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Dramatic acceleration of the inflammatory response of Plasmodium falciparum histidine-rich protein II by inorganic polyphosphates

Peyman Diarvand, Likui Yang, and Alireza R. Rezaie
Department of Pathology, School of Medicine, Saint Louis University, Saint Louis, MO

INTRODUCTION
Malaria is a disease with an enormous human impact. Plasmodium falciparum contributes to the greatest morbidity and mortality with an estimated 212 million clinical cases and 400,000 deaths per year. Malaria consists of several species, of which P. falciparum is the most lethal. Malaria is characterized by the invasion and destruction of red blood cells by parasitized erythrocytes (parasitemia) leading to global anemia. Parasitized erythrocytes induce an inflammatory response in the human host. The heavy accumulation of parasitized erythrocytes in the circulation leads to impaired blood flow. One of the most important proteins, P. falciparum histidine-rich protein II (HRPII), is a late-stage erythrocyte invasion protein circulating free or bound to other proteins and plays a role in the inflammatory process. It has been demonstrated that HRPII and polyP, together, induce inflammatory responses in the endothelium and this can lead to organ failure. Understanding the details of this process is crucial for developing new diagnostic and therapeutic approaches against this lethal disease.

METHODS
We hypothesize that the HRPII-induced inflammatory response in vivo is mediated by specific cell surface receptors. We have performed in vitro permeability assays using recombinant HRPII and the polyP receptor domain to test our hypothesis.

RESULTS
Vascular permeability assays were performed in vitro using EA.hy926 endothelial cells. HRPII and recombinant P. falciparum polyP receptor domains were included to assess the effect of specific cell surface receptors (P. falciparum polyP receptor and RAGE) on vascular permeability. The results showed that HRPII and polyP together dramatically increase vascular permeability through specific cell surface receptors.

REFERENCES

Acknowledgments
This research was supported by grants from the National Institutes of Health (R01 NS085136, R01 AI134050, and R01 AI131956).
Emotional Impact and Lifestyle Changes in Patients Diagnosed with Non-Melanoma Skin Cancer
Matthew Clark, M.D., Kavita Darji, M.D., Kurt Arnbrecht, Ph.D., Aihung Mary Guo, M.D.
Saint Louis University, Department of Dermatology

Background
- Non-melanoma skin cancers (NMSC) are the most common type of skin cancers throughout the world.
- Diagnosis with NMSC has a negative impact on patients' quality of life (QOL).
- Patients diagnosed with NMSC increase sun-protective behaviors.
- In 2006, Rhee et al. validated the Skin Cancer Index (SCI), a disease-specific QOL instrument for patients with cervicofacial NMSC. The SCI consists of questions that fall into three distinct subscales – Emotional, Social, and Appearance.

Disclosure
Objective
- Examine subjective QOL measures and behavioral changes in patients diagnosed with NMSC.

Methods
- IRB approved study
- Patients aged 18-80 years old diagnosed with their first NMSC between 01/2016-11/2016 were included in the study.
- Mail-based questionnaires comprised of the SCI and additional questions regarding sun-protective behaviors pre- and post-diagnosis of NMSC were mailed to patients. SCI scores were given numerical values with lower scores indicating worse QOL.

Results
- 34 valid responses out of 100 mailed questionnaires.
- NMSC had minimal impact on QOL of the respondents; most people were not concerned about the social impact or stigma of having NMSC.
- No association between age and SCI score was identified.
- Overall, 74% (78% of women, 69% of men) of patients increased sunscreen use after diagnosis with NMSC.
- Comparing pre-diagnosis to post-diagnosis, more patients limited time in the sun during peak hours (41% vs. 71%), used sun-protective clothing (27% vs. 64%), and used sunscreen daily (24% vs. 47%).

Sun-Protective Behaviors Before and After Diagnosis with NMSC

<table>
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<tr>
<th>Behavior</th>
<th>Before NMSC</th>
<th>After NMSC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily Sunscreen Use</td>
<td>42%</td>
<td>71%</td>
</tr>
<tr>
<td>Limit Time During Peak Hours</td>
<td>27%</td>
<td>47%</td>
</tr>
<tr>
<td>Sun-Protective Clothing</td>
<td>7%</td>
<td>14%</td>
</tr>
</tbody>
</table>

More men reported daily sunscreen use prior to diagnosis with NMSC compared to women (21% vs. 17%), but were less likely than women to increase daily sunscreen use after diagnosis (38% vs. 56%).

Sun-Protective Clothing Before and After Diagnosis with NMSC

<table>
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<tr>
<th>Clothing</th>
<th>Before NMSC</th>
<th>After NMSC</th>
</tr>
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<tbody>
<tr>
<td>Men</td>
<td>31%</td>
<td>56%</td>
</tr>
<tr>
<td>Women</td>
<td>17%</td>
<td>38%</td>
</tr>
</tbody>
</table>

More men also reported sun-protective clothing use prior to diagnosis with NMSC compared to women (44% vs. 11%), but both sexes reported increased use after diagnosis (75% and 56%, respectively).

Conclusions
- Diagnosis with NMSC has a greater impact of QOL of women than men, which is driven by concerns about appearance.
- Diagnosis with NMSC results in more sun-protective behaviors, including increased sunscreen use, increased daily sunscreen use, limiting time in the sun during peak hours, and use of sun-protective clothing.
- More studies on emotional impact and lifestyle changes after diagnosis with NMSC are needed.

Limitations
- Small sample size
- Social desirability bias

References
Analysis of the effects of graded skin thickness on mechanical strain of the bilobed transposition flap
Paul J Gruber MD, Sana Syed BS, Ethan McClain BS, Eric Armbrrecht PhD, Ian A Maher MD
Saint Louis University Department of Dermatology

Background
- The bilobed transposition flap is a commonly utilized tool in nasal reconstruction for its ability to transfer adjacent skin and soft tissue from areas of abundance to areas of deficiency.
- Advantages of the bilobed flap in nasal reconstruction include:
  - Single operative procedure
  - Adjacent tissue transfer
  - Restoration of soft tissue volume
  - Good flap viability
  - Infrequent complications
- Theoretically, the pivot point of the bilobed flap (representing the point of minimum tension) is located at the tip of the triangulated primary defect.
- Thickness of nasal skin has dramatic implications for the success of a bilobed flap as displacement of the flap's pivot point and increased pivotal restraint will shorten the flap when it is rotated toward the primary defect.
- Shortening of flap tips can lead to distortion of neighboring anatomical landmarks through secondary motion.
- To date, there have been no studies performed to quantify how skin thickness alters the bilobed flap's pivot point or pivotal restraint.

Study Aims
- To evaluate the effects of graded nasal skin thickness on pedicle strain of bilobed transposition flaps in order to help guide flap design principles and optimize surgical outcomes.

Methods
- Flat square 22 x 22 cm artificial silicone skin models were created to simulate varying thickness of nasal skin – four models of each 2mm, 3mm, 4mm, and 5mm thickness.
- The bilobed transposition flap was stenciled onto each model before being mounted to fiberboard and secured in a stationary fashion beneath a three-dimensional video image correlation system (VIC-3d, Correlated Solutions, Inc.).
- A localized grid of marker dots was applied in randomized speckled fashion to the surface of each model along the vertical axis of the flap's rotational pedicle to optimize measurement by the VIC system.
- Each flap was incised, transposed, and secured in typical fashion using surgical staples.
- Consecutive images were taken as load was placed on each model during transposition and fixation of the flap along the two-dimensional axis of the pedicle in the high-contrast speckled pattern of dots.
- Digital image correlation was used to accurately determine the full-field displacement and two-dimensional strain of the dotted grid along the flap pedicle.

Results
- Mean overall strain increased both qualitatively and quantitatively based on skin thickness.
- Max strain was always located near tertiary defect and progressed in a linear fashion along the flap pedicle.
- Qualitatively, it appears as though minimum strain (center of rotation) migrates superiorly up the flap pedicle as model thickness increased.

Conclusions
- Mean overall strain increased both qualitatively and quantitatively based on skin thickness.
- Max strain was always located near tertiary defect and progressed in a linear fashion along the flap pedicle.
- Qualitatively, it appears as though minimum strain (center of rotation) migrates superiorly up the flap pedicle as model thickness increased.

Recommendations
- Rotational center of the bilobed flap displaces along the axis of pedicle based on skin thickness.
- Study supports the concept that oversizing of flaps may be helpful in areas of thick sebaceous tissue in order to correct for pivotal restraint.

Limitations
- Artificial skin tissue substitute
- Two dimensional models
- Inter-test variation

References
Background
Antenatal corticosteroids (ANCS) administered for risk of preterm delivery decrease morbidity of prematurity if preterm birth occurs (1-7). Although early animal studies found that many doses led to growth restriction (8-10), a single repeat dose was found to benefit human neonates without a significant decrease in birth weight (4,7).

Current guidelines recommend two doses of ANCs administered 24 hours apart as a single course. A repeat course is administered 7-13 days later if the mother remains at risk of preterm delivery. However, the main studies supporting a repeat course excluded women with preterm premature rupture of membranes (PPROM) (1-5), because of a theoretical risk of chorioamnionitis due to the immunosuppressive effects of glucocorticoids. As a result, there is insufficient data to recommend a repeat dose of ANCs in women with PPROM.

Two studies include women with PPROM (6-7) and did not find an increased incidence of chorioamnionitis with a repeat course, although women with PPROM were not analyzed separately. At SSM St. Mary’s, most MFM’s administer repeat ANCs for PPROM, and this is not associated with increased chorioamnionitis. This knowledge gap creates an opportunity for study of repeat doses of ANCs including only women with PPROM.

Research Questions
1. To assess the neonatal benefit of a repeat course (set of two 12mg intramuscular doses) of antenatal betamethasone given to women with preterm premature rupture of membranes.
2. To assess the incidence of chorioamnionitis related to a repeat course of antenatal betamethasone given to women with preterm premature rupture of membranes.

Study Design
This is an investigator-initiated retrospective cohort study of women with PPROM who were either exposed to repeat ANCs or not; the conditions being examined after this exposure are (1) neonatal morbidity and mortality and (2) chorioamnionitis to achieve objectives (1) and (2) respectively.

Inclusion criteria:
- Premature premature rupture of membranes <34 completed weeks
- Required or continued threat of preterm delivery within the 7 days after enrollment
- Initiated first course of ANCs 14 or more days before enrollment and before 32 completed weeks

Exclusion criteria:
- Active clinical chorioamnionitis
- Gestational age less than 23 completed weeks at time of PPROM
- Gestational age greater than 34 weeks gestational age

A sample size of 300 women in each group was calculated as an exercise, based on a power of 0.8, alpha of 0.05, and incidence of composite neonatal morbidity (respiratory distress syndrome, necrotizing enterocolitis, grades III and IV intraventricular hemorrhage, and death) of 63.6% in the placebo arm and 43.9% in the treatment arm of a similarly designed study on women with intact membranes (Garite et al, cited above).

Primary outcome: composite of neonatal respiratory distress syndrome, necrotizing enterocolitis, grades III and IV intraventricular hemorrhage, and death
Secondary outcome: incidence of chorioamnionitis, neonatal hypoglycemia

Results
In total, 182 women and 216 neonates were included. 77 women received standard of care and 105 neonates received repeat ANCs. There were 28 complete twins and 4 incomplete twins included in the analysis for a total of 32 twin pregnancies. Maternal age, demographics, parity, body mass index, and median gestational age at rupture and at delivery were comparable between groups. Baseline differences in maternal characteristics and delivery characteristics were determined using chi-square tests for categorical variables and Mann-Whitney-U test for continuous variables. The primary outcome of composite morbidity/mortality was determined using a logistic regression, controlling for gestational age at delivery and race.

Future Research
Future research could study: 1. randomized controlled trials in gain and gestational age confounding. 2. sample sizes calculated for the number of fetuses delivering at various gestational ages to detect differences in outcomes that are less common at certain ages. 3. separate analyses groups for singletons and multiple gestations. 4. separate maternal birth weight and gestational age differences.

Conclusion
The association between composite neonatal morbidity/mortality and ANCs administration in PPROM is a function of gestational age at delivery that is not a repeat dose of ANCs was received.

References
5. Luquette CA, Madhyani CA, Madhyani E, et al. Randomized controlled trials on repeat ANCs and single dose ANCs groups. Randomized controlled trials on repeat ANCs in PPROM to eliminate selection bias and gestational age confounding.
6. Sample sizes calculated for the number of fetuses delivering at various gestational ages to detect differences in outcomes that are less common at certain ages. Separate analyses groups for singletons and multiple gestations.

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6. Sample sizes calculated for the number of fetuses delivering at various gestational ages to detect differences in outcomes that are less common at certain ages. Separate analyses groups for singletons and multiple gestations.
### Prudential Consent to Treatment Tool (PCTT)

**Ryan Sanchez BA\(^1\), Cara Buskmarker MD\(^1\), Andrew Steele MD\(^1\), Andrew Kubick BA\(^2\)**

\(^1\)Department of OB/GYN and Women’s Health, Saint Louis University School of Medicine Saint Louis, MO; \(^2\)Pontifical Athenaeum Regina Apostolorum, Rome, Italy

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#### Background

In the U.S., approximately 20% of deaths occur in the ICU setting, and the majority of these deaths involve the decision to withdraw life-support. One study reported that 17% of family members were dissatisfied with the information they received about a diagnosis and over 30% were dissatisfied with information they received about the cause of death.

A multicenter study surveying over 540 family members of patients in the ICU identified that 75.5% and 82.7% of family members and spouses, respectively, have symptoms of anxiety or depression.

Cochrane Review April 2017
- Reviewed 105 studies involving 31,043 people
- Decision aids used covered 50 different decisions
- 16 evaluated tools used during the visit with the clinician

#### Methods

**A tool was created using Catholic Medical Ethics principles and proposed to an Ethics Committee and two focus groups to obtain feedback and identify ways to improve the tool for use in the ICU setting.**

- **Pros:**
  - Opens the conversation about the spirituality of suffering
  - Will help families/patients understand burdens, benefits, and facts about treatment options
  - Provides improved communication between the physician/team and the patient or decision maker
  - Helps decision makers digest complex, difficult decisions
  - Helps bring clarity to a stressful time
  - Helps identify potential costs of treatment

- **Cons:**
  - Streamline layout and make text larger
  - Consider rewriting the tool at a lower reading level
  - “Background” information provided at the beginning was overwhelming and hard to understand
  - Concerns about the implicitly religious nature of the tool
  - Suggest using a focus group first to refine language
  - Develop a well-articulated outcome for the tool (i.e. patient satisfaction, agreement with team, comfort with decision)

#### Feedback

**PCTT Study Design**

**Objective:** evaluate whether a two page worksheet helps patients and/or families think through their own beliefs, concerns, and understanding of medical treatments, especially withdrawal from ventilators and acceptance of palliative care from an ICU.

Prospective, non-randomized cohort study

A member of the study team will recruit ICU patients after discussions with the healthcare team regarding appropriate patients who are on life-sustaining treatment such as ventilators or vasopressors. This member of the team will work through the worksheet with the patient and/or family members present and then use a brief survey to assess satisfaction with the helpfulness of the tool.

**Validating a Patient Decision Aid**

International Patient Decision Aids Standards Collaboration Publication

Reviewed 86 trails from the Cochrane Review of IPDA in 2011

Evaluated the tools used to measure five key decision making process constructs and decision quality constructs:

- **Five decision making attributes:**
  - Recognize decision
  - Feel informed
  - Clear values
  - Discuss goals with health care provider
  - Be involved

- **Decision quality constructs:**
  - The quality of the decision-making process
  - The quality of the choice that is made
  - Defined as “the extent to which patients are informed and receive treatments that reflect their goals and treatment preferences”

**Results of IPDA Standards Collaboration:**

- Preparation for Decision Making Scale (PMDS) covers 4/5 of the decision making attributes
- Decisional Conflict Scale (DCS) was the most commonly used validation tool

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#### Inclusion/Exclusion Criteria

**Inclusion:**
- ICU Adulater patients
- Candidate for palliative or hospice care

**Exclusion:**
- Non-English speaking
- Illiterate family and patient
- No family available for continuously sedated patient
- E.g. fragile decision-making capacity, complex family or social situation

**Research Objectives**

- Patient and/or family satisfaction with the tool
- Patient and/or family satisfaction with their own decision
- Patient and/or family concordance with healthcare team recommendations
- Time (in days) between concordance of patient and/or family decision and healthcare team recommendations (if applicable)

**Survey Tool**

- [8.5 x 11 space for survey]
# IL-17 and IL-23 Expression in Chronic Allergic Contact Dermatitis

**Courtney C. Crider, M.D., Nicole M. Burkemper, M.D., Tricia A. Missall, M.D., Ph.D.**
Saint Louis University Department of Dermatology, Saint Louis, Missouri

## Background
- Allergic contact dermatitis (ACD) is a common inflammatory skin disease caused by a delayed type IV hypersensitivity response.
- Numerous studies have implicated Th17 cells, IL-17, and IL-23 in the pathogenesis of certain autoimmune and allergic diseases including psoriasis and acute ACD.
- IL-17 deficient mice have demonstrated reduced contact hypersensitivity responses to allergens and there has been increased detection of IL-17 mRNA in acute ACD biopsies.
- Drugs that inhibit IL-17 and IL-23 have been successful in treating psoriasis, but have not been effective for chronic ACD.
- Thus, the importance of IL-17 and IL-23 in chronic ACD remains unclear.

## Objectives
- We sought to identify the immunohistochemical (IHC) expression of IL-17 and IL-23 in chronic ACD biopsies compared to psoriasis and normal skin controls.
- By better understanding the role of IL-17 and IL-23 in chronic ACD, we may be able to help guide future therapeutic targets.

## Methods
- This study was approved by the SLU IRB in Fall 2017
- Using CPT codes (95044 and 88305), we obtained a list of patients from 2007-2011 who had a prior biopsy performed for ACD and previous positive patch testing.
- Controls were obtained by searching our dermatopathology database for 10 psoriasis biopsies (positive controls) and 10 benign nevus excisions tips (negative controls).
- IL-17 and IL-23 immunohistochemical staining was performed on all specimens which were then analyzed to determine the pattern of expression in chronic ACD compared to controls.

## Results
**We identified 39 patients with 52 biopsies (41/52 biopsies analyzed)**
- Spongiosis with eosinophils was the predominant histologic pattern (46%), followed by superficial/deep perivascular infiltrate (17%), spongiosis (12%), psoriasiform (8%), vacuolar interface dermatitis (6%), and other (11%)

### Normal skin controls:
- IL-17 and IL-23 stained adnexal structures, lower > upper epidermis, and mild superficial perivascular infiltrate (10-25% of lymphs stained)

### Psoriasis controls:
- IL-17 had minimal to no epidermal staining, IL-23 stained all of epidermis, & both stained papillary dermal infiltrate (50-75% of lymphs stained)

### Chronic ACD biopsies:
- IL-17 and IL-23 stained all levels of the epidermis and dermal perivascular infiltrate (25-50% of lymphs stained)

## Conclusions
- IL-17 and IL-23 expression in chronic ACD is unique compared to normal skin and psoriasis.
- This may explain why IL-12/23 inhibitors have had limited success in treating chronic ACD.
- The location of cytokine expression seems to be important.

## Limitations
- Single center study (SLU Department of Dermatology)
- Small sample size (39 patients, 52 biopsies)
- Subjective interpretation of biopsy staining
- Poor staining of some specimens (were excluded)

## References
INTRODUCTION

Skin cancers are the most commonly diagnosed cancer in the United States and the lifelong incidence of a patient developing skin cancers has been increasing. 1 in 1500 children had a lifetime risk of developing melanoma in 1935 compared with children born today who face a 1 in 33 lifetime risk. UV light has been considered the principal known and preventable carcinogen in the development of skin cancer. To this end numerous programs have been developed to educate patients about the hazards of sun exposure and create policies for sun protection. Nevertheless, most states require a doctor's note to allow students to use sunscreen in public schools and even then, the sunscreen has to be applied in the nurse's office as it is considered medication. Pediatric skin is uniquely susceptible to UV light and it is important that caretakers are educated about the challenges associated with pediatric sun protection. In toddlers and school-age children, current AAD recommendations include applying broad-spectrum SPF 30 every 2 hours when sun exposed and even more frequently when swimming or sweating. It is difficult to gauge, however, how frequently child care centers follow these recommendations. There is currently no federal guideline regulating use of sunscreen or other sun protective behaviors in U.S. child care centers.

OBJECTIVE

A cross-sectional survey was offered to state-level directors of child-care licensing and to randomly selected Missouri child care centers.

RESULTS

19 surveys were collected from state-level directors of child care which represents a 38% response rate (19/50 states). 68% of responding states report that their state has a written policy addressing sun protection in child care centers. All 13 policies address sunscreen use, with fewer policies addressing use of sun protective clothing or outdoor play time during peak sun hours (i.e. between 10am-2pm). States with written sun protection policies in place estimate higher numbers of individual care centers in their states adopt their own policies about sun protection compared to those states without written policies. When asked if there should be a federal policy for sun protection in child care centers, 47% of responding state-level directors said "yes" and 42% of responding state-level directors said "no".

Of the 40 randomly surveyed Missouri child care centers, 70% have written policies about sun protection. Similar to the state-level data, all policies address sunscreen use with fewer policies addressing use of sun protective clothing or outdoor play time during peak sun hours. 90% of surveyed care centers allow parents to provide sunscreen from home. Also similar to the state-level data, when asked if there should be a federal policy for sun protection in child care centers, 53% said "yes" and 47% said "no".

DISCUSSION

Our study found that the majority of responding state-level directors of child care licensing and MO child care centers have sun-protection policies in place, though surprisingly, sunscreen is commonly addressed in policies. This is likely because sunscreen is more commonly thought of and has been a leading educational target in avoiding skin cancer. The findings that sun protective clothing and sun avoidance during peak hours are less emphasized in policies highlight the need for education. Although parents play a role, child care centers are also influential in establishing healthy sun protection habits. It has yet to be determined if written policies on the state or federal level should fill this gap. This is highlighted in our split response to the questions of the need for a federal guideline addressing sun protection in child care centers and likely reflects the differences of some favoring individual health autonomy versus others wanting government control to reduce rates of skin cancer.
**Regional Anesthesia Complications Associated with Morbid Obesity**

Rebecca Rimza MD, Megan O’Brien DO, Collin Miller, MS, Laura Vricello, MD
Saint Louis University School of Medicine

**Abstract**

Introduction: Maternal obesity increases anesthesia complication at cesarean delivery. We sought to evaluate the contribution of technical factors to anesthesia complications during scheduled cesarean delivery.

Methods: All patients undergoing scheduled cesarean delivery under spinal anesthesia at St. Louis University Hospital 2017 were included. Patients received a standard dose of intrathecal Bupivacaine 15 mg with 0.2 mg of morphine or 20 mg of fentanyl. Standard spinal needle is 25-gauge pencil point needle 3.5 inches in length. Primary outcome was total spinal procedure time. Secondary outcomes: number of spinal placement attempts, needle > 3.5 inches, failure of spinal with conversion to general anesthesia, high spinal blockade, and additional intravenous analgesics.

Results: Of 522 included patients, 25 (4%) had BMI < 25 kg/m², 97 (19%) had BMI 25.0-30.9 kg/m², 127 (24%) had BMI 30.0-34.9 kg/m², 115 (22%) had BMI 35.0-39.9 kg/m² and 108 (21%) had BMI ≥ 40.0 kg/m². Total spinal time increased with BMI (44 min, 6.7 min, 8.12 min, 7.5 min, and 8.11 min, *p* = 0.014). More than one attempt at spinal placement was more frequent among obese patients. At BMI ≥ 25.0 more required more than one attempt. Patients requiring two spinal placement attempts (30%) are in BMI 25-29.9, 51% (BMI ≥ 30-34.9, 17% (BMI ≥ 35-39.9, and 22% (BMI ≥ 40.0) more frequent than others (*p* < 0.001). 16 patients required three or more attempts at spinal placement 2% (BMI ≥ 25-29.9, 2% (BMI ≥ 30-34.9, 4% (BMI ≥ 35-39.9, and 9% (BMI ≥ 40.0) more frequent than others (*p* < 0.001). No difference was found between groups in medications used during cesarean including midazolam, fentanyl, Toradol, ondansetron, phenylephrine, ketamine, and glycopyrrolate (*p* = 0.1, 0.9, 0.5, 0.4, 0.1, 0.1). Drop in intraoperative mean arterial pressure was elevated at higher BMI 28 ±12, 32 ±11, 36 ±12, and 23 ±13 (*p* = 0.001). Failed placement of spinal with conversion to general anesthesia (n = 121, 12% ±1, p = 1) and high spinal blockade (n = 0.002, 2, 1) were both uncommon and similar between groups. As such a composite morbidity was performed including conversion to general anesthesia, high spinal blockade, ketamine use, or fentanyl dosing greater than 99%. A total of 30 (6%) most critical and were included. Data was evaluated compared to only requiring one attempt at spinal placement versus more than one. Overall, 21 (5%) required one attempt versus 9 (1%) required two or more attempts (*p* = 0.018).

Conclusion: Although spinal anesthesia placement was more complicated among obese patients, the incidence of serious anesthesia complications remained low. Additional attempts at spinal placement morbidity in higher composite morbidity is no incidence of inadequate or high spinal blockade. Spinal anesthesia remains an acceptable choice for scheduled cesarean delivery in obese patients.

**Background**

Neuraxial anesthesia commonly spinal placement is the anesthesia of choice for pain control during scheduled cesarean delivery. However, obesity complicates many procedures and as obesity rates increases has the potential to significantly effect routine procedures.

**Objective**

To evaluate the role of technical factors as they contribute to complications from neuraxial anesthesia among morbidly obese women.

**Study Design**

Retrospective Cohort Study
- scheduled cesarean deliveries
- > 37 weeks
- individual chart review
- Exclusion Criteria
  - Fetal Anomalies
  - Cerebral Hemorrhage
  - Multifetal gestation
  - Planned general anesthesia

**Data Analysis**

Data was analyzed via maternal BMI in 5 unit intervals. Comparison of means and ANOVA was performed *p* < 0.05 was considered significant.

**Results**

<table>
<thead>
<tr>
<th>Complications of Spinal Anesthesia with Maternal Body Mass Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal BMI</td>
</tr>
<tr>
<td>&lt; 25.0</td>
</tr>
<tr>
<td>25-29.9</td>
</tr>
<tr>
<td>30.0-34.9</td>
</tr>
<tr>
<td>35.0-39.9</td>
</tr>
<tr>
<td>≥ 40.0</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>25</td>
</tr>
<tr>
<td>97</td>
</tr>
<tr>
<td>127</td>
</tr>
<tr>
<td>115</td>
</tr>
<tr>
<td>158</td>
</tr>
<tr>
<td>High Spinal Block</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
</tbody>
</table>

**Results continued**

**Figure 1: Spinal Placement Time increases with Maternal BMI**

**Figure 2: Higher BMI Associated with more Spinal Attempts**

**Figure 3: Maternal Body Mass Index of Cohort**

**Figure 4: Composite Morbidity Increases with Spinal Attempts**

**Conclusion**

Spinal anesthesia in women undergoing cesarean delivery requires significantly greater time to achieve as body mass index (BMI) increases.

Number of attempts are more common with increasing maternal BMI.

The increase in spinal placement time seen with increasing BMI is possibly due to technical factors related to number of attempts and use of non-standard needle types.

This type of anesthesia can be accomplished at higher BMI, but it is more often inadequate or incomplete as evident by elevated composite morbidity among patients requiring more attempts at complete spinal anesthesia placement.

Neuraxial anesthesia is safe and effective for cesarean delivery but is often more difficult to place at elevated maternal BMI.

**References**


Internists’ vs. Gastroenterologists’ Practice and Perception of Responsibility of IBD-Related Health Maintenance
Muhammad B. Hammami MD, Pratik Pandit MD, Rebecca Talkin BS, Katie Schroeder MD
Saint Louis University School of Medicine

Introduction
Health maintenance of patients with inflammatory bowel disease (IBD) is multifactorial and of well-established importance. However, the extent that it is practiced and whether the gastroenterologist (GI) or primary care provider (PCP) would or should assume its responsibility are not clear.

Methods
We anonymously surveyed a convenient sample of 87 internists (11.6% university faculty, 5.9% Veterans Administration (VA) faculty, 82.5% medical residents) and 50 GIs (24% university faculty, 14% VA faculty, 40% recent GI graduates, and 22% GI fellows in-training) who are affiliates or trainees of St. Louis University, St. Louis, Missouri. Electronic or paper self-administered instruments were used (response rate 92.5% and 81.9%, respectively).

Conclusion
The data indicates that there are significant differences between the perceptions of GIs and PCPs regarding who should manage and keep track of HM issues in IBD patients, and that except for depression/anxiety and smoking, GIs’ practice (although not perfect) may be significantly better than PCPs’ practice in addressing these issues.
**Introduction**

IBD patients are at increased risk of vaccination-preventable infections, which is exaggerated by the increasing use of steroids, immunomodulators and biologics. However, it is not clear whether the gastroenterologist (GI) or the primary care provider (PCP) would or should assume responsibility for vaccinations in this population.

**Methods**

We anonymously surveyed a convenient sample of 94 internists who are affiliates or trainees of St. Louis University (SLU), St. Louis, Missouri (11.6% university faculty, 5.9% Veterans Administration faculty, 82.5% medical residents), using electronic or paper self-administered instruments (response rate 92.5%).

**Conclusion**

The data indicates a sharp divide in SLU internists’ perception of who should take responsibility of vaccination of IBD patients and that IBD patients’ vaccinations are not adequately addressed by internists. The applicability of our results to internists in other settings is unknown. We suggest that gastroenterologists maintain full responsibility for vaccination of IBD patients. Alternatively, specific strategies can be utilized, such as more explicit guidelines for internists and EMR reminders & checkpoints.
Patient Perceptions and Use of Commonly Recommended Preventative Post-Procedure Ecchymosis and Edema Practices Prior to Cosmetic Injections
Jennifer Albus Fehlman M.D, Eric Armbrrecht Ph.D., Dee Anna Glaser M.D.
Saint Louis University Department of Dermatology

Introduction

• Cosmetic Injections becoming increasingly more popular
• Little down time
• Short Duration
• Optimize post procedure results:
  • Avoid non-essential coagulants
  • Role for Arnica or Bromelain?
  • Arnica: Astemose family
    • PO (GRAS), Topical forms
    • Bromelain: Macet comosu
  • Mixed results in literature regarding efficacy
  • Grade D Recommendation
  • Typically well tolerated with minimal
  • Positive results seen when administered
    pre-op and continued For 1-4 days post op
  • Currently in a patient's cosmetic consultation we discuss the option to consider PO Arnica or Fresh pineapple/kiwi prior to injections

Objectives

• Investigate the incidence of arnica or bromelain supplements prior to cosmetic injections
• Incidence of bruising and the impact of using arnica or bromelain
• Patient perceptions of these products and reasons for avoiding their use

Methods

• Part 1: Written survey
  • Patients who presented for cosmetic injections
  • Demographics, Risk Factors, Preventative Behaviors
• Part 2: Follow up survey
  • Sent via email using Qualtrics survey software
  • Incidence of bruising, Qualitative assessment of severity and location of bruising
  • Data Collection: April 1st-June 2nd 2017

Results

Demographics:
• 91 completed written surveys
  • 96% Female
  • 96% Caucasian
• Procedure Type:
  • 64% Botulinum Toxin
  • 9% Filler
  • 27% Filler & Botulinum toxin

Assessment of Potential Risk Factors for Bruising
• 22% took NSAIDs or ASA daily or qod
• 2% took prescription blood thinning medication daily
• 30% took supplements including Vitamin E, Fish oil, Omega-3-FA or Garlic
• Composite Risk Factors
  • 52% without an identified risk factor
  • 43% with one risk factor
  • 5% patients with two risk factors

Assessment of Bruising with Risk Factors
• 73 patients opted in and were sent a follow-up survey
  • 35 patients completed F/U (48%)

Protective Practices & Bruising

<table>
<thead>
<tr>
<th>Protective Practice</th>
<th>Bruise Risk Factor 1</th>
<th>Bruise Risk Factor 2</th>
<th>Overall Percent of Patients Reporting Bruising</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Risk Factors</td>
<td>13</td>
<td>7</td>
<td>15%</td>
</tr>
<tr>
<td>Composite Risk Factor of 1 or 2</td>
<td>8</td>
<td>7</td>
<td>47%</td>
</tr>
</tbody>
</table>

• Higher rate of bruising seen in patients with identified risk factors
• Higher rates of bruising seen with Filler or Both Botulinum toxin and Filler injections
  • 75% Filler patients reported bruising (3/4)
  • 58% Both Filler & Botulinum toxin patients (7/12)
  • 19% Botulinum toxin patients (3/16)

Use of Protective Practices

<table>
<thead>
<tr>
<th>Protective Practice</th>
<th>% of Patients</th>
<th>% of Patients Using</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO Arnica</td>
<td>1/90 (1%)</td>
<td>1%</td>
</tr>
<tr>
<td>Topical Arnica</td>
<td>2/95 (2.1%)</td>
<td>2.35%</td>
</tr>
<tr>
<td>Bromelain</td>
<td>1/90 (1%)</td>
<td>1.1%</td>
</tr>
<tr>
<td>Peach Pineapple, or kiiwi</td>
<td>1/90 (1.1%)</td>
<td>1.1%</td>
</tr>
</tbody>
</table>

• Similar frequencies of the use of protective practices seen in both patients with or without risk factors
  • ~13%

Conclusion

• Limited use of preventative practices
• Unaware/Lack of knowledge
• Patients with identified risk factors, did bruise more often than those without
• Appeared that protective practices are not associated with a lower risk of bruising
  • Did not see increased use of preventative practices among those who identified a risk factor
• Despite limited use, patient's bruising rates were low and bruising severity reported as minimal on average

Limitations

• Small sample size
• Retrospective nature
• Recall bias
• Sampling bias
• Other factors, not assessed by our survey, can affect a patient's likelihood of bruising

Future Considerations

• Consider an additional follow-up survey to identify any changes in post procedure practices
• Consider scheduling patient reminders ~2 weeks before an upcoming appointment
• Additional prospective studies regarding true efficacy of these practices

Works Cited

A case of CVA secondary to occlusion of carotid by pressure of a retropharyngeal phlegmon in an adult
Capt. Lindsay M Snow, MD, USAF MC, and Krishna Anderson, MD
Saint Louis University O'Fallon, SIHF, USAF, HSHS St Elizabeth's

Abstract
Stoke is extremely common in the geriatric population. Presented is a case of a patient found to have a CVA secondary to occlusion of the internal carotid artery by pressure from an expanding retropharyngeal phlegmon (RPP).

Introduction
71 yo male presented with back pain and progressive lower extremity weakness, no complaint of throat pain. Sensation and reflexes were intact with lower extremity weakness worse on the right. He was febrile, vitals stable, WBC of 14.3. Initial CT head was unremarkable, CT lumbar spine showed foraminal narrowing. Blood cultures grew gram+ cocci, UA showed leukocyte esterase, and rare bacteria; with an elevated lactate and Tmax of 102.9 we initiated sepsis protocol and started on broad-spectrum antibiotics. Head MRI demonstrated acute 3mm right parietal infarct. A 71.6 mm RPP was found on c-spine MRI causing right internal carotid artery occlusion of 99-100% on ultrasound. He was transferred to an academic facility where he received IV antibiotics as ENT deemed surgical intervention unnecessary. He spent 4 weeks in inpatient rehab followed by discharge to SNF.

Scholarly Question
Should clinicians consider RPP as a cause of neurologic deficits?

Discussion
RPPs rarely occur in adults- usually the result of trauma. They are more common in children; there are case reports of RPPs causing carotid occlusion and neurologic deficits with no sequelae in pediatric literature. In my literature review I did not find any case reports of RPP causing neurologic deficits or CVA in adults.

Conclusions
Further examination into the frequency of RPP in adults is warranted. Carotid occlusion is always on the differential for CVA, but given the rarity of RPP in adults it is unlikely it will be included unless there is a high index of suspicion.

Contact
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USAF, SU O'Tallon Family Medicine Residency
Email: lindsay.snow.1@us.af.mil
Keratoacanthomas: A Review of Excised Specimens
Alex Ernst M.D., Ashaki Patel MSIV, Ramona Behshad M.D., Eric Armbrrecht Ph.D.

Background
Keratoacanthomas are cutaneous neoplasms often considered low grade squamous cell carcinomas. Clinical characteristics/behavior include:
- Rapid growth
- Spontaneous involution
- Rare metastatic potential

Objectives
- We sought to quantify post biopsy cancerous tissue rates in keratoacanthomas and well differentiated squamous cell carcinomas.

Methods
- This study was approved by the St Louis University Institutional Review board.
- The study team utilized the Powerpath® digital archive search engine to identify patient histopathologic information from Jan 2010 to Dec 2015. Biopsy and excision specimens of keratoacanthomas and well differentiated squamous cell carcinomas were identified.
- Residual cancer rates were compared via data analysis.

Results

<table>
<thead>
<tr>
<th>Keratoacanthoma</th>
<th>Squamous Cell Carcinoma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td>23 62 85</td>
</tr>
<tr>
<td>Average</td>
<td>72.6 55.4 67.6</td>
</tr>
<tr>
<td>Residual cancer</td>
<td>97 71 99</td>
</tr>
<tr>
<td>Average</td>
<td>72.1 68.1 65.2</td>
</tr>
</tbody>
</table>

There is no association between residual cancer tissue and age, p = 0.321

Conclusions
- There is no difference in residual cancerous tissue rates when comparing keratoacanthomas versus well differentiated squamous cell carcinomas.
- Older patients tend to have greater rates of residual cancerous tissue after performance of biopsy.

Limitations and future considerations
- No control for biopsy technique or intention
- Lack of timeline
- Unknown medical past medical history
- Lack of full thickness specimen leading to over diagnosis of squamous cell carcinoma
- Evaluate recurrence rates in future studies
- Compare location specific information

References
We implemented the initial cycle of a quality improvement project in November 2017 with a goal to improve the number of accurately completed consent forms in our Medical ICU from a strikingly low baseline of 5% to an ambitious 100%.

To facilitate this, we identified 14 essential consent components based on the consent form policy. Each form was binarily scored based on completion of each of the required 14 components; giving each consent form a total score out of 14. Improvement was achieved through a multifaceted approach that included education of nursing staff and physicians to raise awareness of our deficits and improve knowledge about the accurate consent documentation process along with e-mails, break-room reminder notices and pocket cards identifying essential consent components.

We used form field feedback to identify key areas of focus. These included: Physician Name, Procedure/Date/Time, Witness Signature, Patient Name, Patient Consent to Treatment.

The physician signature and consenting physician name sections of the consent form suffered lag effect of the initial intervention after just 3 months stressing the importance of repetitive education.

To address these deficits, hospital-wide system-based interventions such as a brief, mandatory formal presentation to new all medical staff dosing our institution's orientation, as well as redesigning our current consent forms to clearly identify mandatory fields will now be considered.

This simple and effective intervention can be deployed throughout our institution's other departments.

The improvement following our intervention was undoubtedly dramatic and significant. However, there is certainly still room for improvement.

The Physician Name, Procedure Benefits and Alternatives, Witness Signature and consenting Physician Name sections on the consent form suffered from lag effect of the initial intervention after just 3 months stressing the importance of repetitive education.

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This simple and effective intervention can be deployed throughout our institution's other departments.
A Case of Clozapine Induced Myocarditis

Lucas Gu, DO; Zachary Oman, DO/MBA

Department of Internal Medicine, St. Louis University School of Medicine, St. Louis, Missouri

Introduction

Myocarditis is an inflammatory disease involving the myocardium. It can be precipitated by a variety of causes including infections, drugs, toxins and radiation. Here we present a case of myocarditis due to clozapine. Clozapine is an effective antipsychotic associated lower rates of suicide attempts in treated patients compared to other antipsychotics.

Case Report

A 33 year old male with history of schizophrenia admitted for auditory hallucinations. Schizophrenia was refractory to valproic acid, risperidone and haloperidol. Clozapine was started for resistant schizophrenia. Patient became persistently tachycardic on day 3 of clozapine therapy, and first reported chest pain on day 13 of clozapine therapy, clozapine was discontinued on day 15 following EKG finding of <1mm ST elevation.

Discussion

The incidence of myocarditis in patients on clozapine therapy is approximately 0.7-1.4%. The mechanism of myocardial injury is due to hypothesized to be IgE mediated eosinophilic hypersensitivity reaction, and myocarditis typically occurs within the first 4 weeks of clozapine therapy.

Conclusion

- Earliest clinical sign of myocarditis are persistent tachycardia and chest pain, fever may not be present.
- Eosinophilia is a late manifestation of clozapine induced myocarditis, elevation in peripheral eosinophils can be delayed up to 7 days following elevated troponin.
- Early cessation of clozapine is associated with decreased mortality in clozapine induced myocarditis, mortality rate of myocarditis associated with clozapine is approximately 10%.
Electrocardiographic features in Children with an Anomalous Right Coronary Artery originating from Left Aortic Sinus

Manish Malkar MD, MPH and Jason Garnreiter, MD, Saint Louis University, St. Louis, MO

Authors have no disclosures

**Background**

- Anomalous coronary artery originating from (opposite aortic sinus) (right coronary more common than left) is a rare congenital anomaly with documented incidence of 0.7% in a large sample of school children who underwent screening by coronary magnetic resonance angiography for high-risk cardiovascular conditions to prevent sudden cardiac death in the young (1)

- Aberrant right coronary artery arising from left aortic sinus. (ARCAOS) is known to cause several symptoms such as chest pain, dyspnea, palpitations, syncope and has been associated with sudden deaths in young athletes (2)

- Although there are few case reports and case series describing electrocardiographic findings in ARCAOS including normal coronary artery arising from opposite aortic sinus. (3)

- There have been no larger scale attempts made to systematically study the changes in ECGs in children and young adults (3,4)

**Aim & Hypothesis**

- Aim: To compare electrocardiogram parameters in patients with ARCAOS compared to that of age matched controls

- Hypothesis: The patients with ARCAOS have distinct electrocardiographic findings compared to that of age matched controls

**Methods**

- Patients who underwent unroofing surgeries for ARCAOS between July 2003 to July 2016 were identified using electronic medical record (EMR)

- Age matched controls who had normal intracardiac anatomy as demonstrated by echocardiogram were identified. The controls were referred for heart murmurs

- Pre-operative ECGs were then compared to ECGs of age matched controls aimed at rhythm, axis, intervals and amplitudes

- Fisher exact, Chi-square and Mann Whitney U test were used. Data are presented as mean ± SD or as %.

**Results**

**Demographic data**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>ARCAOS (N=40)</th>
<th>Controls (N=40)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years</td>
<td>10 ± 3.8</td>
<td>11.8 ± 3.9</td>
<td>0.82</td>
</tr>
<tr>
<td>Females, N (%)</td>
<td>15 (37.5%)</td>
<td>18 (45%)</td>
<td>0.65</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White, N (%)</td>
<td>16 (40%)</td>
<td>15 (37.5%)</td>
<td>0.52</td>
</tr>
<tr>
<td>African American, N (%)</td>
<td>19 (47.5%)</td>
<td>20 (50%)</td>
<td></td>
</tr>
<tr>
<td>Other, N (%)</td>
<td>3 (7.5%)</td>
<td>3 (7.5%)</td>
<td></td>
</tr>
<tr>
<td>Unknown, N (%)</td>
<td>2 (5%)</td>
<td>4 (10%)</td>
<td></td>
</tr>
</tbody>
</table>

**ECG characteristics: ARCAOS (preop) vs Controls**

<table>
<thead>
<tr>
<th>ECG features</th>
<th>Cases (N=40)</th>
<th>Controls (N=40)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>QTc Interval, Mean ± SD (msec)</td>
<td>0.051</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R wave amplitude In V1</td>
<td>107 ± 21</td>
<td>132 ± 21</td>
<td>0.007</td>
</tr>
<tr>
<td>QTc interval, Mean ± SD (msec)</td>
<td>0.051</td>
<td></td>
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<td>R wave amplitude In V1</td>
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<td>132 ± 21</td>
<td>0.007</td>
</tr>
</tbody>
</table>

**Frequency of sinus and low right atrial rhythms**

<table>
<thead>
<tr>
<th>ARCAOS (Preoperative)</th>
<th>N=40</th>
<th>Controls</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCAOS (Postoperative)</td>
<td>N=40</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

- The sinus node originates from the right coronary artery in 66% of humans. Hence restoration of sinus rhythm from low right atrial rhythm post unroofing surgery may suggest compromised blood supply to the sinus node in patients with ARCAOS.

- The degree of QTc prolongation in ARCAOS though was statistically significant, it was clinically insignificant and hence could be a coincidental finding

**Conclusion**

- There are subtle ECG differences in children with aberrant right coronary artery originating from the left aortic sinus

- A higher occurrence of a low right atrial rhythm which resolved after unroofing surgery could suggest compromised blood supply to the sinus node in children with aberrant right coronary artery arising from the left aortic sinus

**References**

Impact of Balloon Size on Outcomes in Neonates with Critical Aortic Stenosis - An institutional experience

Manish Malkar MD, MPH and Saadeh Jureidini, MD, Saint Louis University, St. Louis, MO
Authors have no disclosures

Background
- The critical aortic stenosis presents in neonates and results in ductus arteriosus dependent systemic circulation.
- The treatment of choice for critical aortic stenosis has evolved from a surgical procedure to a non-surgical percutaneous transcatheter balloon valvuloplasty.

Aims & Hypothesis
- Aims: To study the outcomes of neonates who underwent percutaneous balloon aortic valvuloplasty for critical aortic stenosis with particular emphasis on the degree of aortic regurgitation, residual transannular valve pressure gradient and its correlation to the relative size of aortic balloon.
- To determine the safest residual transaortic valve pressure gradient after the balloon intervention.
- Hypothesis: Aortic balloons more than or equal to 7 mm are associated with higher incidence and magnitude of aortic regurgitation that may or may not require further surgical or balloon intervention.
- The residual transaortic valve pressure gradient ≤ 30 mm Hg is associated with least need for re-intervention.

Methods
- Retrospective chart review study of the neonates who underwent percutaneous balloon aortic valvuloplasty for critical aortic stenosis from January 1999 to July 2016.
- Medical records from EPIC as well as paper charts of the patients were reviewed for collecting demographic and clinical information.
- Institutional IRB approval was obtained.
- Non-parametric and Fisher exact tests were used.

Inclusion criteria
- Neonates and young infants < 30 days of age with diagnosis of critical aortic stenosis with ductus arteriosus dependent systemic circulation who underwent percutaneous balloon aortic valvuloplasty between January 1999 and July 2016.

Exclusion criteria
- Hypoplastic left ventricle (end diastolic dimension ≥ score ≥ 2.5).
- Hypoplastic or stenotic mitral valve (area ≥ score ≥ 2.5 or mean mitral valve inflow Doppler gradient > 6 mmHg).
- Sub or supravalvar Aortic stenosis.
- History of in-utero aortic valvuloplasty.
- Moderate or severe Aortic Regurgitation.
- Associated congenital heart disease other than Patent Ductus Arteriosus, Ventricular Septal Defect, Atrial septal defect or Coarctation of the aorta.

Results
- From the year 1999 through 2016, data from consecutive 19 neonates with critical congenital aortic valve stenosis (AVS) who underwent BA in the first 15 days of life, were evaluated.

Discussion
- Ours being retrospective chart study over 18 years period, 2 groups had variable periods of follow ups.
- Rarity of disease occurrence contributed to limitation in sample size making achievement of statistical significance difficult for some comparisons.
- Ours is the first study to investigate the safest permissible residual pressure gradients to minimize the reintervention rate as well as impact of balloon size on the long term outcomes in these patients.

Conclusion
- Conservative balloon size ≤ 6 mm is ideal to achieve adequate relief of pressure gradient (≤ 30 mm Hg) & minimize aortic regurgitation.
- Repeat balloon aortic valvuloplasty may be expected with this conservative approach, but in the long run is preferable over surgical intervention for aortic regurgitation when larger balloon size was used.
- Our message is repeat percutaneous balloon aortic valvuloplasty is better than aortic valve replacement surgery or Ross operation.

References
Outcomes of Goals of Care Conversations with Hospitalized Veterans from Palliative Care Consultations

Cameron Simmons, MD1; Sukesh Manthri, MD1; Oscar A. Cepeda, MD2
1. Fellow, Hospice and Palliative Medicine, Saint Louis University, St. Louis, MO, USA. 2. Assistant Professor, Hospice and Palliative Medicine, John Cochran VA Hospital, St. Louis, MO, USA.

Background

- Inpatient palliative care (IPC) consultation services have been widely adopted in US hospitals.
- Outcomes research has demonstrated improved quality of life for palliative inpatients for symptom control and satisfaction with care. Families benefited from emotional support, care planning, and transitions of care.
- Outcomes including hospital length of stay, hospital costs, and discharge disposition also appear to improve.
- VA provides palliative care (PC) consultation teams at all its hospitals nationwide, although such services are provided at only about one fourth of all American hospitals; however, few studies exist to show how a PC service is utilized at a VA hospital.
- This study of one PC consult team at an urban VA provides a unique picture of how the PC team is utilized.

Methods

- A retrospective study in which an institutional database with a total of 130 patients admitted to VA hospital with severe illness resulting in PC consult was reviewed.
- Our study was IRB approval exempt. The attending physician kept track of each IPC encounter between September 2014 and April 2016.
- Patient charts were reviewed and the following information was collected: age, patient location, diagnosis, number of days between admission and PC consult, number of days between admission and family meeting, and change in goals of care.
- Analysis was confined to descriptive measures including frequencies, means, ranges, and medians.

REFERENCES


Table 1: Patient Characteristics

<table>
<thead>
<tr>
<th>Total number of patients</th>
<th>130</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average age</td>
<td>72.4 years</td>
</tr>
<tr>
<td>Number of days for IPC after admission</td>
<td>5.2 days</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient Location</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU: 71 (54.6%)</td>
<td>Medical or surgical floor: 57 (43.8%)</td>
</tr>
<tr>
<td>Emergency room: 1 (0.8%)</td>
<td>Palliative care clinic: 1 (0.8%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Metastatic cancer: 31 patients, 24%</td>
<td>Dementia: 22 patients, 17%</td>
</tr>
<tr>
<td>Septic shock and liver failure: 7 patients, 5%</td>
<td>Respiratory failure: 17 patients, 13%</td>
</tr>
</tbody>
</table>

Table 2: Statistics based on floor vs ICU Consultations

<table>
<thead>
<tr>
<th>Total number of patients</th>
<th>130</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average number of days for IPC after admission</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient Location</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU: 77</td>
<td>Medical or surgical floor: 72</td>
</tr>
<tr>
<td>Emergency room: 1 (0.8%)</td>
<td>Palliative care clinic: 1 (0.8%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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</tr>
</tbody>
</table>

Discussion

- From a purely outcomes-based interpretation, IPC consultation was associated with 83% of patients receiving a change in code status from Full Code / TSL-1. Remarkable only 3 out of 130 patients (2%) expired while inpatient with full code status.
- Knowing that Early IPC consultation by medical teams improves quality of life, our data also allows a unique comparison between timing of PC referrals. Our average number of days for initial IPC consultation following admission was 3 days on the floor and 7 days in the ICU.
- The final study conclusion our team left discussed was that the majority (71.5%) of family meetings were held with family only (no patient involvement). This implies a missed opportunity to have earlier PC involvement where the patient themselves could participate. This calls for further interventions regarding early identification of these patients and better processes to assist in their decision making.

Limitations

- It is a single-institution study and every organization has its own internal culture which leads to biased results away from general applicability.
- Though this study speaks to the effectiveness of IPC consultation, it does not distinguish which outcomes were specific to PC team vs the concurrent medical teams involvement.
- We also did not have a concurrent or historical control group of demographically similar and equivalency ill patients for whom palliative consultation was not requested.

Conclusions

- IPC are utilized timely (3 days floor, 7 days ICU), and results in change of code status in 83% of patients (with only 2% of patients expiring as full code while inpatient).
- Study also supports ongoing improvement for earlier PC intervention as 71.5% of family meetings were held without the patient, which highlights the vulnerability of the medically unbehelld patients in the VA setting.
Prospective, blinded evaluation of template-based cesarean documentation error in an obstetric training program

William M. Perez, MD, Laura Vricella, MD
Saint Louis University School of Medicine

Abstract

Background

Objectives: Cesarean operative report accuracy potentially impacts both postoperative care and future obstetric decision-making. We aimed to describe the accuracy of resident cesarean operative reports in the era of electronic health record templates.

Study Design: This project was undertaken as a quality improvement initiative, and as such, was not approved by an IRB. Attending physicians were asked to complete a standardized audit form following cesarean deliveries which was compared to the uncorrected resident operative report. Errors were classified as none, major, or minor. Major errors included errors with potential to affect perioperative management or influence future obstetric management while minor errors did not have such potential. Author and operative characteristics were collected for comparative and predictive analyses.

Results: We reviewed 100 cesarean operative reports over a 6 month period. Major error was identified in 33% and minor error was identified in 53% of operative notes. Advancing training level was associated with lower incidence of major (OR 0.39, 95% CI 0.17–0.92), whereas operative time (aOR 1.03 95% CI 0.98–1.03), documentation interval (aOR 1 95% CI 0.996–1.003), and shift type (aOR 0.62 95% CI 0.19–1.95) were not predictive.

Conclusion: A high incidence of clinically significant documentation error was observed in a residency training program using standardized templates for cesarean operative reports. Incidence of major error decreased with increasing training, but minor error was similar across levels of training, suggesting that error may be a consequence of method of documentation. Measures must be taken to improve documentation accuracy in medical training to provide optimal obstetric care.

Quality Improvement Initiative

Inclusion Criteria: All cesareans in study period
Exclusion Criteria: None

Anonymous audit of cesarean documentation errors

Comparison of attending description of cesarean

Classification of errors

Major:
- Potential to adversely affect postoperative care
  - Omission of arterial bleeding requiring O&T ligation
- Potential to adversely affect future obstetric management
  - E.g., low transverse vs. classical hysterectomy

Minor:
- No potential to affect postoperative care or future obstetric management
  - E.g., inaccurate description of suture type

Statistics

Chi-square analysis of error frequency

Study Design

Figure 1: Example Operative Note Template

Figure 2: Operative Note Audit Tool

Results

Table 1: Resident physician documentation: frequency of major and minor errors

<table>
<thead>
<tr>
<th>Error category</th>
<th>% Major</th>
<th>% Minor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall error</td>
<td>19.0</td>
<td>53.0</td>
</tr>
<tr>
<td>Omission of essential step</td>
<td>10.9</td>
<td>3.0</td>
</tr>
<tr>
<td>Productive notes not described</td>
<td>8.0</td>
<td>23.0</td>
</tr>
<tr>
<td>Repair of deep cut not described</td>
<td>8.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Incorrect hysterotomy type described</td>
<td>3.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Performance and repair of Myerod incision not described</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Abdominal wall closure not described</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Inadequate description of major findings</td>
<td>1.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Excessive adhesions not described</td>
<td>1.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Uterine &quot;steal&quot; not described</td>
<td>1.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Femoral denervation complete not described</td>
<td>1.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Undiagnosed placental or fetal anomalies not described</td>
<td>1.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Failure to describe bowel injury and management</td>
<td>1.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Omission of method of laceration</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Inaccurate depth definition</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Breach head component not described</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Narrow pelvis not described</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Tension sutures not described</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Breast described as cephalic</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Incorrect localization related to labor arrest</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Omission of bilateral internal iliac ligation</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Table 2: Anisotropes and operative characteristics by presence of major and minor errors

<table>
<thead>
<tr>
<th>Variable</th>
<th>Major error</th>
<th>% Major error</th>
<th>% Minor error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior</td>
<td>10 (36)</td>
<td>9 (33)</td>
<td>11 (37)</td>
<td>0.40</td>
</tr>
<tr>
<td>Vaginal</td>
<td>2 (11)</td>
<td>5 (32)</td>
<td>2 (11)</td>
<td>0.48</td>
</tr>
<tr>
<td>Major</td>
<td>3 (21)</td>
<td>7 (47)</td>
<td>1 (11)</td>
<td>0.47</td>
</tr>
<tr>
<td>Minor</td>
<td>7 (50)</td>
<td>5 (33)</td>
<td>3 (30)</td>
<td>0.45</td>
</tr>
<tr>
<td>Both</td>
<td>0 (0)</td>
<td>1 (1)</td>
<td>3 (30)</td>
<td>0.45</td>
</tr>
</tbody>
</table>

Table 3: Multiple logistic regression predicting major documentation error

<table>
<thead>
<tr>
<th>Variable</th>
<th>OR</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>POST</td>
<td>0.34</td>
<td>0.13–0.89</td>
<td>0.04</td>
</tr>
<tr>
<td>POST</td>
<td>1.91</td>
<td>0.98–3.84</td>
<td>0.05</td>
</tr>
<tr>
<td>POST</td>
<td>1.91</td>
<td>0.98–3.84</td>
<td>0.05</td>
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<td>POST</td>
<td>1.91</td>
<td>0.98–3.84</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Conclusion

- We found a 33% incidence of major documentation errors and a 53% incidence of minor documentation errors.
- Major documentation error decreased significantly with advancing training level, while minor documentation error remained constant.
- Interventions to improve incidence of documentation error is imperative. Error may be a consequence of method of documentation.
- Measures must be taken to improve documentation accuracy in medical training to provide optimal obstetric care. Possible interventions include strict EHR template or operative note dictation into the EHR system. Further study could aid in determination of most accurate documentation method.
Quality Improvement: Improving Efficiency in the Bronchoscopy Suite

Ghassan Kamel1, MD, Armin Kravarči, MD, Pujan Patel1, MD, MD, Erin Rackey1, RT, John Mwangi1, MD, Zafar Jamkhana1, MD, MPH, Setu Pataola1, MD, MPH.

1Division of Pulmonary, Critical Care and Sleep Medicine, Department of Internal Medicine, Saint Louis University School of Medicine, Saint Louis, MO
2Department of Respiratory Therapy, SSM Saint Louis University Hospital, Saint Louis, MO

BACKGROUND

- Multiple delays in procedure start time and turn over have been reported by fellows and faculty in the bronchoscopy suite.
- The majority of our procedures are performed in the bronchoscopy suite.
- Improving efficiency and patient flow will not only increase procedure number and reimbursement but will also enhance learning opportunities for trainees.
- We have conducted a quality improvement project aimed at improving turnover and patient flow in our bronchoscopy suite.
- Similar studies have been conducted in Gastroenterology endoscopy suites (1,2) except for one study performed in a bronchoscopy suite (3).
- Pre-procedure time was identified as a major source of delay (1-3).

METHODS

- Pre-intervention data were collected from June 30, 2016 to August 17, 2016.
- Pre-intervention data analysis performed.
- Using a fishbone diagram, factors at stake were identified (Figure 1).

Intervention:

- Education of pulmonary fellows and faculty (Didactics and Handouts).
- Education of bronchoscopy suite staff.
- Post-intervention data collection from September 1, 2016, to November 11, 2016.
- Data Analysis:
  - IBM SPSS Statistics for Windows Version 23.0.
  - Descriptive statistic with percentage or proportion was used to describe the data.
  - χ2 statistic was used to analyze the qualitative variables.
  - P value of < .05 was considered statistically significant.

DATA

Table 1: Metrics measured

<table>
<thead>
<tr>
<th>Metric</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected Arrival</td>
<td>Time the patient is expected to arrive to ACU</td>
</tr>
<tr>
<td>Arrival to ACU</td>
<td>Actual time the patient arrived to ACU</td>
</tr>
<tr>
<td>Marked Ready in ACU</td>
<td>Time RN recorded the vital signs</td>
</tr>
<tr>
<td>Timeout Performed in ACU</td>
<td>Time the timeout was performed in ACU</td>
</tr>
<tr>
<td>H&amp;P signed by MD</td>
<td>Time attending signed the H&amp;P</td>
</tr>
<tr>
<td>Arrival to Bronchoscopy Suite</td>
<td>Time the patient is in bronchoscopy room</td>
</tr>
<tr>
<td>Bronchoscopy Suite Timeout</td>
<td>Time the bronchoscopy room time-out was performed</td>
</tr>
<tr>
<td>Scheduled time</td>
<td>Actual procedure scheduled time</td>
</tr>
<tr>
<td>Start Time/Scope In Time</td>
<td>Time bronchoscope was inserted</td>
</tr>
<tr>
<td>Stop Time/Scope Out Time</td>
<td>Time bronchoscope was removed and procedure ended</td>
</tr>
<tr>
<td>Out of Room</td>
<td>Time the patient was transferred out of room to ACU</td>
</tr>
</tbody>
</table>

Table 2: Results

<table>
<thead>
<tr>
<th>Percent of Time</th>
<th>Pre-Intervention</th>
<th>Post-Intervention</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedure Started Late</td>
<td>Outpatient</td>
<td>92.6%</td>
<td>53.8%</td>
</tr>
<tr>
<td>Total</td>
<td>76.4%</td>
<td>52.0%</td>
<td>0.002</td>
</tr>
<tr>
<td>H&amp;P Signed Late</td>
<td>65.5%</td>
<td>33.3%</td>
<td>0.017</td>
</tr>
</tbody>
</table>

DISCUSSION

- Our perception of significant delays in the bronchoscopy suite was translated into objective data.
- Our educational intervention resulted in improved efficiency especially in procedure start time and time the procedure H&P was signed.
- A significant number of procedures continue to be delayed.
- Our results are consistent with previously published literature that identified the pre-procedure period as the main source of delays.
- More quality improvement initiatives are needed to identify a different work flow that would improve the flow in the bronchoscopy suite, especially in the pre-procedure period.

REFERENCES

Introduction
Laryngotracheal clefts (LC), a congenital deformity of the posterior portion of the larynx and trachea, are a rare and often challenging congenital airway malformation. Occurring in every 10,000-70,000 live births, LCs cannot be diagnosed prenatally, and are usually found when symptoms manifest. We present a multi-staged case study of a neonate requiring surgical correction of cardiac anomalies with a laryngeal cleft that was diagnosed on initial intubation attempts.

Case Report
Our patient is a one day-old full term female with total anomalous pulmonary venous return diagnosed prenatally. She presented for repair of TAPVR on day one of life. She was induced and ventilated uneventfully. A 3.0 mm cuffed endotracheal tube was introduced into the trachea and appeared to be main-stemmed.

Case Report Continued
When the ETT was withdrawn a large leak was noted. Further attempts produced similar results. A 3.0 mm ETT was then main-stemmed in order to ventilate the patient. An emergent bronchoscopy revealed a Type III laryngeal cleft. Due to the urgent need for cardiac repair and difficulty in ventilating, the ENT surgeon performed a repair of the LC. The patient was transported to the ICU with a 3.0 mm uncuffed ETT in place. On day 9 of life, she underwent cardiac repair. Post-operatively, she was difficult to ventilate and her chest x-ray showed white-out of her left lung. Repeat bronchoscopy identified that her cleft repair had broken down due to prolonged intubation. She was placed on ECMO support due to ventilatory and hemodynamic instability. There was continued difficulty with endotracheal tube placement due to a deep cleft and short trachea so she returned to the OR for a bronchoscopy, while still on ECMO.

Under direct visualization a 2.5 mm uncuffed ETT was placed in the right mainstem and another was placed in the left mainstem. A Y-adaptor was connected to both tubes and both lungs were ventilated.

Discussion
Laryngeal clefts have been characterized by a modified Benjamin and Ingles scale into five types (O-IV) ranging from a submucosal cleft (O) to a cleft which may extend to the carina (IV). With type III, or IV LCs, surgical repair is often complicated, requiring multiple revisions, with a high rate of morbidity and mortality. Proper ventilation is of utmost importance in these patients, to prevent aspiration and pulmonary complications.

Conclusion
Laryngeal clefts are a challenging congenital airway deformity. Difficulties in endotracheal tube placement and ventilation frequently occur in more significant clefts. Creative solutions such as ETTs in each mainstream bronchus may be necessary to achieve adequate ventilation and oxygenation.

References
Saeed R., Alpers F. Endoscopic laryngotracheal cleft repair without tracheostomy or intubation. Langenbecks Arch. 2006; 414: 632-634.
Thalamic Deep Brain Stimulation For Holmes Tremor

Erik Krause*, DO; Neha Prakash, MD, Richard Buchholz, MD, Pratap Chand, MD
Department of Neurology and Neurosurgery, Saint Louis University School of Medicine, MO, USA

INTRODUCTION

Holmes tremor (HT) is often a symptom of various neurological disorders. The aim of this study was to evaluate the effects of DBS on tremor in patients with HT. The study included 2 patients, both of whom were diagnosed with HT. The preoperative evaluation revealed that both patients had signs of contralateral neglect and hemiparesis. The patients were implanted with bilateral DBS leads in the ventralis intermedius nucleus of the thalamus.

METHODS AND MATERIALS

The patients were evaluated with clinical examination and neuroimaging studies. The therapy was performed using a depth electrode to target the thalamic nucleus. The lead was connected to a neurostimulator, and the patient was monitored for the duration of the procedure. The therapy was continued for several months, with periodic adjustments to the stimulation parameters. The patients were followed up for at least 6 months after the procedure.

RESULTS

The study included 2 patients, both of whom were diagnosed with HT. The preoperative evaluation revealed that both patients had signs of contralateral neglect and hemiparesis. The patients were implanted with bilateral DBS leads in the ventralis intermedius nucleus of the thalamus. The therapy was performed using a depth electrode to target the thalamic nucleus. The lead was connected to a neurostimulator, and the patient was monitored for the duration of the procedure. The therapy was continued for several months, with periodic adjustments to the stimulation parameters. The patients were followed up for at least 6 months after the procedure.

DISCUSSION AND CONCLUSION

Holmes tremor is a rare condition characterized by a combination of involuntary, rhythmic body movements, rigidity, and a dystonic posture. Despite the rarity of the condition, it is important to identify and treat it early to prevent the development of secondary complications. The current standard of care is the use of antiparkinsonian medications, which can only provide temporary relief. DBS has been explored as an alternative treatment option. The current study aimed to evaluate the effectiveness of DBS for the treatment of Holmes tremor.

Figure 1: MRI of prior right midbrain cavernoma in Patient 1 (left image). MRI of MS lesions in brainstem of Patient 2 (right image).

Figure 2: MRI of MS lesions in brainstem of Patient 2 (right image).

Figure 3: Tremor rating scale outcomes

REFERENCES


Saint Louis University Hospital

when it's CRITICAL
Review of systems: (started 1 month prior to admission), Morphine XR 15mg BID Meds — Insulin glargine 34U OHS, Insulin lispro, Amitriptyline 50mg OHS

Social He — Smokes vapor cigarettes, No alcohol/drugs, Has tattoos

PMHx— DM1 (since age 6, previous poor control), depression further work up. 05K ED started tigecycline, treated for DKA/sepsis, and despite stopping ice baths. He saw podiatry who sent him to the ED for prior to admission, patient started soaking his feet in ice baths (1' bad he could longer walk and dropped out of school. For 2-3 months preceding 10 months, he had intermittent episodes of severe painful. of worsening, painful, foul-smelling bilateral loot ulcerations, During the introduction/background.

An 18-year-old male with PMH of diabetes mellitus type I and depression was transferred from outside hospital for a 3-4 week history of worsening, painful, foul-smelling bilateral foot ulcerations. During the preceding 10 months, he had intermittent episodes of severe painful, swollen, red feet that worsened with heat and improved with cold and elevation. He was seen in ED multiple times and given antibiotics for "bilateral cellulitis" with minimal improvement. His symptoms became so bad he could no longer walk and dropped out of school. For 2-3 months prior to admission, patient started soaking his feet in ice baths (+/- epsom salts) 20-24 hours per day. One month later, he noted development of "dark red spots" and "ulcers" on his feet that worsened despite stopping ice baths. He saw podiatry who sent him to the ED for further work up. DSH ED started tigecycline, treated for DKA/sepsis, and transferred to Saint Louis University Hospital.

PMHs — DM1 (since age 6, previous poor control), depression — No PMH of Raynaud's, livedo, nodules, liver/kidney problems, neuropathy, lupus

Fam He — No autoimmune or clotting disorders, No erythromelalgia

Social He — Smokes vapor cigarettes, No alcohol/drugs, Has tattoos

Meds — Insulin glargine 34U QHS, Insulin lispro, Amitriptyline 50mg QHS (started 1 month prior to admission), Morphine XR 15mg Bid

Review of Systems:

- Positive for: pain, burning, purulent discharge, limited ROM of feet, fever, tachycardia
- Negative for: chills, nausea, vomiting, active bleeding, rashes

Case Presentation:

**PHYSICAL EXAM:**

- Vital: BP 130/75 | Pulse 122 | Temp 100.3°F | Resp 16 | Ht 6' | Wt 118 lb | SpO2 98% | BMI 16 kg/m2
- GAW: Awake and alert, in acute painful distress
- HENT: NCAT, EOMI, Poor dentition
- RESP: CTAB
- CARDIO: RR 110, normal S1 and S2. No gallops.
- AB: Abdomen soft, NCT, ND, r75, no organomegaly
- EXT/SKIN: Numerous foul-smelling, tender ulcerations of various sizes, most with overlying brown-yellow crust (some with mild yellow drainage) on bilateral dorsal feet, dorsal 1st toes, dorsal proximal 3rd-5th toes, 1st/2nd toe-web, medial feet, medial ankles, and plantar heels. No edema. Erosions and ulcers seem to be fairly symmetric and have sharp cut off at the ankles. Ill-defined red mottled patch on L-R medial malleoli. Tattoos on bilateral upper extremities.
- NEURO: No focal deficits. A&O x3.
- VASC: Bilateral DP and PT pulses intact.

**PERTINENT LABS AND IMAGING:**

**Outside Hospital:**

- WBC 24K, ESR 103 (0-15), CRP 9.4 (<0.5), glucose 323, HbA1C 6.5%
- Bilateral foot X-rays — negative for osteomyelitis
- C3/C4, c-ANCA, p-ANCA, MPO/P113, ANA, ds’DNA, Hep C negative, HIV negative
- Blood cultures: negative
- Tissue culture: +MSSA, Stenotrophomonas
- Wound culture: +MSSA and group A strep
- UA trace protein, trace ketones, glucose 70
- HbA1C 6.6%
- H1L Labs:
  - Bilateral Foot X-rays — negative for osteomyelitis
  - C3/C4, c-ANCA, p-ANCA, MPO/P113, ANA, ds’DNA, ASO, RF all normal.
  - Hep C negative, HIV negative
  - Blood cultures: negative
  - Wound culture: +MSSA and group A strep
  - Tissue culture: +MSSA, Stenotrophomonas
  - Maltophilia, Diphtheroids
  - Cryoglobulins: negative (repeated to ensure no false negative)

**RePEAT cryoglobulin test **POSITIVE** at 15.5 mg/dl**

**SKIN BIOPSY** (Punch biopsy x 2 (dorsal foot — edge of ulcer) for H&E + DIF):

- Epidermal necrosis with dermal hemorrhage and fibrin thrombi, GMS/gran stain positive, AFB stain negative, DIF negative. Epidermal necrosis, spongiform pustules, numerous neutrophils in dermis. Dermal hemorrhage with scattered hemosiderophages. Fibrin thrombi present in dermal vessels. May represent changes adjacent to ulcer, however a primary vaso-occlusive process cannot be completely excluded.

**FINAL DIAGNOSIS:**

Cryoglobulinemia (features of types I and II/III) and cold water immersion injury ("trench foot") triggered by frequent ice baths of feet (to treat symptoms of erythromelalgia vs. neuropathy) in the setting of DM Type 1

**Treatment/Follow-Up:**

- Patient was discharged home on antibiotics with dressing changes by home health, and was encouraged to keep feet warm and out of ice.
- No specific treatment for cryoglobulinemia, as there were no signs of systemic involvement and no new cutaneous lesions.
- Improved ulcers on skin exam at F/A.

**Discussion:**

**Erythromelalgia:**

Involves burning, pain, warmth, and redness of distal extremities (feet > hands) worse with heat/exercise and better with cold/freeze. Can be due to thrombocytosis (type I), familial or idiopathic (type II), 2/2 to other causes (type 3 - autoimmune diseases, myeloproliferative disorders, medications, infections, etc.). Can be seen in patients with DM Type 1 and also rarely associated with cryoglobulinemia. May resolve if inciting behaviors are avoided.

**Cold Water Immersion Injury ("Trench Foot"):**

Due to prolonged exposure of feet to cold, moist environment (but above freezing). Involves over hydration of stratum corneum in combination with cold-induced vasospasm, leading to tissue injury and subsequent ulcerations (+/- necrosis). Management involves rapid drying/warming and prevention.

**Cryoglobulinemia:**

Serum immunoglobulins (cryoglobulins) that precipitate at temps <37°C and dissolve w/rewarming. Types II & III associated with Hep C. Treat underlying disorder and immunosuppression if severe.

**Cryoglobulin Testing:**

Transport blood in warm 37°C tubes. If room temp, cryoglobulins precipitate before separating serum, leading to false negatives! Lab should centrifuge out serum at 37°C, store samples at 4°C for 3-7 days, then look for presence of cryoprecipitate. Then, rewarm tube (look for reversibility), quantify cryoprecipitate, and perform immunofixation electrophoresis (identify type).

**References:**

Risk of Herpes Zoster in Chronic Lymphocytic Leukemia Treated with Fludarabine or Bendamustine

Martin W. Schoen MD, MPH1, Kristen M. Belfill MD, MPH1, Theodore S. Thomas MD MPH2,3, Sunhong Luo MD, Kahea A. Mohammed MD MPH4, and Kenneth Carson MD, PhD1
1. Saint Louis University School of Medicine 2. Washington University in St. Louis School of Medicine 3. Research Service, St. Louis Veterans Affairs Medical Center

BACKGROUND

- Chronic Lymphocytic Leukemia (CLL) is associated with reduced immune surveillance and viral infections
- Treatments for CLL are associated with immune suppression and infections
- Herpes Zoster (HZ) reactivation of varicella zoster virus is more common in patients with compromised immunity or chemotherapy
- HZ is treated with high dose acyclovir or valacyclovir, low doses can be used as prophylaxis to prevent viral reactivation
- Fludarabine is a purine analog that causes compromised immunity or chemotherapy, which can be given with or without cyclophosphamide to treat CLL
- In 2008, bendamustine was approved in US and associated with fewer adverse events than treatment with fludarabine

METHODS

- Veterans Affairs Central Cancer Registry (VACCR) was used to identify patients diagnosed with CLL from 1/2001 to 4/2016
- ICD-9 codes were collected from all patients and the code 053.X was used for HZ
- HZ events were defined as the first time of ICD9 code and pharmaceutical prescription at high dose (>1500mg) given within 30 days
- Prescriptions were each reviewed to be appropriate for treatment of HZ
- Prophylaxis defined as at least two prescriptions during first year after first chemotherapy (≥1500mg)
- T-Tests and Chi-square statistics used to analyze baseline population differences
- Cox proportional hazard model used to evaluate risk of HZ after chemotherapy
- Univariate as well as multivariate hazard ratios (HR) including prophylaxis, co-morbidities and prior HZ infection

RESULTS

- Demographic and Clinical Characteristics of CLL Patients Receiving Chemotherapy n=1544

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Fludarabine n=1084 (70%)</th>
<th>Bendamustine n=460 (30%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at therapy (year)</td>
<td>62.5 (61.9-63.7)</td>
<td>64.9 (64.2-65.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Year of therapy (median)</td>
<td>2008</td>
<td>2008</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Age at diagnosis (year)</td>
<td>62.5 (61.9-63.7)</td>
<td>64.9 (64.2-65.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Year of diagnosis (median)</td>
<td>2006</td>
<td>2008</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>White/Other</td>
<td>871 (80.5%)</td>
<td>393 (85.0%)</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>205 (18.9%)</td>
<td>66 (14.3%)</td>
<td></td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>8 (0.7%)</td>
<td>3 (0.7%)</td>
<td></td>
</tr>
<tr>
<td>Given prophylaxis</td>
<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Months prior to chemotherapy (median)</td>
<td>20.8</td>
<td>44.5</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Median overall survival after chemo (months)</td>
<td>53.7</td>
<td>47.1</td>
<td>0.016</td>
</tr>
<tr>
<td>Median overall survival from diagnosis (months)</td>
<td>87.3</td>
<td>121</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>ICD9 Code for HZ prior to chemotherapy</td>
<td>23 (2.1%)</td>
<td>10 (2.2%)</td>
<td>0.948</td>
</tr>
<tr>
<td>Given cyclophosphamide</td>
<td>600 (55.4%)</td>
<td>0 (0%)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

CONCLUSIONS

- Bendamustine associated with reduced rate of herpes zoster infections compared to fludarabine
- Decreasd risk persisted even while accounting for lower rate of prophylaxis and higher co-morbidities
- Future studies should evaluate the effect of prophylaxis in patients at risk for herpes zoster

REFERENCES


Limitations:

- Study predominantly of men, VA population
- Definition of HZ infections narrow, possible underestimate of total number of infections
- Treatment assignment due to approval of bendamustine in 2008 and limited follow-up available for bendamustine

Herpes Zoster Infections:

- Fludarabine containing regimens had a higher rate of HZ at five years (11.4% vs. 5.4%, p<0.001)
- Bendamustine had univariate HR of 0.61 for Herpes Zoster
- In multivariate model, bendamustine had HR of 0.59 with adjustment for comorbidities, prophylaxis and prior HZ
- Prior HZ was strongest predictor of HZ occurrence

Factors associated with Herpes Zoster

- Univariate Cox Proportional Hazard Model
- Multivariate Cox Proportional Hazard Model

<table>
<thead>
<tr>
<th>Treatment and Bendamustine vs. Fludarabine</th>
<th>HR (95% CI)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment with Bendamustine</td>
<td>0.61 (0.40-0.95)</td>
<td>0.027</td>
</tr>
<tr>
<td>Treatment with Bendamustine</td>
<td>0.59 (0.38-0.92)</td>
<td>0.019</td>
</tr>
</tbody>
</table>

- Charlson-Roman Comorbidities Index
- Prophylaxis for 1 year prior to chemotherapy
- ICD9 Code for HZ prior to chemotherapy

Overall Survival without HZ (Percent)

- Kaplan-Meier Survival free of Herpes Zoster: Fludarabine vs. Bendamustine

RESULTS (cont'd)

- More patients were given a fludarabine containing regimen than bendamustine (1084 vs. 460 patients)
- Bendamustine patients were older (69.4 vs. 65.4, p<0.001) with higher comorbidity index (2.19 vs. 1.65, p<0.001) and with a longer time from diagnosis to treatment
- Fludarabine given earlier in time (2008 vs. 2012), with longer follow-up available
- Cyclophosphamide administration not significant associated with HZ reactivation
- More patients given HZ prophylaxis in fludarabine regimens compared to bendamustine (57.4% vs. 25.7%, p<0.001)
Stop. Think. Does My Patient Need Those Labs?

Oluwasayo Adeyemo MD. MPH, Rachna Rawal MD, Paul Kunnath MD, Hala Saad MD, Alex Lane MD, Ara Vartanyan BS, Jennifer M. Schmidt MD

Department of Internal Medicine. Saint Louis University School of Medicine

Introduction

- Reducing unnecessary lab testing decreases overall healthcare costs
- Literature shows intervening on resident physicians creates sustained impact on their future practice
- SMART AIM:
  - Primary Aim: To decrease lab orders by 15% in one academic year
  - Secondary Aim: Encourage ordering of specific labs

Methods

- **Participants**
  - Residents rotating on General Medicine Inpatient teams
  - Total: 63 weeks
  - Control: 15 weeks
  - Interventions: 3 Phases of 16 weeks

- **Data Collection**
  - Electronic Medical Record Data (Epic)
  - Surveys (developed by project team)

Results

- Residents Discuss Labs with Team
- Do Residents Think They Order More Mindfully?

<table>
<thead>
<tr>
<th>Time</th>
<th>Residents Discuss Labs with Team</th>
<th>Do Residents Think They Order More Mindfully?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weeks</td>
<td>After 32 Weeks</td>
<td>After 64 Weeks</td>
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<tr>
<td>Data</td>
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<td>0</td>
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<tr>
<td></td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>120</td>
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<tr>
<td>Data</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>120</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Epic Lab Frequency Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labs Every Morning</td>
</tr>
<tr>
<td>Other Frequencies</td>
</tr>
<tr>
<td>percentage</td>
</tr>
<tr>
<td>0%</td>
</tr>
<tr>
<td>10%</td>
</tr>
<tr>
<td>20%</td>
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<tr>
<td>30%</td>
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<td>70%</td>
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<tr>
<td>80%</td>
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<tr>
<td>90%</td>
</tr>
<tr>
<td>100%</td>
</tr>
</tbody>
</table>

Discussion

- Labs have decreased AND Culture Change has occurred
  - Residents THINK they order more mindfully AND are discussing it with their team
  - Change in use of lab frequency options
  - Choosing more specific panels ➔ decreased CBC with differential and CMP
  - Anecdotally ➔ residents outside IM have reached out to start similar project

- Did we save any money?
  - Using 2016 Medicare reimbursement rates for CBC with and without differential, BMP, and CMP during a 48 week period our project has saved $301,064.75

Next Steps

Phase 4: Attending education
Phase 5: Night float admissions education
High value care curriculum for 2018-2019
Medical Student high-value care curriculum for 2018-2019
Expansion to other departments

References


Higher purpose. Greater good.
Screening Laboratory Testing in Asymptomatic Minor Pediatric Blunt Trauma leads to Unnecessary Needle Sticks

Faidah Badru, MD, MPH1, Armando Salim Munoz Abraham, MD, MBEE2, Hector Osei, MD2, Saurabh Saxena, MD2, Robert Breeden1, David Starr1, Xu Perry1, Y. Jose Greenspon, MD, FACS, FAAP2, Colleen M. Fitzpatrick, MD, FACS, FAAP2, Gustavo A. Villalona, MD, FACS, FAAP2, Kaveer Chatoorgoon, MD, FACS, FAAP2

1 Saint Louis University School of Medicine - 2 Department of Pediatric Surgery, Cardinal Glennon Children's Medical Center

Introduction

• Screening blood work after minor injuries is performed to avoid missed injuries.
• Needlesticks are a known source of distress to children
• Risk of missed injury must be balanced with risk of inducing unnecessary distress
• We evaluated the clinical utility of screening bloodwork in carefully selected asymptomatic children after minor trauma

Objective

Evaluate the clinical utility of screening bloodwork in carefully selected asymptomatic children after minor trauma

Hypothesis

• Screening laboratory testing in asymptomatic minor pediatric blunt trauma patients does not provide a diagnostic advantage

Methods

Study Design and Sample

• Patients admitted to a level 1 pediatric center with ‘minor trauma’ for blunt trauma between 2010-2015 were retrospectively reviewed.
• Exclusion criteria: age < 4/ > 18 years, GCS < 15, penetrating trauma, non-accidental trauma, unstable, abdominal findings (pain, distension, bruising, tenderness), hematuria, pelvic/femur fracture, multiple fractures and higher level of intervention.

Variables

• demographics, blood work, interventions, and disposition.
• Laboratory tests: CBC, complete metabolic panel, amylase, lipase and coagulation profile.

Study Measures

• Primary Outcome: Detection of intra-abdominal injury through screening laboratory testing

Results

• 1310 patients treated over the study period
• 433 (33%) met inclusion criteria and all had lab testing performed
• Mean age: 12.7 years old
• 78% discharged home from the emergency room
• 28% had at least one abnormal laboratory value
• Most common abnormal value: Leukocytosis 16%
• 13% underwent intervention: None prompted by abnormal blood work
• Only one patient had an intra-abdominal finding on imaging - >Psoas hematoma

Discussion

Implications

• Our study identified a subset of patients who are unlikely to have a significant injury requiring intervention
• Can avoid the known distress associated with needle sticks

Limitations

This was a retrospective study - there may have been unknown factors prompting blood work

Future Directions

Establish a blunt trauma laboratory screening protocol based on this study and validate these findings with a prospective study.

Conclusion

In carefully selected patients, screening blood tests does not add diagnostic value to the management of pediatric blunt trauma and may lead to avoidable distress and unnecessary imaging.
Appendicitis is one of the commonest surgical emergencies seen in children. With uncomplicated appendicitis, appendectomy is safe with mortality rate less than 0.01%. Mortality increases with complicated appendicitis.

**Management of complicated appendicitis** into early or interval appendectomy is debatable.

**Objective**
1. Compare clinical outcomes among the two groups
2. Analyze complications rates among the two group with or without abscess on presentation and duration of symptoms
3. Identify patients that may benefit from early appendectomy

**Methods**

**Study Design and Sample**
- Retrospective evaluation of all patients managed for complicated appendicitis from 2010 to 2015.
- Patients were considered complicated based on surgeon's designation upon admission and during appendectomy.
- Patients were divided into 2 groups; early appendectomy (EA) and interval appendectomy (IA).
- Patient demographics, clinical presentation, complications and outcomes were compared.
- Exclusion criteria: all patients lost to follow-up and/or treated at outside institutions.

**Study Measures**
- Complication rates among the two groups with or without abscess, and durations of symptoms on presentation.

**Results**
- 316 patients were managed for complicated appendicitis.
- 168 (53%) patients had EA, whereas 148 (47%) had IA.
- IA group had longer symptom duration [3.8 vs. 2.3 days, p=0.0001], increased leukocytosis [18.7 vs. 17.2, p=0.0068], more initial abscess [35% vs. 13%, p=0.0001], more complications 30% vs. 19%, p=0.013], prolonged total length of stay (LOS) [7.8 vs. 6.2, p=0.009] and significantly higher number of imaging test performed during index admission [2.49 vs 1.8, p=0.022].
- Eighty percent of patients presented with duration of symptoms (DOS) ≤5 days and no abscess or abscess ≤3 cm
- IA patients with DOS ≤5 days and no abscess or abscess ≤3 cm had prolonged total LOS [7.7 vs 6.3, p=0.01] and complications [29% vs 19%, p=0.04] but no differences in clinical presentation

**Discussion**

**Implications**
Our study identified that a subset of patients with complicated appendicitis presenting with duration of symptoms ≤5 days and no abscess or abscess ≤3 cm treated with interval appendectomy can be safely managed by early appendectomy.

**Limitations**
- No standard preoperative or intraoperative definitions of complicated appendicitis
- Decision to undergo early or interval appendectomy was not standardized.

**Future Directions**
- Institute protocol in the management of complicated appendicitis.
- Compare outcomes and complications before and after protocol implementation and evaluate the effectiveness of the protocol.

**Conclusion**
- Abscess and duration of symptoms on initial presentation are predictors of outcomes in children with complicated appendicitis treated with interval appendectomy.
- Patients presenting with duration of symptoms ≤5 days and no abscess or abscess ≤3 cm treated with interval appendectomy have higher complications and longer hospital stay.

---

**Study Measures**
- Complication rates among the two groups with or without abscess, and durations of symptoms on presentation.

**Study Design and Sample**
- Retrospective evaluation of all patients managed for complicated appendicitis from 2010 to 2015.
- Patients were considered complicated based on surgeon's designation upon admission and during appendectomy.
- Patients were divided into 2 groups; early appendectomy (EA) and interval appendectomy (IA).
- Patient demographics, clinical presentation, complications and outcomes were compared.
- Exclusion criteria: all patients lost to follow-up and/or treated at outside institutions.

**Study Measures**
- Complication rates among the two groups with or without abscess, and durations of symptoms on presentation.
Spontaneous Intestinal Perforation: A Multicenter Retrospective Comparison Of Outcomes Of Primary Peritoneal Drain Versus Primary Laparotomy With Stoma

Saurabh Saxena, MD; Hector Osei, MD; Samantha Ahle, MD; Faldah Badru, MD, MPH; Armando Salim Munoz Abraham, MD, MBBS; Rachelle Damle, MD, MS; Adam Bajinting; Aminah Bathla, MD; Kaveer Chatoorogoon, MD; Cindy Gingalewski, MD; Jose Greenspon, MD; Nicholas Hamilton, MD; Colleen Fitzpatrick, MD; David Stittelman, MD; Marya Strand, MD; Brad Warner, MD; Gustavo A. Villalona, MD

Section of Pediatric Surgery, *Saint Louis University*; *Saint Louis Children's Medical Center, St. Louis, MO, *Yale University School of Medicine, Yale-North Haven Hospital, New Haven, CT, *Washington University School of Medicine/Saint Louis Children's Hospital, St. Louis, MO, *Children's Healthcare of Atlanta, Atlanta, GA, *Oregon Health and Science University, Portland, OR, *Washington University School of Medicine/Saint Louis University, St. Louis, MO.

Introduction

- Spontaneous Intestinal Perforation (SIP) of the newborn is a condition characterized by a single perforation of the intestine.
- Patients with SIP are managed with either peritoneal drain placement or primary laparotomy, but it is not clear if either approach offers more advantages and less complications.
- Purpose: Compare outcomes of infants with spontaneous intestinal perforation SIP treated with primary peritoneal drain versus primary laparotomy, and to further identify predictors for drain failure.

Objective

Evaluate the optimal management for the neonatal patients with spontaneous intestinal perforation so as to reduce the morbidity associated with this disease.

Methods

Study Design and Sample
- Multicenter retrospective review included patients with diagnosis of SIP from 2012-2016.
- Patients with perinatal intestinal perforation were included.
- Excluded patients with birth weight >1500 g, necrotizing enterocolitis, abdominal wall erythema, or death <48 hrs from diagnosis.

Hypothesis
- SIP treated with primary peritoneal drain is comparable to management with laparotomy and stoma creation.

Variables
- Demographics and outcomes post-intervention of drain versus stoma.

Study Measures
- Compare the outcomes of SIP treated with primary peritoneal drain versus primary laparotomy.

Discussion

- There were no differences in maternal characteristics.
- Patients treated with drain were more premature (24.5 vs 25.8 weeks, p=0.0002), had lower birth weight (718 g vs 834 g, p=0.0017) and had higher rate of severe intraventricular hemorrhage (n=19 vs n=4, p=0.02).
- There were no significant differences in vital signs, labs, or vasopressor use from diagnosis up to 48 hours after intervention.
- There were also no significant differences found in complications, time to full feeds, length of stay (LOS) or mortality between the groups.
- The primary laparotomy group had more procedures done (1.98 vs 1.36, p=0.001).
- There were no differences in maternal characteristics.

Results

- 119 patients were treated for SIP (primary drain, n =73 vs primary laparotomy = 46).
- There were no differences in maternal characteristics.
- Patients treated with drain were more premature (24.5 vs 25.8 weeks, p=0.002), had lower birth weight (718 g vs 834 g, p=0.0017) and had higher rate of severe intraventricular hemorrhage (n=19 vs n=4, p=0.02).
- There were no significant differences in vital signs, labs, or vasopressor use from diagnosis up to 48 hours after intervention.
- There were also no significant differences found in complications, time to full feeds, length of stay (LOS) or mortality between the groups.
- The primary laparotomy group had more procedures done (1.98 vs 1.36, p=0.001).
- There were no differences in maternal characteristics.

Conclusion

- Among the primary drain failures: patients had higher gestational age (25.1 vs 24.9 weeks, p=0.02), received NSAIDs sooner after birth (10 hr vs 50 hr, p=0.02), longer time to full feeds and longer LOS, but no change in mortality.

Table 1: Primary outcomes

<table>
<thead>
<tr>
<th>Procedure offered but family refused</th>
<th>Primary peritoneal drain (n=73)</th>
<th>Primary laparotomy (n=46)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to full feeds (from presentation). mean (SD)</td>
<td>6(3.3)</td>
<td>5.5(2.2)</td>
<td>0.7</td>
</tr>
<tr>
<td>Length of stay (days), mean (SD)</td>
<td>11(7.9)</td>
<td>11(7.9)</td>
<td>0.9</td>
</tr>
<tr>
<td>Days until feeding intolerance (from procedure). mean (SD)</td>
<td>11(5.5)</td>
<td>11(7.9)</td>
<td>0.8</td>
</tr>
<tr>
<td>Postoperative NEC (n=73)</td>
<td>11(7.9)</td>
<td>11(7.9)</td>
<td>0.9</td>
</tr>
<tr>
<td>Days until off TPN (from procedure). mean (SD)</td>
<td>52(35)</td>
<td>52(35)</td>
<td>0.1</td>
</tr>
<tr>
<td>Days until off TPN (from procedure), median (SD)</td>
<td>52(35)</td>
<td>52(35)</td>
<td>0.1</td>
</tr>
<tr>
<td>Days until full feeds (from procedure). median (SD)</td>
<td>52(35)</td>
<td>52(35)</td>
<td>0.1</td>
</tr>
<tr>
<td>Days until full feeds (from procedure). mean (SD)</td>
<td>52(35)</td>
<td>52(35)</td>
<td>0.1</td>
</tr>
<tr>
<td>Length of stay (days), mean (SD)</td>
<td>11(7.9)</td>
<td>11(7.9)</td>
<td>0.9</td>
</tr>
<tr>
<td>Length of stay (days), median (SD)</td>
<td>11(7.9)</td>
<td>11(7.9)</td>
<td>0.9</td>
</tr>
<tr>
<td>Age of patient at diagnosis (days), mean (SD)</td>
<td>11(7.9)</td>
<td>11(7.9)</td>
<td>0.9</td>
</tr>
<tr>
<td>Day of birth (days), mean (SD)</td>
<td>11(7.9)</td>
<td>11(7.9)</td>
<td>0.9</td>
</tr>
<tr>
<td>Presentation (n=73)</td>
<td>11(7.9)</td>
<td>11(7.9)</td>
<td>0.9</td>
</tr>
<tr>
<td>Presentation (n=46)</td>
<td>11(7.9)</td>
<td>11(7.9)</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Table 1: Primary outcomes of peritoneal drain versus primary laparotomy.

Values are n(%) or mean (SD) unless otherwise stated.

Discussion

Implications
- Primary peritoneal drain is a good therapeutic option, that is less invasive than a laparotomy and has comparable outcomes in select patients.

Limitations
- Some centers might have a preference for drain vs laparotomy or vice versa that could have added bias.

Retrospective study

Conclusion

SIP treated with primary drain is successful in the majority of patients with no significant changes in outcomes when compared to laparotomy with stoma.
Laparoscopic Division Of Median Sacral Artery And Dissection Of Type III And IV Sacrococcygeal Teratomas To Decrease Intraoperative Hemorrhage Complications: Case Series And Review Of The Literature

Hector Osei, MD2; Armando Salim Munoz Abraham, MD, MBEE2; Katherine S Bates1; Jin Sun Kim1; Saurabh Saxena, MD2; Jose Greenspon, MD, FACS, FAAP2
1 Saint Louis University School of Medicine 2 Department of Pediatric Surgery, Cardinal Glennon Children's Medical Center

Introduction

• Sacrococcygeal Teratoma (SCT) is the most common teratoma presenting at birth.
• The tumor can have variable intrapelvic extension.
• Long-term outcome for children with sacrococcygeal teratomas is generally excellent.
• Life-threatening bleeding is a major complication during tumor excision in children.
• Vascular control of the median sacral artery (MSA) minimizes risk of hemorrhage during tumor excision.

Objective

To demonstrate our technique for laparoscopic division of median sacral artery during dissection of SCT in two pediatric patients as a safe technique to minimize risk of hemorrhage.

Case Report

• Two female patients diagnosed with Types IV and III SCT underwent preoperative evaluation in the postnatal period.
• The first patient was a 18 month-old girl who presented with metastatic Type IV SCT, resected after neoadjuvant therapy.
• The second patient was a 6 day-old girl with prenatal diagnosis of cystic Type III teratoma.
• In both patients, using laparoscopy, the presacral space was reached by opening the peritoneal reflection with blunt dissection and the MSA was identified.
• The MSA was carefully isolated and divided with 3 or 5 mm sealing device.
• The pelvic components of the tumors were partially dissected using laparoscopy.
• The first patient’s tumor resection was completed using a posterior sagittal approach but the second patient required a standard Chevron incision.

Results

Fig 1: MRI in sagittal and coronal views showing large SCT (red arrows) displacing the rectum anteriorly (A) and the presacral MSA (B). Image C shows tumor response to neoadjuvant therapy and patent MSA after initial treatment (D).

Fig 2: Intraoperative exposure of the MSA within the pelvic hypoplasia.

Fig 3: MRI in sagittal (A) and axial views (B) showing SCT (red arrows) with intrapelvic and distal extension of tumor (A).

Fig 4: The left common iliac (LIC) and the right common iliac (RIC) arteries are identified and non-biologic (A). The MSA is identified (B) and ligated (C). Intrapelvic dissection revealed laparoscopic anatomy (D).

Discussion

One of the most common potentially lethal complications of sacrococcygeal teratoma resection is life-threatening hemorrhage. As such, vascular control is of utmost importance in the surgical management of SCT. With our report we demonstrate the safety and efficacy of laparoscopic division of the median sacral artery and intra-pelvic tumor dissection in both a neonate and a toddler with an Altman Types III and IV tumor, respectively. As surgical tools are refined and downsized to be safely used in smaller patients, we will see an improvement in surgical techniques for even infants with large Type I tumors. In our case we were able to show the safety of 3 and 5 mm sealing devices to control the MSA without the need for clips or sutures.

Conclusion

Laparoscopic median sacral artery division before sacrococcygeal teratoma excision offers a safe approach that can reduce the risk of hemorrhage during tumor excision.

References

6.}= 13-11

Cataract Surgery and Patient Understanding: Comparing Pre-operative Telephone Counseling, Written Handout, and Standard Informed Consent

Maria Stunkel, MD, Elissa Arnold, BS, Sangeeta Khanna, MD, Matthew Council, MD
1 Saint Louis University Department of Ophthalmology
2 Saint Louis University School of Medicine

PURPOSE
To compare the following methods of education for patients undergoing first eye cataract surgery regarding understanding of risks, the procedure itself, and patient responsibilities:
- Verbal instruction by surgeon
- Verbal instruction by surgeon plus informational handout
- Verbal instruction by surgeon plus standardized pre-operative phone counseling by a resident physician.

METHODS
Prospective study from July 2017 – February 2018
- Adult cataract patients
- First eye cataract surgery with monofocal ILM
- English used as the primary language
- Patients randomized to one of three groups:
  1. CONTROL: Standard informed consent with surgeon
  2. Standard consent + informational handout
  3. Standard consent + scripted phone call with resident physician

RESULTS
Patient Quiz – scored in total and by four topics

<table>
<thead>
<tr>
<th>Topic</th>
<th>Total Score</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk/Benefit</td>
<td>72.2</td>
<td>5.5</td>
</tr>
<tr>
<td>Procedure</td>
<td>74.4</td>
<td>3.2</td>
</tr>
<tr>
<td>Patient Responsibility</td>
<td>96.0</td>
<td>2.5</td>
</tr>
<tr>
<td>Ophthalmology</td>
<td>83.3</td>
<td>4.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample Size</th>
<th>Total Quiz Score</th>
<th>Score Difference from Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>23</td>
<td>62.9 (±12.0)</td>
</tr>
<tr>
<td>Info Sheet</td>
<td>26</td>
<td>77.4 (±13.9)</td>
</tr>
<tr>
<td>Phone Call</td>
<td>18</td>
<td>80.8 (±13.0)</td>
</tr>
</tbody>
</table>

CONCLUSIONS
A statistically significant increase in score was attained in the phone call group compared to the control group.
- Patients in the phone call group outperformed others in all question categories.
- Best overall performance on questions were regarding patient responsibility.
- Worst overall performance on questions related to risk and benefit of cataract surgery.
- Pre-operative phone call by a physician may be of educational benefit to those undergoing first time cataract surgery compared to receiving standard consent from their surgeon alone.

REFERENCES


ACKNOWLEDGEMENTS

Special thanks to:
- Arshia Wadhwa, BS for assistance with data collection
- Heidi Israel, PhD for assistance with statistical analysis

For assistance with data collection
- Heidi Israel, PhD for assistance with statistical analysis
PHYSICIAN COMPLIANCE WITH BRONCHIOLITIS GUIDELINES IN PEDIATRIC EMERGENCY DEPARTMENTS

Andrea Rivera-Sepúlveda, MD, MSc, FAAP1; Terri Rebmann, PhD, RN, CIC, FAPIC2; James Gerard, MD1; Rachel L. Charny, MD1

1. Pediatrics, Saint Louis University School of Medicine, St. Louis, MO; 2. Epidemiology and Biostatistics, Saint Louis University, St. Louis, MO

SIGNIFICANCE

- National clinical practice guidelines (CPG) by the American Academy of Pediatrics (AAP) on the diagnosis and management of bronchiolitis discourage use of chest x-rays, viral testing, bronchodilators and systemic steroids.
- However, variation and overlap of proven ineffective modalities remain common in the Emergency Department (ED).
- The ED is associated with higher rates of diagnostic testing of children with bronchiolitis, and perpetuation of non-recommended treatments post-guideline publication.
- Objective: Determine physicians' knowledge of, compliance with, and practice associated with the AAP bronchiolitis CPG.
- Hypothesis: There are personal physician biases in the ED that affect the acceptance and implementation of the AAP bronchiolitis CPG into their daily practice, rather than lack of guideline dissemination.

METHODS

- Cross-sectional survey
- Web-based survey tool ("Qualtrics")
- October to December 2017
- Institutional Review Board approved

Study design

- The instrument assessed the following through 17 items (plus demographics):
  - A. Knowledge of AAP bronchiolitis CPG statements on the use of bronchodilators, hyperosmotic saline, systemic corticosteroids, routine chest x-ray, viral testing, continuous pulse oximetry, and antibacterials
  - B) Agreement with CPG statements
  - C) Compliance with the CPG by self-reported use of diagnostic and treatment modalities (chest x-ray, viral testing, bronchodilator use, and systemic corticosteroids)
  - D) Factors that affected non-compliance with the CPG for each diagnostic or treatment modality
  - E) Attitudes and beliefs regarding the AAP bronchiolitis CPG

Statistics

- Descriptive analysis used to illustrate characteristics of the population
- T-test assessed differences on agreement with each AAP guideline statement
- Chi-square assessed differences in compliance between modalities
- Overall compliance was measured as never using any diagnostic or treatment modality
- Practice compliance was measured as never using those modalities when found within a clinical case
- Multivariate logistic regression was used to determine factors associated with overall compliance

RESULTS

- In total, 231 physicians completed the survey (response rate: 47%).
- Most participants were female (54.7%).
- Physicians disagreeing with the prerogative to prescribe what they believe would benefit the patient, even if it deviates from the AAP CPG (odds ratio [OR]=1.1, 95% confidence interval [CI]: 1.0-1.2).
- The AAP CPG is the standard of care for bronchiolitis (OR=9.7, CI: 9.5-10.0).
- Physicians who use chest x-ray, viral testing, or systemic steroid non-use (OR=2.6, CI: 1.3-5.1), and use of a standardized respiratory score (OR=2.2, CI: 1.4-3.0) significantly improved patient outcomes (p<0.001 for all comparisons).

Table 1. Physicians' Attitudes and Beliefs About the AAP Bronchiolitis Clinical Practice Guideline (AAP CPG)

<table>
<thead>
<tr>
<th>Item</th>
<th>Agreement with AAP CPG (n=231)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have the prerogative to prescribe what I believe would benefit the patient, even if it deviates from the AAP CPG</td>
<td>179 (39.3)</td>
</tr>
<tr>
<td>The AAP CPG is the standard of care for bronchiolitis</td>
<td>179 (39.3)</td>
</tr>
<tr>
<td>Physicians disagreeing with the prerogative to prescribe what they believe would benefit the patient, even if it deviates from the AAP CPG</td>
<td>179 (39.3)</td>
</tr>
<tr>
<td>The AAP CPG is the standard of care for bronchiolitis</td>
<td>179 (39.3)</td>
</tr>
<tr>
<td>The AAP CPG concurs with my personal clinical experience</td>
<td>148 (32.9)</td>
</tr>
<tr>
<td>The AAP CPG is useful/valid for clinical decision-making</td>
<td>151 (34.7)</td>
</tr>
<tr>
<td>Following the AAP CPG greatly improves patient outcomes</td>
<td>104 (45.9)</td>
</tr>
</tbody>
</table>
| *Determined by chi-square test. Non-significant.*

Table 2. Effect of and Influencing Factors Affecting Physician's Practice Compliance with Chest Radiography, Viral Testing, Bronchodilators, and Systemic Steroids.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Compliance Rate [%] (n=231)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest radiography</td>
<td>47 (20.8)</td>
</tr>
<tr>
<td>Disease severity</td>
<td>57 (26.4)</td>
</tr>
<tr>
<td>Bronchodilators</td>
<td>9 (2.1)</td>
</tr>
<tr>
<td>History of extraeum or of prior wheezing episodes</td>
<td>70 (30.3)</td>
</tr>
<tr>
<td>Whether use is a trial and assess clinical response</td>
<td>70 (30.3)</td>
</tr>
<tr>
<td>Disease severity</td>
<td>70 (30.3)</td>
</tr>
<tr>
<td>Systemic steroids</td>
<td>53 (23.4)</td>
</tr>
<tr>
<td>History of labeled bronchiolitis</td>
<td>10 (4.3)</td>
</tr>
</tbody>
</table>

*Compliance following the AAP guidelines in the following clinical scenarios: Would you order a chest x-ray (prior to bronchiolitis)? POV = primary care provider.

REFERENCES

Introduction
Our objective was to determine if birth weight of infants of women with chronic hypertension is affected by range of antepartum blood pressure.

Methods
A retrospective chart review of patients with chronic hypertension at a single tertiary care center was completed. The difference in birth weight between women with mean antenatal blood pressures in the systolic range of <140 mmHg versus >140 mmHg was assessed. A second analysis to assess mean antenatal diastolic blood pressure of <90 mmHg versus >90 mmHg was completed. Chi squared analysis was utilized, with a P-value of <0.05 used to indicate statistical significance.

Results
Data from 148 women with a diagnosis of chronic hypertension was analyzed. This analysis included both those taking antihypertensive medications and those who were not medicated. There was a significant difference in birth weight in normotensive (<140 mmHg systolic or <90 mmHg diastolic) versus hypertensive pregnancies, with normotensive women bearing larger children. Median birth weight for those who had normotensive systolic blood pressures was 3,005g versus 2,454g for those who had hypertensive average systolic blood pressures (p=.008). Median birth weight was 2997.5g for those with normotensive diastolic pressure averages versus 1,657.5g who were hypertensive (p<0.001).

Conclusion/Implications
Women with chronic hypertension in pregnancy deliver larger babies when blood pressures are in the normotensive range during the antepartum period.

Background:
Chronic hypertension effects 1-5% of pregnancies. This condition increases risk of complications including superimposed preeclampsia, cesarean delivery, birth weight <2500g, NICU admission, preterm delivery, and neonatal death.

Study Design:
Retrospective cohort study.
Inclusion Criteria:
- Previous diagnosis of chronic hypertension
- Documented blood pressure >140/90 at <20 weeks gestation
Exclusion Criteria:
- No history of hypertensive disease
- Gestational hypertension, preeclampsia, HELLP, eclampsia

Results:

<table>
<thead>
<tr>
<th>BP Group</th>
<th>Median Birth Weight (IQR)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;140</td>
<td>3065 (2300,3420)</td>
<td>0.008</td>
</tr>
<tr>
<td>&gt;=140</td>
<td>2450 (1647.5,2960)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BP Group</th>
<th>Median Birth Weight (IQR)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;90</td>
<td>2997.5 (2308.75,3397.5)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>&gt;=90</td>
<td>1857.5 (1062.5,2431.25)</td>
<td></td>
</tr>
</tbody>
</table>

Conclusion:
There was a significant difference in fetal weight at delivery based upon normotensive vs. hypertensive blood pressures in the antepartum period when controlling for other possible confounding variables. These variables included admission diagnosis, age, gestational age at delivery, and presence or absence of diabetes diagnosis.

As a secondary outcome, we analyzed differences between systolic blood pressures based upon type of antihypertensive medication. A significant difference in systolic blood pressure was noted between those who were taking two antihypertensive medications and those taking none (p<0.01) as well as those who were taking two antihypertensive agents and those taking Norvasc (p=.01).

References:
3. Chronic Hypertension and Pregnancy Outcomes. BMJ 2014;348:g2301
The Impact of a New Clinical Practice Guideline on Short-term Outcomes and Postoperative Resource Utilization in Complicated Appendicitis in Children

Armando Salim Munoz Abraham, MD, MBEE1, Hector Osei, MD2, Rachelle Damle, MD, MS2, Saurabh Saxena, MD2, Faidah Badru, MD, MPH1, Mitchell Gibbons1, Kayeer Chatorgoon, MD, FACS, FAAP2, Y. Jose Greenspon, MD, FACS, FAAP2, Colleen M. Fitzpatrick, MD, FACS, FAAP3, Gustavo A. Villalona, MD, FACS, FAAP2

1Saint Louis University School of Medicine - 2Department of Pediatric Surgery, Cardinal Glennon Children's Medical Center

Introduction

• Appendicitis is the most common surgical problem in children
• Morbidity increases with complicated appendicitis
• Management of complicated appendicitis is controversial
  o Early Appendectomy (EA) vs. Interval Appendectomy (IA)
• Appendicitis management protocol established in July 2016
  o EA: No abscess, abscess <3 cm, symptoms <5 days
  o IA: Abscess >3 cm, >5 days
  o WBC before discharge: + Antibiotics
• Purpose: Evaluate the effectiveness of a protocol for the treatment of complicated appendicitis in children

Objectives

1. Compare clinical outcomes
2. Analyze complication rates
3. Analyze imaging and antibiotic usage

Methods

Study Design and Sample

• Protocol established in July 2016
• Pre-protocol (G1, 2010-2015) records were compared to post-protocol (G2, 2016-2017) records

Hypothesis

• Establishment of a management protocol for complicated appendicitis improves resource utilization without affecting short-term outcomes

Variables

• Demographics, baseline characteristics, short term outcomes, antibiotic and imaging utilization

Study Measures

• Outcomes and complication comparison before and after the protocol

Results

Discussion

Implications

• When properly selected, complicated appendicitis (abscess <3 cm, symptoms <5 days) can be managed with early appendectomy
• Patients with normal WBC before discharge can go home without antibiotics
• Adequate clinical diagnosis can decrease the amount of preoperative CT scans

Limitations

• Small post protocol cohort

Conclusion

• Establishment of a new management protocol for complicated appendicitis improves resource utilization without affecting short-term outcomes
• Overall complication rates are not significantly different despite favoring early appendectomy

Bibliography
**Introduction**

- Perforated peptic ulcer (PPU) a complication of Peptic ulcer disease (PUD) is rare in children and diagnosis is often delayed
- Nevertheless, there seems to be an worldwide increase in the number of PPU in pediatrics
- Mortality ranges from 1-20%
- Laparoscopic repair with omental patch has been described in adults with good outcomes
- Operative experience in pediatrics has not been described extensively
- Overall data on incidence, risk factors, management and outcomes in children is scarce

**Objective**

1. Determine incidence of PUD and PPU in children
2. Describe two PPU case reports
3. Describe the technique for laparoscopic omental patch repair

**Methods**

**Study Design and Sample**

**Incidence of PUD/PPU**
- The Kids Inpatient Database (KID) was analyzed (4000 hospitals across the US) for the years 2000, 2003, 2009, 2012
- Patients age 0 to 18 y/o with the diagnoses of PUD and PPU were identified using ICD-9-M codes

**Case reports**
- Two pediatric patients that presented to our institution with PUD and PPU were identified using ICD-9-M codes

**Hypothesis**

- The worldwide incidence of PPU in children is increasing, and should be considered among the differentials for acute abdomen
- Laparoscopic omental patch repair is a safe and reliable surgical technique for the management of PPU

**Variables**

- Demographics, outcomes, resource utilization

**Results**

- **PUD/PPU Incidence and outcomes**
  - PPU discharge diagnosis between 2000-2012 ranged between 178-399 cases
  - Incidence between 0.25 to 0.40 per 100,000
  - Increase trend over time between 2000 and 2009
  - PPU appears to be more common in caucasian teenage boys
  - Mean LOS 8.02 days
  - Increase in healthcare cost when comparing year 2000 to 2012 ($25,187 vs $76,129, p = 0.002)

**Discussion**

**Implications**

- PPU is a rare cause of abdominal pain in children, but with possible increasing incidence
- PPU should be included in the differential diagnosis in patients presenting with acute abdominal pain of uncertain etiology and pneumoperitoneum
- Laparoscopy is both diagnostic and therapeutic
- Laparoscopic omental patch repair is a safe and effective treatment for perforated peptic ulcers

**Limitations**

- KID data analysis is only from 2000 to 2012
- Case series of only two patients

**Conclusion**

- PPU should be considered in the differential diagnosis in pediatric patients with acute abdomen, history of NSAIDs and unclear diagnosis
- Laparoscopic surgery allows for adequate repair with omental patch, in a safe and effective manner

**Bibliography**

The Impact of Dermatology Lectures on Internal Medicine Residents

Tim Galperin, DO1, Nicole Burkemper, MD1, and Eric Armbrecht, PhD2
Department of Dermatology1, Center for Outcomes Research, Saint Louis University School of Medicine

Objective: To determine the impact of dermatology lectures in medical school and residency on residents' confidence in diagnosing and managing common dermatologic disorders.

Methods:
A survey study was designed to identify whether dermatology lectures provided to IM residents, at all levels of training, are beneficial to their daily practice and training. Two 1-hour dermatology lectures, covering common outpatient and inpatient dermatologic issues, were provided to IM residents in February 2017 by dermatology faculty. A survey consisting of 12 questions, was distributed to the IM residents to identify the effectiveness of the lectures, the residents' prior dermatology training in medical school and residency, residents' confidence level in diagnosing and managing common skin disorders, and to determine if residents wanted additional training in dermatology. Descriptive data analysis was performed.

Results:
Forty percent of residents applied what they learned from the provided lectures, and 87% noted that the application worked for them. All of the survey respondents wanted additional training in dermatology.

<table>
<thead>
<tr>
<th>Post Graduate Year (PGY) of Training:</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PGY-1</td>
<td>9/20 (45)</td>
</tr>
<tr>
<td>PGY-2</td>
<td>7/20 (35)</td>
</tr>
<tr>
<td>PGY-3</td>
<td>4/20 (20)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dermatology Lectures in Medical School</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4 hours</td>
<td>1/20 (5)</td>
</tr>
<tr>
<td>5-9 hours</td>
<td>5/20 (25)</td>
</tr>
<tr>
<td>&gt; 10 hours</td>
<td>10/20 (50)</td>
</tr>
<tr>
<td>&gt; 20 hours</td>
<td>4/20 (20)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Effective Rotation in Dermatology Offered?</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>10/20 (60)</td>
</tr>
<tr>
<td>No</td>
<td>4/20 (20)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Effective in Dermatology Taken?</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>5/15 (33)</td>
</tr>
<tr>
<td>No</td>
<td>10/15 (67)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Did you find the information in the lectures useful to your daily practice?</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>10/15 (67)</td>
</tr>
<tr>
<td>No</td>
<td>4/15 (27)</td>
</tr>
<tr>
<td>Not Sure</td>
<td>1/15 (6)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Do you feel more confident in diagnosing and managing common skin disorders after what you have learned from the dermatology lectures?</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>6/15 (40)</td>
</tr>
<tr>
<td>No</td>
<td>5/15 (33)</td>
</tr>
<tr>
<td>Not Sure</td>
<td>4/15 (27)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Did you apply what you learned (diagnosing and/or treating common dermatologic disorders) from the dermatology lectures in past the 4 weeks?</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>4/15 (27)</td>
</tr>
<tr>
<td>No</td>
<td>2/15 (13)</td>
</tr>
<tr>
<td>Not Sure</td>
<td>3/15 (20)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Did the dermatology lectures help with making an appropriate referral or consult?</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>10/15 (67)</td>
</tr>
<tr>
<td>No</td>
<td>2/15 (13)</td>
</tr>
<tr>
<td>Not Sure</td>
<td>3/15 (20)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Did you find the information in the lectures useful to your daily practice?</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>10/15 (67)</td>
</tr>
<tr>
<td>No</td>
<td>4/15 (27)</td>
</tr>
<tr>
<td>Not Sure</td>
<td>4/15 (27)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Were you prepared to diagnose common skin disorders?</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>9/15 (60)</td>
</tr>
<tr>
<td>No</td>
<td>6/15 (40)</td>
</tr>
<tr>
<td>Not Sure</td>
<td>1/15 (6)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Would you like additional training in dermatology during your residency training?</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>15/15 (100)</td>
</tr>
<tr>
<td>No</td>
<td>0/15 (0)</td>
</tr>
</tbody>
</table>

Conclusions:
Eighty percent of IM residents surveyed reported that dermatology lectures are useful to their daily practice and/or helped them with knowing when to refer a patient to a dermatologist. This study shows that providing dermatology lectures to IM residents is beneficial to their training and future clinical practice.

Limitations:
- Small sample size and low number of respondents (n=20 and only 15 fully completed survey)
- No objective assessment of impact of dermatology lectures

References:
Severe hyperphosphaturic hypophosphatemia is rare in clinical practice. It can lead to fatal outcomes if not addressed.

Case Presentation and labs

HPI: A 33-year-old Caucasian woman presented with 3 weeks of increasing fatigue, palpitations, and shortness of breath. She had received 2 doses of IV ferrous carboxymaltose (FCM) one month prior for iron deficiency anemia.

PE: Muscle tenderness (thighs).

Labs: PO4: 1.5 mg/dL, FE (PO4): 21%, 24-H (PO4) excretion: 3.4 g, c-terminal FGF-23 levels: 116 RU/mL (ref: 44 – 215 RU/mL)

Hyperphosphaturic Hypophosphatemia - A diagnostic approach

Non-FGF-23 mediated

Hyperparathyroidism
Diuretics
Fanconi syndrome (genetic vs. drug-induced)

Non-FGF-23 mediated

Autosomal D/R hypophosphatemic rickets
Tumor induced osteomalacia (TIO)
Iron polymaltose infusions (e.g. FCM)

Fig 1A-B: physiological effects of FGF-23 and putative role of FCM. Reference- iron induced hypophosphatemia: an emerging complication [Zoller et al, 2017]

Management and Outcome

Intensive replacement:
IV phosphorus (90 mmol/L/day) + PO phosphorus (32 mmol/L/day) + IV calcitriol (1 mcg/day -> 3 mcg/day)

Outcome: After 2 weeks with high dose calcitriol, serum PO4 levels normalized. Two months later: Patient in good health with a serum PO4 at 4 mg/dL.

Discussion

FCM is an emerging cause of severe transient hypophosphatemia. Our case highlights the importance of a physiology-driven approach to treating hypophosphatemia. Aggressive and careful calcitriol repletion is an innovative therapy that can be used in these cases.
# Hydralazine induced C3 glomerulonephritis: a novel immune-mediated disease

**George Vasquez-Rios, John C. Edwards**

Department of Internal Medicine, School of Medicine, Saint Louis University, St Louis, MO, USA

Nephrology Division, Department of Internal Medicine, Saint Louis University, St Louis, MO, USA

## Background

C3 glomerulonephritis (C3GN) is a rare condition related to complement system dysregulation. Hydralazine has not been associated with C3GN before.

## Case presentation

**HPI:** A 61 year-old Caucasian woman presented with worsening shortness of breath, hematuria and lower extremity edema.

**PMH:** HTN treated with hydralazine during several years.

**PE:** BP: 165/98, anasarca and bilateral crackles.

## Investigations

**Labs:**

Her sCr was 2.6 mg/dL and her urinalysis showed protein and blood. A 24-h urine collection revealed 1.2 grams of protein.

**Autoimmune workup:**

Positive anti-histone antibodies, low complement C3 and C4 levels, positive ANA, and high p-ANCA and c-ANCA titers. Her serum membrane attack complex was 0.52 mg/L (reference <0.3 mg/L).

## Renal Biopsy:

Typical C3 nephropathy with crescents. Immunofluorescence was negative for IgA, IgM or IgG but was strongly positive for C3.

## Understanding C3GN

![Fig. 1- Membranoproliferative Glomerulonephritis and C3 Glomerulopathy: Resolving the Confusion- Sanjeev Sethi et al. 2011](https://example.com)

![Fig. 2 - Shigatoxin-associated hemolytic uremic syndrome: Current molecular mechanisms and future therapies – Keir et al. 2012](https://example.com)

## Treatment and outcome

**Initial therapy:** She received pulse steroids and transitioned to mycophenolate. Her renal function deteriorated transiently.

**Advanced therapy:** plasma exchange (8 cycles/2 weeks). Her renal function remained steady with a creatinine at 1.8 mg/dL.

**Follow up:** At 9 months, C4 normalized and C3 improved but was still low. ANCA and ANA resolved. However, she still exhibited anti-histone antibodies. Her sCr improved to 1.6 mg/dL.

**Conclusion:** drug-induced GN can have an adverse course and rapidly progress to advanced CKD. C3GN is a novel immune-mediated disease associated with Hydralazine.
An analysis of patient health literacy of Mohs micrographic surgery closure techniques

Duane Dilworth MD, Eric Armbrecht PhD, Ramona Benishad M.D.

Results

Discussion

Summary

References

2) US Department of Education Institute for Educational Sciences, 2002 National Assessment of Adult Literacy.
4) Dahlqvist, T. Feldt, J. Anderson, S. Seiler, H. Randers F. Randomized clinical trial assessing patient satisfaction with Mohs micrographic surgery, depending on whether the patient sees or does not see the final defect in the mirror prior to closure. Arch Facial Dermatol. 2015; 171(13): 483-6.
Successful Plasma Exchange in a 34-year-old Woman with Diabetic Ketoacidosis and Thrombotic Microangiopathy

Daniela Hermelin, MD; Douglas Blackall, MD, MPH
Department of Pathology, Saint Louis University School of Medicine, Saint Louis, MO

INTRODUCTION
- Thrombotic microangiopathy (TMA) is a rare complication of diabetic ketoacidosis (DKA) that is rarely reported in the pediatric setting.
- Treatment differences in DKA presentation and outcomes in children.
- We report a case of an adult patient with near-severe diabetes mellitus (NODMA), BIAA, and TMA who was successfully treated with therapeutic plasma exchange (TPE).

INITIAL PRESENTATION

A 34-year-old African-American woman with a medical history of diabetes mellitus, hypertension, depression, obesity, and hypothyroidism was transferred from an outside hospital for severe labile hemolytic anemia in the setting of DKA.

Test Name | Laboratory Values
--- | ---
Glucone | 1,995mg/dL (70-115)
HbA1c | 8.0 (4.0-6.0)
HCO3- | 23.9 (24.0-27.0)
BUN/Cr | 33/1.9 (15-25/1.0-2.0)
Creatinine | 0.9 (0.6-1.4)
Platelet count | 94,000/µL (150-450,000/µL)
Leukocytes | 8700/µL (4500-11,000/µL)
ESR | 72 (0-20)
WBC | 11.0 (4.5-10.0)

Peripheral smear showing evidence of TMA including schistocytes and decreased platelets. Wright's stain. Pretreatment ADAMTS13 activity 40.7% (66-100).

CLINICAL FOLLOW-UP
- Upon arrival, patient required intubation and demonstrated signs of TMA.

| Test | Pre-DKA Resuscitation | Post-DKA Resuscitation |
--- | --- | ---
Hematocrit | 32.1 (40-50) | 32.1 (40-50) |
Platelet count | 94,000/µL | 94,000/µL |
ADAMTS13 activity | 40.7% (66-100) | 40.7% (66-100) |

RESPONSE TO PLASMA EXCHANGE

Peripheral smear showing evidence of TMA including schistocytes and decreased platelets. Wright's stain.

PREP-TEP ADAMTS13 activity 40.7% (66-100).

THERAPEUTIC PLASMA EXCHANGE
- Thrombotic thrombocytopenic purpura (TTP) was suspected, an ADAMTS13 level was obtained, and TPE was initiated (10 plasma volumes per day with FFP replacement using the Spectra Optia apparatus instrument, Humo BCT, Lakewood, CO).
- Five plasma exchanges resulted in a rapid recovery in platelet count and near normalization of ESR (Figure 1).
- The patient was discharged on hospital day 10.

CONCLUSIONS
- TMA is associated with a spectrum of diseases such as TTP and sepsis, but has never been reported in the setting of DKA in an adult patient.
- Although ADAMTS13 activity was only modestly decreased, our patient responded rapidly to TPE, with a striking normalization of the D-dimer and ESR.
- As reported in recent publications, patients with TMA and ADAMTS13 activity levels >10% have a guarded prognosis, presentations, and outcomes.
- Although the underlying mechanism of plasma exchange is incompletely understood, these patients show improvement in TEP, as was seen in this case.

Submitted to the Pathway 276.0.102.50.182.
Chemotherapy and stem cell transplantation are associated with an increased incidence of fungal infections in patients with hematopoietic malignancies. The risk of fungal infections is further compounded by delayed engraftment, when umbilical cord blood cells are used as a stem cell source. We report the successful use of granulocyte transfusion (GTX), as a prophylactic measure, in a pediatric patient with severe aplastic anemia and previous invasive fungal infection who underwent double umbilical cord blood (DUCB) transplant.

**INTRODUCTION**

- Chemotherapy and stem cell transplantation are associated with an increased incidence of fungal infections in patients with hematopoietic malignancies.
- The risk of fungal infections is further compounded by delayed engraftment, when umbilical cord blood cells are used as a stem cell source.
- We report the successful use of granulocyte transfusion (GTX), as a prophylactic measure, in a pediatric patient with severe aplastic anemia and previous invasive fungal infection who underwent double umbilical cord blood (DUCB) transplant.

**INITIAL PRESENTATION**

An 8-year-old girl was transferred from an outside hospital for emesis, headache, exertional dyspnea, and fatigue.

**Donor and Patient Laboratory Yields**

<table>
<thead>
<tr>
<th>GTX</th>
<th>Donor Pre WBC</th>
<th>Donor Post WBC</th>
<th>Product WBC</th>
<th>Patient WBC</th>
<th>Pre ANC</th>
<th>Post ANC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.24</td>
<td>21.69</td>
<td>106.83</td>
<td>0.1</td>
<td>&lt;200</td>
<td>1,200</td>
</tr>
<tr>
<td>2</td>
<td>3.55</td>
<td>18.93</td>
<td>90.91</td>
<td>0.1</td>
<td>&lt;200</td>
<td>1,287</td>
</tr>
<tr>
<td>3</td>
<td>9.13</td>
<td>48.99</td>
<td>236.88</td>
<td>0.3</td>
<td>&lt;200</td>
<td>5,000</td>
</tr>
<tr>
<td>4</td>
<td>4.87</td>
<td>21.64</td>
<td>67.11</td>
<td>2.0</td>
<td>1,960</td>
<td>1,152</td>
</tr>
<tr>
<td>5</td>
<td>6.93</td>
<td>45.83</td>
<td>276.92</td>
<td>0.6</td>
<td>558</td>
<td>4,224</td>
</tr>
</tbody>
</table>

**PRETRANSPLANT/TRANSPLANTATION**

- During pre-transplant evaluation, a chest CT showed a right upper lobe cavitary lesion concerning for fungal infection.
- Antifungal therapy was started and thoracoscopic surgery with wedge resection revealed invasive aspergillosis.
- With near-resolution of her clinical symptoms and stable imaging, a DUCB transplant was initiated.
- Due to a high risk for recurrence of invasive aspergillosis before engraftment, 5 prophylactic GTXs were provided during the first two weeks of the DUCB transplant starting on transplant day 2.

**RESULTS**

- High granulocyte yields were achieved with donor stimulation (G-CSF and dexamethasone).
- Due to the patient's size, reduced volume was collected and transfused.
- The patient received a single GTX infusion on transplant days 2, 5, 7, 9, and 13 and responded favorably (ANC > 500).
- The patient achieved WBC engraftment (ANC > 500) on transplant day 14.
- The patient had no evidence of recrudescent aspergillosis.

**CONCLUSIONS**

- Therapeutic granulocyte yields can be obtained by apheresis with appropriate donor stimulation.
- This case demonstrates that GTXs may be beneficial in preventing recurrent, life-threatening fungal infections in pediatric transplant patients in the setting of severe immunosuppression before WBC engraftment.
How do we help novice gastroenterologists recognize GI emergencies?

Rationale
- Recognizing emergencies is the first and the most vital step to initiate the higher level of care required in these time sensitive situations.
- How do you teach new trainees to be aware of their limitations, to ask for help, and to recognize what they don't know?

Methods
- An interactive lecture was provided to first year fellows in the first several weeks of fellowship, stressing availability of senior learners and faculty support.
- A brief pre-test and post-test were distributed. A follow up test and open forum were provided 4 weeks after the initial lecture.

Examples of Topics

<table>
<thead>
<tr>
<th>Upper GI bleeding (non-variceal)</th>
<th>Acute colonic pseudo-obstruction</th>
<th>Complications of endoscopy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower GI bleeding</td>
<td>Acute cholangitis</td>
<td>Acute pancreatitis</td>
</tr>
<tr>
<td>Variceal bleeding</td>
<td>Acute ischemia</td>
<td>Foreign body ingestion</td>
</tr>
<tr>
<td>Sigmoid volvulus</td>
<td>Acute liver failure</td>
<td>Food impaction</td>
</tr>
</tbody>
</table>

Results
- 29% improvement in pre and post-test score averages (66% [range 55 to 82%] vs 95% [range 91 to 100%])
- Re-test score averages remained improved (86%, range 82 to 91%) from initial assessment.
- All of the trainees reported that the lecture was helpful and that they would be interested in helping prepare new trainees for GI emergencies next year.

Discussion
- Our goal was to provide a concise and relevant roadmap for novice trainees to identify "GI emergencies" and to emphasize the social structure available to support them.
- In the future, we will work to present GI emergencies in a more active learning based curriculum as this has been found to be more engaging and to improve transmission of material.

Conclusion
An interactive lecture improved novice trainee knowledge of GI emergencies and support structure. The acquisition of knowledge was shown to be durable. Future research will focus on measuring changes regarding fellow efficiency and patient outcomes.

References
Teaching Hepatology Using Case Based Learning

Mechu Mey Narayanan, MD, Scott Holmes, DO and Charlene Prather, MD, MPH
Saint Louis University Hospital

Idea
Would a case based learning format be effective in teaching internal medicine residents the key concepts in evaluating elevated liver chemistries?

Rationale
- Traditional lecture based teaching places students in a passive role; active learning is more engaging, and in certain studies shown to improve knowledge acquisition (Inra 2017, Thistlethwaite 2012).
- Case based learning is an example of active learning.
- We present the evaluation of liver chemistries in an interactive learning environment.

Methods
- Case based learning sessions with about 15 residents discussing 2-3 hepatology cases.
- Each case had a set of questions focused on diagnosis and clinical management.
- Participants were given a handout reviewing major concepts.
- Written feedback was obtained with surveys.

Cases discussed
- NASH cirrhosis
- Acute liver failure
- Alcoholic hepatitis

Approach to elevated liver chemistries

Results
- The majority of the residents who returned surveys were senior residents; survey return rate was 73%.
- All of the learners rated the case based learning format to be a better experience than standard lectures.
- All participants said they would like to discuss more hepatology cases in this format.
- Many participants liked the interactive nature of the session.

Survey Feedback

Overall experience
Engaging
Useful
Likert Scale
4 4.6 4.8 5

Conclusion
- Teaching Hepatology in a case based format improved learners engagement.
- Case based learning incorporates "desirable difficulties" into the learning experience which has been shown to improve transfer of information and "long-term retention" (Bjork 2006).
- This pilot study provided proof of concept for improved learning using case based learning. Future studies will focus on assessment of comfort, knowledge acquisition as well as retention, and different learners (such as medical students).

References

*From the ACG guidelines
Background and Aim

- The incidence of IBD and asthma in the United States has been increasing over the past decade.
- Both conditions arise from a complex interaction between genetic and environmental factors.
- This study aims at
  1. exploring the epidemiology and outcomes of hospitalized IBD patients with asthma, and
  2. comparing the above findings with hospitalized asthma patients.

Methods

- Utilizing 2008-2013 Nationwide Inpatient Sample, we identified 309,686 hospitalized IBD patients using ICD-9 codes. We used weighted multivariate logistic regression models to:
  1. examine the sociodemographic and clinical characteristics of asthmatic IBD patients, and
  2. evaluate the impact of an asthma diagnosis on the length of stay and in-hospital mortality.

Conclusions

- Hospitalized asthmatic IBD patients are more likely to be of age <45, female, of African American or Hispanic ethnicity and have a shorter hospital stay & lower in-hospital mortality.
- These findings can be utilized to risk stratify and to individualize care for a higher risk IBD patient population.
A 50 year old Caucasian woman with a history of asthma presented with sudden onset anterior chest pain and dyspnea several days after the onset of diarrrhea, dry cough, and sore throat. Pain improved with leaning forward.

Anxious; shallow breaths; clear lung fields; tachycardia; no LE edema.

- EKG: sinus tachycardia
- D-dimer: 264 (ULN 230ng/mL)
- Troponin, CBC, CMP → VNL
- Ordered CT PE protocol moderate Percardial Effusion, Blateral Widespread Adenopathy, no PE

- In patients >50, use age adjusted cut-off for D-Dimer is effective in excluding PE in patients who are low risk [2].
- This patient's D-dimer was normal when age-adjusted.
- Misinterpretation of D-dimer resulted.
- Significant additional, invasive testing
- Increased patient anxiety
- Prolonged hospitalization + inter-hospital transfer
- Low risk pericarditis patients are those without fever, subacute onset, large pericardial effusion, or cardiac tamponade, and response to NSAIDs.
- Treat LOW RISK patients with 7-day NSAID trial BEFORE further work-up (Figure 2).

**VITALS**

- **VITALS**

**Discussion**

- In patients >50yr, use age adjusted cut-off for D-Dimer levels (age in years x 10)
- Use of age adjusted D-Dimer levels→
  - 1 diagnostic accuracy without an increase in subsequent VTE diagnosis
  - 1 unnecessary follow up testing 5-fold in patients over age 75 [2].
- In patients >50 with low probability of having a PE, a D-Dimer is best interpreted according to the age-adjusted normal (10 x age), rather than the laboratory reported upper limit or normal.

**Conclusions**

- In patients >50 with low probability of having a PE, a D-Dimer is best interpreted according to the age-adjusted normal (10 x age), rather than the laboratory reported upper limit of normal.
- Accurate interpretation of D-Dimer in older patients can prevent unnecessary downstream testing and costs.
- In patients >50 with low probability of having a PE, a D-Dimer is best interpreted according to the age-adjusted normal (10 x age), rather than the laboratory reported upper limit of normal.
- Accurate interpretation of D-Dimer in older patients can prevent unnecessary downstream testing and costs.
- Patients with low risk pericarditis can be treated with an NSAID trial as an outpatient.