in light of the information that electrosurgical smoke inhalation may be harmful to health. On most questions respondents could answer on a scale of 1 to 10. Values of 6-10 on responses to noticing smoke and 5-10 on responses to whether the smoke smell is bothersome were grouped for some analyses.

Statistical Analysis:
Pre-intervention characteristics of staff and clinicians noticing smoke and being bothered by smoke were assessed using proportions and 95% confidence interval estimates of the proportions. A cross-tabulation using Bhapkar’s test for marginal homogeneity was used to assess whether information presented on potential smoke harms changed responses. Statistical analysis was performed using SAS v9 (SAS Institute Inc, Cary, NC, USA).

Results:
There were a total of 437 useable responses. 54.36% (95% CI 49.5%-59.1%) of respondents pre-intervention noticed electrosurgical smoke, and 35.5% (95% CI 31.0%-40.2%) were bothered by it. Once presented with the potential risk of electrosurgical smoke, 31 more respondents were bothered while 44 fewer were not at all bothered (P<0.0001). 69% favored increased cost associated with smoke remediation at baseline and 71.4% favored increased cost once presented with the potential risk (P= 0.0075).

Conclusion:
Many dermatologic clinicians and staff notice and are bothered by surgical smoke to some extent. When presented with the possibility that inhaling electrosurgical smoke may be harmful, dermatologists were more likely to be bothered by electrosurgical smoke, more likely to prefer a practice environment where smoke evacuation was available and more likely to be willing to bear additional cost for smoke evacuation.
Investigating the Efficacy of Interventions to Improve Parental/Guardian Acceptance of the Influenza Vaccine for Pediatric Patients

Author: Dr. M. MacLeod

Introduction: Influenza infections result in significant morbidity and mortality in the pediatric population. Annual influenza vaccinations are recommended for patients over the age of six months by both the Centers for Disease Control (CDC) and the American Academy of Pediatrics (AAP). Appropriate vaccination decreases the incidence of influenza infections, both through direct protection of each vaccinated individual, as well as through herd immunity.

Objective: To determine if educating pediatric residents about pediatric parental/guardian concerns regarding the influenza vaccine and giving residents specific advice on how to recommend the vaccination leads to an increase in the proportion of children vaccinated.

Methods: This was a pre-post intervention chart review conducted at the St. John Pediatric Resident Clinic. We conducted a pre-intervention (11/1/16-1/31/17) retrospective chart review of office visits for patients between six months and 18 years of age. This was followed by an educational intervention for the residents. A second chart review was done for the post-intervention period, 11/1/17-1/31/18. Data were analyzed using the chi-squared test and Student’s t-test.

Results: We assessed 502 patients in the pre-intervention period and 507 in the post-intervention period. There were no significant differences between gender, age, or significant past medical history (PMH) between the two groups. During the pre-intervention period, 33.7% of patients were offered the vaccine compared to 46.6% in the post-intervention period (p<0.0001). For vaccine administration, in the pre-education period, 57.7% of children did not receive the vaccine, 16.4% received it and 10% received it without an indicated booster shot, compared to 49.7%, 16.8% and 14.8%, respectively, in the post-administration period (p=0.04). Predictors of the vaccine being offered (over both periods) are shown in the table.

Conclusion: Our educational intervention increased the proportion of children who had the vaccine offered and administered to them at a clinic visit in our primary care pediatric clinic setting. Regular resident education on this topic may help to sustain this improvement.
Fatigue Increases Anterior Cruciate Ligament Injury Risk in Youth Athletes: Results from a Field-Based Drop-Jump Test

Author: Dr. M. Fidai

Abstract

Background: Anterior cruciate ligament (ACL) injury is common among adolescent athletes. The role of athlete fatigue on ACL injury remains unknown.

Purpose: The purpose of this study was to determine if fatigue increases ACL injury risk in adolescent athletes, as measured through a standardized fatigue protocol and video-based drop-jump test. A secondary aim was to determine if individual risk factors could be identified that place certain athletes at high risk for injury. Our hypothesis was athlete fatigue would lead to an increase in the risk of ACL injury as determined by a field-based drop-jump test.

Study Design: Case Series

Methods: Youth and adolescent athletes were recruited for this video analysis study. Athletes were recorded performing a standard drop-jump test assessing dynamic valgus upon landing. Participants then completed a standardized fatigue protocol consisting of a timed period of high-intensity aerobic tasks. Fatigue was quantified using a maximum vertical jump, which was compared to pre-fatigue values. The 3 drop-jump tests were repeated post-fatigue. All drop-jump recordings were randomized and scored for injury risk by 11 independent reviewers, and athletes who demonstrated increased injury risk after the fatigue protocol were identified. Uni-variate analysis was performed to identify characteristics that predisposed athletes to increased risk.

Results: Eighty-five (47 females and 38 males) athletes with an average age of 15.4 years were included in this study. Forty-nine percent of athletes demonstrated an increase in injury risk graded by drop-jump assessment after a high-intensity fatigue protocol. A significantly higher percentage of athletes were graded “medium or high-risk” in jumps recorded after the fatigue protocol (68%) as compared to prior to the fatigue protocol (44%; $P < 0.01$). Female athletes ($P < 0.01$) and those older than 15 years of age ($P < 0.01$) were the most affected by fatigue.

Conclusion: In adolescent athletes, fatigue appears to increase the risk of ACL injury as assessed by field drop-jump testing. Female athletes and those over the age of 15 years were the most vulnerable to the effects of fatigue on ACL injury risk. These results may guide risk-stratified selection for ACL injury screening when utilizing drop-jump testing.
FUSION AND QUALITY OF LIFE OUTCOMES IN TWO CONSECUTIVE LEVELS NON-SEGMENTAL MINIMALLY INVASIVE TRANSFORAMINAL LUMBAR INTERBODY FUSION (MiTLIF): A FEASIBILITY STUDY

Author: Dr. S. Rajamand

Introduction: Fusion rates for non-segmental MiTLIF using four instead of six screws has not been studied. We conducted a pilot study to determine the baseline fusion rate in patients who underwent two-level non-segmental MiTLIF.

Methods: This was a pilot study to evaluate baseline fusion rate for non-segmental vs. segmental two-level MiTLIF in this institution. We reviewed patients who underwent two-level minimally invasive lumbar fusion during 2015 in two hospitals under multiple surgeons. Three consecutive lumbar vertebrae were instrumented using four instead of six pedicle screws without instrumenting the intervening vertebra in a non-segmental technique. We excluded patients <18-year-old, with traumatic, oncologic, infectious etiology, had 5 pedicle screws inserted, or previous spinal surgery at the same levels. The primary outcomes, fusion, SF-12, ODI, and back visual analog score were collected prospectively at 1 year postoperatively by in-person interviews or by phone. Fusion was evaluated using the Suk fusion criteria. Secondary outcomes were readmission/reoperation within one month due to screw-related complications, estimated blood loss, operating room time, and fluoroscopy time. Univariate analysis was used and P<0.05 was considered statistically significant. Sensitivity analysis was performed.

Results: We studied 116 patients. Seven patients were lost to follow up. Ninety-five (82%) patients had four-screws inserted. Patient perioperative characteristics, fusion and quality of life outcomes were not significantly different between the two groups. Readmission/reoperation was 29% for six screws compared to 4% for four screws. The mean length of stay was 2 days longer for six screw placement. Fusion rate between the non-segmental vs. segmental groups was 87% vs. 86%, respectively. Range of fusion was 82%-88% for non-segmental vs. 82%-86% for segmental instrumentation in sensitivity analysis.

Conclusions: We did not demonstrate any significant difference between segmental vs. non-segmental instrumentation for two-level MiTLIF regarding fusion or quality of life. This is an expected outcome as this is a pilot study with both power and data distribution issues. We calculated our sample size to be 467 for our second-phase longitudinal cohort logistic regression study.
AVOIDING CHF READMISSION- OVERUSING BNP/NTPROBNP AGGRESSIVELY TRIAL (ACROBAT)

Author: Dr. F. Ido

Abstract

Introduction- Congestive heart failure (CHF) is one of the most common reasons for hospital admission with a high rate of readmission. Although considered a clinical diagnosis, signs and symptoms of CHF exacerbation are often nonspecific. Dyspnea, which is often the primary presenting symptom is also present in patients with underlying lung disease. Previous research led to biomarkers such as NT-proBNP/BNP that were found to have a high positive predictive value for diagnosing CHF exacerbation. When elevated, NT-proBNP values greater than 500pg/ml correlate to CHF as the cause of dyspnea. Although this cut off value has shown accuracy in differentiating cardiac from a pulmonary etiology, it is unclear whether patients with a diagnosis of CHF exacerbation have declining levels that eventually reach below this threshold. If patients maintain levels above this threshold upon discharge then utilizing the biomarker during readmission for determining the etiology of dyspnea may incorrectly influence clinical decision making.

Methods- A total of 26 patients were enrolled from two separate institutions with a confirmed diagnosis of CHF exacerbation. Patients with CHF due to preserved ejection fraction (EF>50%), those with end stage renal disease or on dialysis, or NT-proBNP values <1,000pg/ml or >35,000pg/ml were excluded from the study. Patients were separated into two groups based on baseline kidney function (Group 1=GFR≥60ml/min, Group 2=GFR<60ml/min). NT-proBNP values were drawn 3-6 consecutive times with intervals ranging between 6-28 hours. The percent of patients with predominantly declining NT-proBNP values and those that reached a level below threshold prior to discharge were calculated. Regression model was used to determine the hourly rate of decline per patient. Population simulation with inferential statistics was used to expand both groups and determine the mean rate of loss per group. T-test was applied to determine the difference of the mean rate of loss between both groups.

Results- Out of the 26 patients enrolled, 12 patients were excluded from the study due to an ejection fraction greater than 50%. The remaining 14 patients were placed into two groups depending on inpatient renal function (Group 1=GFR≥60ml/min, n=6 and Group 2=GFR<60ml/min, n=8). A total of 8 out of 14 patients had predominantly declining NT-proBNP values (66% of patients in group 1 and 57% of patients in group 2). All patients regardless of renal function, dose of diuretics or comorbidities maintained NT-proBNP values greater than 500pg/ml prior to discharge. A total of 5 out of 13 patients had elevated NT-proBNP levels and were discharged with a final value greater than the initial level. Mean NT-proBNP rate of loss for group 1 was 95.86 pg/ml, SD ± 48.95pg/ml and group 2 was 58.46 pg/ml, SD ± 57pg/ml, p-value < 2.2e-16 (<0.05).

Conclusion- NT-proBNP values decline at a slower rate in patients with renal dysfunction (GFR<60ml/min). In addition, natriuretic peptide values appear to fluctuate during hospital admission with several patients having an increasing trend despite improvement in symptomatology. Prior to discharge, no patients reached a value below the established threshold for determining CHF exacerbation of 500pg/ml.
IMPROVING ADHERENCE TO A CONTROLLED SUBSTANCE AGREEMENT POLICY:
AN INTERPROFESSIONAL APPROACH

Author: Dr. M. El-Abdallah, MD

INTRODUCTION & BACKGROUND: The overuse of controlled substances has resulted in a public health crisis, warranting enhanced efforts to prevent misuse, abuse, and diversion. Although guidelines have recommended controlled substance agreements (CSAs) to reduce these risks, adherence to such efforts has been described as subpar.

QUESTION & SIGNIFICANCE: Limited evidence exists to describe the extent to which primary care practices adhere to CSAs. Furthermore, best practices to promote the use of CSAs have not been described. This study asks (a) what is the current adherence to a CSA policy in a resident-run clinic and (b) which quality improvement (QI) initiatives can help to improve adherence to this policy?

METHODS & DESIGN: A QI project utilizing the “Plan-Do-Check-Act” (PDSA) cycle was conducted in a resident-run internal medicine clinic. The outcome measure evaluated was signed CSA documented in the electronic medical record (EMR) for patients on long-term controlled substances. Initiatives to improve adherence to the existing CSA policy included resident education, EMR functionalities, and collaboration with the embedded clinic pharmacist. Descriptive statistics were used to summarize the findings.

RESULTS: Prior to QI initiatives, 15% of patients meeting policy criteria had a signed CSA in the EMR (random sample of 79 patients). Four weeks following initiatives, 47% of patients meeting criteria had a signed CSA in the EMR (random sample of 86 patients).

DISCUSSION: This is the first project to describe a successful QI initiative to enhance adherence to a CSA in a large resident-run clinic with an embedded clinic pharmacist. A collaborative approach was utilized, whereby the clinic pharmacist screened and identified patients on long-term controlled substances, while medical residents ensured that patients signed the CSA, with emphasis on monitoring parameters in the policy. Next PDSA cycles will evaluate adherence to random urine drug screens and review of prescription monitoring program records.
Overuse of Antibiotics in Treatment of Asymptomatic Bacteriuria

Author: Dr. A. Aleem

Background
Infectious Disease Society of America (IDSA) published guidelines regarding treatment of urinary infections (UTIs) and asymptomatic bacteriuria (ASB); however, evidence suggests physicians do not regularly follow these guidelines and patients receive antibiotics inappropriately.

Objectives
To compare the use of antibiotics to the institutional guidelines and retrospectively determine prevalence of inappropriate UTI and ASB treatment at St. Mary Mercy Hospital (SMMH).

Methods
A total of 119 patients that were admitted at SMMH from 2015-2016 were included in this quality improvement project. A code book was created with input from members of the Antibiotic Stewardship Committee to help abstract data. Clinical indication for antibiotics, clinical symptoms, and subsequent course including whether a urinalysis and urine culture had been sent for such patients were collected. Chart review was completed in teams of 2 with a total of 5 teams. To eliminate inter-observer variability, 2 abstracters had to compare their abstractions till results were similar. Statistical analysis was then performed.

Results
Our analysis showed that dysuria, urgency and frequency was present 78%, 89%, and 86% respectively. Suprapubic tenderness, new onset delirium, flank pain and fever were noted 89%, 70%, 96% and 88 % respectively. Pyuria was present 74% but squamous cells were noted 55% times as well. Urine culture was positive in 68% cases .55% of times the patients were getting appropriate antibiotics as per institutional guidelines regarding the type of antibiotic and the duration of antibiotic treatment .Only 10% of patients had a indwelling urinary catheter at the time of UTI diagnosis.

Conclusions: This QI project identified the gaps in practice related to treatment of UTI as per our institutional guidelines. There is a possibility of inappropriate urine collection technique due to the high number of Urine samples with epithelial cells. Urine culture was positive in only 68% of the cases, suggesting a over diagnosis of UTI .with the help of antibiotic stewardship committee, we are now targeting areas identified here to improve our care delivery of patients with suspected UTI.
Achieving Tumor Free Margins: Intra-Operative Pathology Consultation to Lower Re-Excision Rates at a Community Hospital

Author: Dr. Abbasi-Rahbar

Introduction

Achieving tumor free margins in a single surgical procedure is the primary goal for breast conserving therapy. However, it is not uncommon for these patients to undergo more than one operation. Positive margins increase the patient’s risk of local recurrence and reduced quality of life with multiple procedures. Based on anecdotal data within our patient population, lumpectomy specimens requiring re-excision had gross pathological findings that could have potentially warranted further margin excision at the index surgery, avoiding re-excision all together.

Methods & Design

579 patients who underwent lumpectomy were reviewed retrospectively over the years 2010 to 2017. Of these patients, 478 were cases of DCIS and invasive ductal carcinoma, which were included in the study. 91 patients underwent re-excision. The gross pathology of each re-excision case was reviewed. Gross findings that came within 2mm margins for DCIS and ink on tumor for invasive ductal carcinoma were considered potentially avoidable re-excisions. 35 cases of the 91 re-excision lumpectomies were found to have positive margins on gross pathologic evaluation at the index surgery.

Results

Of the 476 lumpectomy cases for DCIS and invasive ductal carcinoma, 91 of them underwent re-excision from 2010-2017. The re-excision rate over this time period was calculated to be 19% with an average of 11 women each year requiring re-excision. Of all 91 cases of women who underwent re-excision surgery, 38% (n=35) of them had gross pathologic findings correlating with positive margins and were potentially avoidable re-excisions. The potentially avoidable re-excision rate according to types of histopathology was 28% in DCIS, 55% in invasive ductal carcinoma, and 53% in combined DCIS with invasive ductal carcinoma.

Discussion/Conclusion

Based on the Society of Surgical Oncology-American Society for Radiation Oncology Consensus Guideline on margins, the re-excision rate for breast conserving therapy is 25% in the US. Re-excision surgery has the potential for added discomfort, surgical complications, increased health care cost, and additional unnecessary emotional stress for patients and their families. Our re-excision rate could have been reduced from 19% to 12% if intra-operative pathology consultation had been utilized. By implementing intra-operative pathology consultation for lumpectomies, the re-excision rate can be reduced by more than one-third with the highest impact in patients with invasive ductal carcinoma and combined DCIS-invasive ductal carcinoma.
Improving Osteoporosis Treatment for Patients Hospitalized with Hip Fracture

Author: Dr. A. Ebel

Introduction
Patients with fragility fracture of the hip are considered to have underlying osteoporosis. Fragility fractures are associated with high morbidity and mortality and increase the risk for future fractures. Studies of post-fracture populations show that osteoporosis screening and treatment rates are less than 20%. Hospital admission for hip fractures is a "teachable moment" and provides an opportunity to initiate treatment for osteoporosis. Vitamin-D deficiency is a contributing factor to osteoporosis and screening for deficiency can be done in the inpatient setting as part of the workup for secondary causes of osteoporosis. A review of hip fracture patients admitted to our hospital over a six-month period showed 35% of hip fracture patients had vitamin-D levels checked during admission. Our goals were to increase screening for vitamin-D deficiency in hip fracture patients and initiate vitamin-D supplementation as an initial step to improve inpatient management of osteoporotic hip fractures.

Methods
A hip fracture protocol was developed for patients admitted to the Orthopedic Surgery service that included ordering 25-vitamin-D levels for each patient and initiation of vitamin-D supplementation before discharge if levels were less than 30 ng/ml. Rates of ordering vitamin-D levels were collected before and after intervention and the data was graphed on a run chart.

Results
Rates of screening for vitamin-D deficiency increased from 35% pre-intervention to 79% post-intervention. 44% of patients had levels <30 ng/ml and 72% of these patients were discharged on vitamin-D supplementation. Monthly percentages of vitamin-D levels measured were graphed and run chart rules were applied. The results were significant due to a shift of the data points after the intervention.

Conclusion
By implementing a hip fracture protocol, we improved rates of treatment for vitamin-D deficiency, a common contributing factor to osteoporosis. Screening for vitamin-D deficiency and initiating supplementation can easily be accomplished during an inpatient admission for hip fracture. More multidisciplinary and collaborative processes are needed to increase the sustainability of our intervention and to continue to address this gap in care for hip fracture patients.
Introduction: Studies have shown that patients who are uninsured or underinsured have decreased access to health care causing them to travel farther and wait longer for appropriate care. Recent studies in the medical literature have noted that due to decreased access to care, this population presents with more advanced disease, specifically advanced breast and colon cancer, causing worse outcomes and increased health care burden. Studies have also shown that the greatest disparity in access to care for this subpopulation is in the surgical specialties. Few studies have analyzed this disparity in the orthopaedic literature. Giant cell tumors (GCT) of bone are usually aggressive benign mesenchymal tumors that typically present in patients between the ages of 20-40 years old. Early detection and treatment is essential to prevent complications. We hypothesize that patients with GCT of bone and decreased access to care based on insurance status, will present with more advanced disease burden and increased complications. Identifying these disparities may help affect future policy change.

Methods: Patients that have had biopsy proven GCT of bone at Beaumont Hospital Royal Oak were retrospectively analyzed from 2008 through 2015. Patients were included if they had a pathological diagnosis of GCT of bone and excluded if the tumor was malignant. Charts were reviewed for age at presentation, gender, BMI, ASA score, comorbidities, and payer. Radiographs were reviewed for height, width, and depth of the tumor, which were used to calculate total volume. Cortical breakthrough and/or pathologic fracture were also recorded. GCT was broken down by location and the average GCT size for each group was calculated. Patients were stratified into two groups based on payer: those that had Medicaid or no insurance and those that had a private payer. All collected data was statistically compared between the two groups.

Results: The Medicaid group had 11 patients and the private payer group had 28 patients. Cohorts demonstrated comparable age (P=0.225), gender (P=0.285), BMI (P=0.324), and ASA score (P=0.297) (Table I). No patients in either group had significant comorbidities including diabetes. The average size, cortical breakthrough, and pathologic fractures by location and group can be found in Table II. Pathologic fracture occurred in 27% of Medicaid patients (n=3) and 21% of private payer patients (n=6, P=0.693) (Table II). Cortical breakthrough occurred in 36% of Medicaid patients (n=4) and 21% of private payer patients (n=6, P=0.424) (Table II).

Discussion and Conclusion: The current data shows nearly double the rate of giant cell tumor cortical breakthrough at the time of presentation in Medicaid patients compared to those with private insurance. This implies there may indeed be a delay in diagnosis based on insurance status for those with musculoskeletal tumors. However, at this point the difference has not been shown to be statistically significant based on the current case numbers, therefore the study is being continued in prospective fashion to better elucidate this matter.

<table>
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<tr>
<th>Table I. Demographics</th>
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<tr>
<td><strong>Private (n=28)</strong></td>
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<tr>
<td>Age</td>
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<tr>
<td>BMI</td>
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<td>ASA Score</td>
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<td>Male/Female</td>
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<tr>
<th>Table II. Size, Cortical Breakthrough, and Pathological Fracture by Location and Group</th>
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<tr>
<td><strong>Private Insurance</strong></td>
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<tr>
<td><strong>Location</strong></td>
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<tr>
<td>Proximal Humerus</td>
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<td>Distal Radius</td>
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<td>Distal Ulma</td>
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<td>Distal Femur</td>
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<td>Proximal Tibia</td>
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<td>T-Spine</td>
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Increased Fronto-Thalamic Connectivity Associated with Evolution of CSWS

Author: Dr. K. Set

Background
Continuous spike-and-wave in slow-wave-sleep (CSWS) is a childhood epileptic encephalopathy characterized by a combination of epilepsy, neuropsychological impairment and electrical status epilepticus in sleep (ESES, defined by spike-wave activity in ≥ 85% of slow-wave sleep). Previous studies suggested a role of thalamic abnormalities in the pathophysiology of CSWS and hypothesized abnormal thalamo-cortical connections. We applied diffusion tensor imaging (DTI)-based whole brain connectome analysis to explore patterns of thalamo-cortical connectivity during the evolution of CSWS from the prodromal stage (seizure onset to age at neuropsychological regression) to the acute stage (after onset of neuropsychological regression and during period of active ESES). Refining such imaging metrics could improve understanding of the neuroanatomical substrates and epileptic circuitry in children with CSWS.

Methods
We recruited 13 CSWS patients (age: 7.0 ± 3.4 years, 8 boys, epilepsy duration: 2.3 ± 2.1 years) including 6 patients with prodromal (age: 6.4 ± 3.1 years) and 7 patients with acute CSWS (age: 7.6 ± 4.1 years). Seizure frequency of individual patients was categorized into five levels of severity, 0: no ongoing seizure, 1: yearly, 2: monthly, 3: weekly, 4: daily. DTI data were acquired using a 3-tesla MRI at 55 encoding gradient directions with b-value=1000 sec/mm². A total of 116 cortical regions of interest (ROI) were parcellated using automated anatomical labeling (http://www.gin.cnrs.fr/AAL-216) for DTI-whole connectome analysis. At each ROI, nodal degree was evaluated as the measure of local connectivity strength respectively (higher values indicate more axonal projections to neighboring ROIs). One-way ANOVA with a covariate of age was used for the subgroup comparisons, prodromal vs. acute CSWS to identify ROIs showing significant subgroup differences.

Results
Children with acute CSWS showed significantly increased nodal degree in left frontal ROIs; these were most prominent in inferior orbital gyrus and operculum (p-value < 0.015), resulting from increased projection to ipsilateral thalamus. Interestingly, non-parametric correlation analysis found that this increased connection shows significant positive correlation with seizure frequency (Spearman’s rho= 0.59, p-value= 0.03). Other cortico-thalamic projections showed no significant changes between the two subgroups.

Conclusion
The present study suggests that children in the acute stage of CSWS have an atypical developmental pattern of axonal centrality in frontal lobe which is significantly increased compared to that in children in the prodromal stage of CSWS. The unilaterality of our findings could be due to the small number of subjects in two different subgroups rather than a longitudinal design. Even so, the increased fronto-thalamic connections were positively correlated with seizure frequency suggesting that this projection may be integral to the generation of ESES and neuropsychological consequences seen in CSWS. If further developed, DTI connectomes could be potential markers for children with acute CSWS.
IS C-REACTIVE PROTEIN (CRP)/ALBUMIN RATIO (CAR) A USEFUL PREDICTOR OF RESPONSE TO INTRAVENOUS IMMUNOGLOBULINS (IVIG) AND OUTCOME IN KAWASAKI DISEASE (KD)?

Author: Dr. M. Romero Lopez

Introduction: CAR is a simple inflammatory index that correlates with severity and mortality in sepsis and other conditions. Its utility in the management and outcome of KD is not known. Many scores have been devised to predict response to IVIG in KD, without universal adoption.

Methods and Design: Retrospective chart review of children diagnosed with KD at Beaumont Children’s Hospital between December 2006 and June 2017. Demographic, clinical, laboratory, echocardiographic and treatment data were recorded. Those without CRP or albumin measured prior to starting IVIG were excluded. Nonparametric summaries, univariate logistic regression, and Wilcoxon rank sum test were used for statistical analysis. The objective is to identify if CAR can predict initial response to IVIG and risk of coronary artery aneurysms (CAA) in KD.

Results: 126 children with age range 2 mo-17 yr (median 47 mo) met the criteria. 62% were male. 52.4% were White, 17.5% African-American, 9.5% Asian, and 20.6% had no race recorded. Mean (SD) for days of fever at diagnosis was 5.8 (2.0). Full KD criteria were found in 55.6%; 44.4% had incomplete/atypical presentations (conjunctivitis and rash were most common and lymphadenopathy the least). 110 received 1 IVIG (87.3%). 16 (12.7%) received 2 IVIG, of whom 3 needed additional treatment with steroids and/or infliximab. Median and inter quartile range of albumin was 3.5 g/dL (3-3.9), CRP 83 mg/L (52-136), and CAR 24.4 (14.5-43.9). Those needing 2 IVIG doses had median CAR of 54.2 (28.3-67.3) vs 22.9 (12.1-34.4) for those with 1 dose (p=0.002). No age/sex differences for CAR were found. 11/126 (8.7%) developed CAA. Of those who developed CAA during follow up, median CAR was 40.6 (27.9-49.6) vs 23.2 (12.1-38.1) for those without CAA (p=0.035). No differences were found in CAR for CAA at diagnosis or for other echocardiographic findings (pericardial effusion, valvulitis, railroad tracking). For all 126 patients CAR was a significant predictor of need for 2 IVIG doses (weight coefficient= 0.028; p=0.002; odds ratio 1.029; 95% CI=1.01-1.048). While no single CAR value was predictive of IVIG response or CAA formation, those with CAR of 22 or less had only a 3.7% risk of needing >1 IVIG and 1.8% of developing CAA.

Discussion/ Conclusion: Low CAR can predict a good response to 1 IVIG and low risk of CAA. High CAR values are associated with IVIG resistance and risk of CAA, but cannot accurately predict response and outcome.
ABSTRACT

Objective: End stage renal disease patients undergoing renal transplantation are at risk for surgical complications given their fragile health. These complications not only affect short-term convalescence but long-term graft and patient survival as well. In this regards, minimally-invasive surgery has shown benefit in reducing postoperative morbidity. We sought to examine association between minimally invasive renal recipient surgery and postoperative outcomes including graft function, 6-month complications, and graft and patient survival.

Methods: This is a single center study of patients undergoing open or robotic kidney transplantation. Inclusion criteria included patients with end stage renal disease undergoing living-donor renal transplantation, while, exclusion criteria were a previous major abdominal surgery with a high suspicion for intra-abdominal adhesions, significant atherosclerotic disease of the iliac vessels (>30% stenosis), pediatric recipients, cadaveric donors, and patients with immunologically high risk transplant, second transplant or simultaneous multi-organ transplant. Primary outcome was delayed graft function (DGF), defined as need for dialysis within 1 week of surgery. Secondary outcomes included postoperative complications, pain, graft rejection, and graft and patient survival. Non-parsimonious propensity score methods were used to reduce baseline differences among patients who underwent robotic kidney transplantation as opposed to those that did not. Conditional and Cox regression models evaluated the association between receipt of robotic surgery and outcomes. Ding-VanderWeele method estimated the impact of unknown confounders on study findings. A two-sided p-value<0.05 was considered significant.

Results: Of the 654 patients that met study criteria during the 3-year study period (January 2013 to December 2015), 126 underwent robot-assisted kidney transplantation. Propensity score matching (1:3) yielded an overall sample of 504 patients (robotic, n=126; open, n=378). Standardized mean differences in baseline characteristics between the two groups were reduced significantly post propensity score matching, and were close to 10%, indicating a high degree of similarity. All patients had a minimum follow-up of 1 year. Within the matched-pair cohort, the robotic approach was associated with lower rates of wound infections (0% vs 4%, chi-square p=0.023) and symptomatic lymphoceles (0% vs 7% at 36 months, log-rank p=0.003), as well as, reduced postoperative pain, requirement for narcotic analgesia and blood loss. There were no differences among the two groups, robotic versus open, with respect to graft function (DGF 0% vs 2.4%, chi-square p=0.081), length of hospital stay (median 8 days for both, Mann-Whitney p=0.647), graft rejection (16.2% vs 18.6% at 36 months, log-rank p=0.643), and graft (95.2% vs 96.3% at 36 months, log-rank p=0.266) and overall survival (94.5% vs 98.1% at 36 months, log-rank p=0.307). Ding-VanderWeele analysis suggested a minimal influence of unknown confounders on study findings. The study was limited by its non-randomized design and retrospective analysis.

Conclusions: Robotic kidney transplantation with regional hypothermia was associated with a lower rate of postoperative complications, and improved patient comfort. There were no differences with respect to graft function, and graft and overall survival.