Stony Brook Children's

Pediatric Research Day

May 13, 2015

Stony Brook Children's

SCHOOL OF MEDICINE

DEPARTMENT OF PEDIATRICS

Margaret M. McGovern, MD, PhD

Physician-in-Chief

Stony Brook Children's Hospital

Professor and Chair

Department of Pediatrics

May 13, 2015

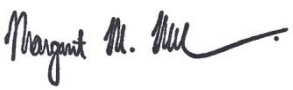
Welcome to the sixth annual Pediatric Trainee Research Day. It is a pleasure to share with you today the work our residents and trainees have been carrying out in children's health research and scholarship.

As we continue on our journey to creating a world class children's hospital program, we are committed to providing hope to sick children and their families by carrying out the research that will improve existing treatments and make the discoveries that will lead to new approaches to pediatric diseases.

To prepare the next generation of pediatricians to take part in this mission, each of our trainees is required to carry out a mentored project during their training. Coming from diverse backgrounds they can select from a spectrum of projects to best suit their career goals and meet their educational needs. Today they will have the opportunity to present their work to their faculty, peers and other colleagues.

Thank you for joining us and showing support to these young investigators. Special thanks also to Dr. Marian Evinger and this year's Organizing Committee (Drs. Fischel, Fenton, Lane, M. Parker, R. Parker, Tobin and Woroniecki) for coordinating the day, and notably to Dr. Michelle Tobin who assembled the Abstracts and Program book and helped presenters with their posters. Also, we appreciate the entire faculty who have served as mentors to provide guidance and encouragement to our trainees.

Sincerely,



Margaret M. McGovern, MD, PhD
Professor and Chair of Pediatrics
Physician-In-Chief Stony Brook Children's Hospital
Associate Dean for Ambulatory Operations

2015 PEDIATRIC RESEARCH DAY

Wednesday, May 13th
8 am – 1:30 pm
Charles B. Wang Center

8 – 8:30 **Registration and Breakfast** – Theater Lobby
8:30 **Welcome – Main Theater -** Dr. M. McGovern
8:40 **Keynote Address – Main Theater** (Chair – A. Lane)
Introduction of Keynote Speaker
8:50– 9:40 Keynote Speaker: Margaret Hostetter, MD
Professor, Cincinnati Children's Hospital Medical Center
"Preventing Central Line Infections: Beyond the Bundle"

Platform Presentations

9:45 – 10:30 **Session I**
Main Theater (Chair- R. Woroniecki) –
Introduction of Invited Judges: Margaret Hostetter , Hussein Foda, MD, Evonne Kaplan-Liss, MD, MPH , and Sidonie Morrison, PhD

Residents Platform Presentations
Lenore Omesi, MD "Biomarkers in Febrile Neutropenia"
Alice Rutatangwa, DO "Use of Non-Inflammatory Acid Sphingomyelinase Mutants for Enzyme Replacement in NPD-A"
KristenVanHeyst, DO "Neuroblastoma Express a Novel EGFR Extracellular Mutation, EGFRΔ768, Which Possesses Distinct Biological Properties"

10:30 – 10:40 **Coffee Bre**ak Theater Lobby

10:40 – 11:40 **Session II** (Main Theater)
10:45- 11:10 **PEDsTalks** (Introduced by M. Evinger)
Katherine Morgera, MD "TB or Not TB: It's No Longer a Question"
Ruchika Mohla, MD "Where There Are No Doctors"
Michelle Tobin, MD "European Fish Oil: Improves Liver Pigmentation"

11:10 – 11:40 **Fellows Platform Presentations** (Chair – J. Fischel) -
Jozan Doyle, MD "Discharge Planning for Preterm Infants Treated with Caffeine for Apnea of Prematurity Based on Pharmacokinetics and Pneumograms"
Hazel Villanueva, MD "Acute Hypoxia Induces Cytokine Synthesis and Release – A Protective Response to Hypoxic Stress"

11:40 – 12:45 **Poster Session -** Theater Lobby (Chair – R. Parker)
Invited Judges plus Organizing Committee volunteers (M. Parker, K. Fenton)

12:45 – 1:30 **Lunch** – Zodiac Gallery
Dr. Hostetter to discuss "Growing Up in Academic Pediatrics"
Presentation of Awards and Closing Remarks by Dr. McGovern

Keynote Speaker Biography

Margaret K. Hostetter, MD

Dr. Margaret K. Hostetter earned her degree in medicine from Baylor College of Medicine, after which she completed a residency at Boston Children's Hospital, followed by a fellowship in pediatric infectious disease, also at Boston Children's and other hospitals within the Harvard medical school system.

In 1982 she joined the Division of Pediatric Infectious Diseases at the University of Minnesota, where she steadily advanced over her career to become the endowed American Legion Heart Research Chair in Pediatrics. In addition to running an active and productive laboratory in Minnesota, Dr. Hostetter co-founded the first clinic specializing in the medical and developmental evaluation of internationally adopted children. Reflecting her leadership and skill in research, her appointments included the Council of the National Institute for Child Health and Human Development.

In 1998, she was recruited to Yale University School of Medicine as Director of the Yale Child Health Research Center to serve as Chief, Section of Immunology. Similar to her tenure at the University of Minnesota, her wisdom and leadership skills were quickly recognized by all. Within four years, she was named as the Jean McLean Wallace Professor, an endowed chair of the Department of Pediatrics and Physician-in-Chief at Yale New Haven Children's Hospital in Connecticut.

Dr. Hostetter returned to her home state (she was born in Toledo), in 2010 to become the Albert Sabin Professor of Pediatrics and Division Chief of Infectious Disease at Cincinnati Children's. Again, within four years, she was named Chair of the Department, as well as the first woman to be named as Director of the Cincinnati Children's Research Foundation, and the first woman to be named Chief Medical Officer at Cincinnati Children's Hospital Medical Center. One of the largest children's hospitals in the Unites States, Cincinnati Children's has a medical staff of more than 1,200 and a total staff of more than 14,000. Its annual budget is about $1.8 billion.

Her research, focusing on pathophysiology surrounding *Streptococcus pneumoniae* and *Candida albicans* has been funded continuously by the NIH since 1983. She has published over 70 research papers, and she holds several patents stemming from her research. Dr. Hostetter has been instrumental in nurturing the careers of countless researchers, including terms as President of the Society of Pediatric Research and the American Pediatric Society. She was elected to the National Academy of Sciences and the Institute of Medicine, and has served on many study sections for the NIH, March of Dimes, and other agencies. Dr. Hostetter has also directed the Pediatric Scientist Development Program, a multi-million dollar training grant for pediatricians funded by the National Institute of Child Health and Human Development.

Abstracts

Resident Platform Presentations

Fellow Platform Presentations

Resident Posters

Fellow/Student Posters

ABSTRACT 1

Biomarkers in Febrile Neutropenia

Lenore Omesi, Robert Parker, Catherine Messina, Rina Meyer

BACKGROUND: Febrile neutropenia is a common cause of morbidity and mortality in pediatric oncology. No well-established algorithms using biomarkers exist for risk stratification of these patients. Although not extensively studied in pediatric cancer patients, studies have shown procalcitonin to be a predictor of bacteremia in other settings.

OBJECTIVE: We performed a pilot study to determine baseline values of procalcitonin in pediatric cancer patients and to ascertain the utility of procalcitonin, CRP, and lactate in predicting bacteremia and identifying patients at risk for poor outcomes.

METHODS: We enrolled 43 patients (70.7% leukemia/lymphoma, 29.3% solid tumors, median age 10 years). Procalcitonin was tested in four groups of patients on chemotherapy – afebrile/non-neutropenic, afebrile/neutropenic, febrile/non-neutropenic, and febrile/neutropenic. During each febrile episode, procalcitonin, CRP, and lactate were tested daily for three days.

RESULTS: Procalcitonin was not found to vary by gender, age, or diagnosis. Preliminary data suggests that procalcitonin is not elevated in afebrile/non-neutropenic patients ($p<0.03$), although it is elevated in neutropenic patients whether or not they are febrile ($p<0.03$), as does lactate ($p<0.02$). Elevated CRP ($p<0.05$) appears to correlate with presence of fever, while lactate does not. Although not statistically significant, there is a trend toward procalcitonin elevations while febrile ($p\sim0.055$). The negative likelihood ratio of normal procalcitonin values being associated with bacteremia is modest (LR ratio 1.09) as is the negative likelihood value of normal CRP, lactate, and procalcitonin together (LR ratio 1.23), but both are likely affected by the small sample size. Interestingly, in three patients with positive blood cultures, procalcitonin was markedly elevated (in some cases, nearly 70 times the upper limit of normal). However, due to the low prevalence of bacteremia in our participants, no conclusions can be drawn from this observation.

CONCLUSION: Procalcitonin values do not appear to be elevated in "well" oncology patients, making it potentially useful in identifying patients with acute infections. Data suggest that normal procalcitonin may be useful in identifying patients less likely to be bacteremic. Because positive blood cultures are relatively rare events, a larger, multicenter trial is needed to further understand the relevance of extremely elevated procalcitonin levels, elucidate the relevant clinical factors and test them prospectively.

ABSTRACT 2

The use of Non-Inflammatory Acid sphingomyelinase mutants for enzyme replacement in NPD-A

Alice K. Rutatangwa, D.O., Benjamin J. Newcomb, Christopher J. Clarke, Ph.D., and Yusuf A. Hannun, M.D., SUNY Stony Brook, NY, United States.

Background: Niemann-Pick disease (NPD) is an autosomal recessive lysosomal storage diseases resulting from a deficiency in acid sphingomyelinase (aSMase) activity. ASMase is a hydrolase that converts sphingomyelin to ceramide. It exists in two forms, the bioactive lysosomal aSMase (L-SMase) and the secretory aSMase (S-SMase) involved in cellular stress responses. NPD severity correlates with the percent of residual L-SMase activity in the cell. NPD-A is a more severe form of the disease characterized by neurodegeneration, failure to thrive and progressive psychomotor retardation leading to death within the first 3 years. Fibroblasts from NPD-A patients exhibit about 0.15% residual aSMase activity. In contrast, NPD-B has a milder presentation with mainly visceral involvement of hepatosplenomegaly, thrombocytopenia, and interstitial lung disease with patients surviving into early adulthood. Fibroblasts from NPD-B exhibit about 4% aSMase activity suggesting that a small increase in activity of aSMase may be able to decrease severity of symptoms of Niemann-Pick disease.
Currently, palliative symptomatic management, stem cell transplantation, and attempts of gene therapy have shown promise, but have limited efficacy in the treatment of NPD. There is ongoing research for enzyme replacement therapy (ERT) in NPD-B with prior research showing failed attempts of ERT in NPD-A, due to possible toxicity and/or increased cellular inflammatory response mediated by S-SMase.

Objective: To determine the effect aSMase replacement in NPD-A cells and to characterize the expression of inflammatory cytokines following ERT in NPD-A cells.

Design/ Methods: We transduced NPD cells with lentivirus containing WT or aSMase mutants lacking inflammatory S-SMase activity (S508A). S508A aSMase mutant enzyme retains the bioactive L-SMase activity. Functionality of overexpression of both aSMase-WT and S508A was monitored by whole cell lipidomic analysis, enzymatic activity assays and assessment of the lysosomal morphology by confocal microscopy. Levels of CCL5, a major pro-inflammatory cytokine, were assayed using ELISA following treatment of NPD cells by overexpression of both aSMase-WT and S508A.

Results:We demonstrate that lipid content is significantly reduced and lysosomal morphology is restored in NPD-A cells following S508A transduction.

Conclusion: Our data show a significant reduction in sphingomyelin lipid storage and normalization of cellular lysosomal morphology in S508A treated NPD-A cells compared to WT over-expressors and control cells.

ABSTRACT 3

Neuroblastoma express a novel EGFR extracellular mutation, EGFRΔ768, which possesses distinct biological and biochemical properties

Kristen A. VanHeyst, James Keller*, Anjaruwee S. Nimnual, Mathew S. Varghese, Michael J. Hayman, Edward L. Chan

Background: Epidermal Growth Factor Receptor (EGFR) is a biologic target for cancer therapy. Clinical response to EGFR inhibitors is variable. Recently, EGFR mutations were found to predict response to anti-EGFR therapy. Since a few children with Neuroblastoma (NB) benefited from EGFR inhibitors in clinical trials, Dr. Chan and his lab screened for EGFR mutations in primary NB. Interestingly, they identified the expression of both EGFRvIII and a novel mutation, EGFRΔ768, in these tumors. They hypothesized that EGFRΔ768 expression confers an aggressive cancer phenotype in NB cells and ultimately characterized the EGFRΔ768 mutation by comparing its biological and biochemical effect with that of wild type (WT)-EGFR and EGFRvIII.

Objective: To assist Dr. Chan in analyzing the proliferation of 3T3 cells containing EGFR Δ768 and monitoring the proliferative response of these cells when treated with Erlotinib and Etoposide.

Materials and Methods: We obtained 62 Snap Frozen primary neuroblastic tumors from the Columbus Bipathology Repository Center and 80 NB RNA from the Children Oncology Group (COG). Five NB cell lines were obtained and confirmed by STR profiling. Stable 3T3 clones expressing WT and mutant EGFR were generated. The clones were visualized under fluorescence microscopy. XTT assays were performed with the stable clones. Responses to Erlotinib from 0.01 – 1 ng/ul and Etoposide from 0.5 – 2 uM were compared among the clones by XTT and western analyses.

Results: This novel mutation enhanced the proliferation of 3T3 cells in vitro when compared to control GFP+ cells. Its expression also confers sensitivity to Erlotinib, but the biochemical inhibition of Erlotinib on EGFRΔ768 is significantly less effective than that on activated WT-EGFR from 0.01 – 0.1 ng/ul. EGFRΔ768+ cells were also significantly more resistant to Etoposide than the GFP and WT-EGFR+ cells.

Conclusion: EGFRΔ768 confers aggressive cancer cell behaviors and has distinct biological as well as biochemical properties.

ABSTRACT 4

Discharge Planning for Preterm Infants Treated with Caffeine for Apnea of Prematurity Based on Pharmacokinetics and Pneumograms

Josel Doyle, Dennis Davidson, Susan Katz, Marie Varela, Catherine Messina, Joseph Decristofaro

Background: Resolution of apnea of prematurity (AOP) is a prerequisite for the safe hospital discharge of a premature infant. Caffeine is an effective and safe therapy for AOP. It reduces the frequency of apnea, decreased mechanical ventilator days and decreases the incidence of BPD. In the NICU, caffeine is usually discontinued at approximately 34 weeks post conceptual age (PCA) and infants are followed for symptoms of AOP before discharge. Serum caffeine concentration as low as 2.9 mg/L have been associated with therapeutic effects for AOP.

Objective: To determine the margin of safety for discharge of the preterm infant with AOP based on caffeine pharmacokinetics and pneumograms.

Method: This was a prospective, cohort study. Premature infants with a gestational age ≤ 32 weeks were enrolled. The decision for caffeine discontinuation was made independently by the attending physician on service. Pneumogram (PG) studies and serum caffeine concentrations were obtained 24h and 168h after the last dose of caffeine was given. PGs scores were based on either apneas > 20 secs or apneas < 20 secs with associated bradycardia < 80 bpm for > 5 secs &/or oxygen saturation < 90% for > 5 secs; each event was assigned as 1 point. One month after patients were discharged home, follow up phone calls were made to the care givers to determine readmission for an apparent life threatening event (ALTE).

Results: 50 infants were enrolled (GA =29 weeks ± 2.2, BW 1273 g ± 356; (mean ± SD)). D/C of caffeine occurred at a PCA of 35 weeks ± 1. Serum caffeine concentrations decreased from 13.3 mg/L ± 3.8 to 4.3 mg/L ± 2 at 24 and 168 h respectively ($p < 0.001$). The serum caffeine half-life (t ½) was 87 ± 25 h. At 7 days after discontinuation of caffeine, 68% of the patients had an abnormal PG. PG scores increased from 1.3 ± 1.8 to 2 ± 2.2 events at 24 and 168h, respectively ($p = 0.015$). Follow up phone calls were completed for 83% of study patients and review of our medical center electronic records revealed no readmissions for ALTE.

Conclusion: In this patient population the mean caffeine level at 7 days after discontinuation was still in a therapeutic range. Seven days after discontinuation there was a small but significant increase in pathologic apneas. Based on the overall t ½ at discontinuation of caffeine for all study patients, the patients would need another 3-4 days for serum caffeine concentrations to drop to a sub-therapeutic value below 2.9mg/L. For premature infants treated with caffeine for AOP, a 10 - 11 day waiting period after discontinuation of caffeine should be considered for a safe hospital discharge.

ABSTRACT 5

ACUTE HYPOXIA INDUCES CYTOKINE SYNTHESIS AND RELEASE IN MOUSE PHEOCHROMOCYTOMA CELLS – A POTENTIAL PROTECTIVE MECHANISM TO HYPOXIC STRESS

Hazel Villanueva, MD[1], Priyadarshani Giri, MD[1] and Marian Evinger, PhD[1]

Background: Acute hypoxia stimulates release of adrenal catecholamines and neuropeptides to counteract adverse metabolic and physiologic effects of this stress. In neonates, adrenal medullary cells function as oxygen [O_2] sensors prior to maturation of the sympathetic nervous system. Previous work has demonstrated rapid release of epinephrine (Epi) and enkephalin from these cells in response to hypoxia. Pro-inflammatory cytokines, interleukin-1 alpha (IL-1α) and interleukin-1 beta (IL-1β) which are also present in adrenal chromaffin cells have been shown to regulate the secretion of catecholamines. To date, it has not been determined whether acute hypoxia influences the synthesis and release of these cytokines thereby affecting the neonate's response to hypoxic episodes. Mouse pheochromocytoma cell line (MPC 10/9) expresses features of developing adrenergic chromaffin cells including hypoxia-evoked Epi synthesis and release, thereby providing an experimental system for studying hypoxia response mechanisms in adrenergic chromaffin cells.

Objective: To determine if acute hypoxia stimulates synthesis and secretion of IL-1β and IL-1α in MPC 10/9 cells.

Design/Methods: MPC 10/9 cells were subjected to hypoxic conditions (10% O2) for intervals of 0,15,30,45, and 60 min. IL-1α and IL-1β were quantified in cell extracts and media via Luminex assay using mouse specific antibodies. Cytokine mRNAs were assessed using reverse transcriptase-mediated polymerase chain reaction (RT-PCR).

Results: IL-1β and IL-1α are present in MPC 10/9 cell extracts at 4.3(±2.1) and 1.2(±0.8) pg/μg protein. After 15min exposure to hypoxia, 1lL-1β content increases 50% to 6.5(±1.5) pg/μg. A parallel increase in IL-1β mRNA also occurs. IL-1α cellular content increases to 1.5 (±0.7) pg/μg during this interval. Hypoxia stimulates release of both IL-1β and IL-1α, with maximal secretion at 30 min.

Conclusions: Hypoxia evokes the synthesis and release of IL-1β and IL-1α in chromaffin cells. In contrast to the previously-demonstrated rapid release of epinephrine and enkephalin (maximal at 15 min), hypoxia evokes a slower release of IL-1β and IL-1α. Although these cytokines can acutely inhibit catecholamine release, their longer-term autocrine influence includes enhanced catecholamine release. In hypoxic MPC 10/9 cells, delayed cytokine release may thus permit an initial, essential epinephrine bolus while still permitting a subsequent catecholamine response to recurring hypoxic events. This can be a potential protective response mechanism in neonatal adaptation during acute oxygen deprivation.

ABSTRACT 6

Are We Practicing Safe MRI screening? Using Root Cause Analysis to explore Near Misses

Robert Abdullah, Susan Robbins, Anthony Indelicato, Bruce Teifer, Lauren Cameron, Nirvani Goolsarran
Division of General Internal Medicine and Geriatrics/Department of Medicine

Introduction: Recently, patient safety incidents were reported as serious near misses and described events in which our current MRI clinical screening process was inadequate and erroneously permitted patients with implanted pacemakers in the MRI scanning room. Root Cause Analysis (RCA) is a tool used to analyze patient safety events; we used RCA to analyze current gaps in our Magnetic Resonance Imaging (MRI) screening process at our institution, aligning with our institutional safety goals.

Hypothesis: The RCA Tool will identify near misses in MRI Screening and barriers to appropriate and safe screening.

Methods and tools: To order an MRI at Stony Brook University Hospital, the physician completes a yes or no questionnaire. Answering yes to any of these questions indicates a contraindication and the order cannot be placed. Prior to entering the MRI Scanner, a separate and longer MRI Safety Questionnaire is completed by any medical staff. The information is obtained from the patient or patient representative and documented in this sheet. The last step is reviewing the questionnaire and re-screening, which is done by the MRI Technologist before physically entering the scanner.

Through a series of inter-professional meetings, we conducted a comprehensive root cause analysis of the current MRI process. Patient safety incidents are automatically monitored by the MRI Team and recorded.

Results: There were 7 near miss events from December 2013 to September 2014, identified by the MRI Technologists prior to a patient unsafely entering the MRI Suite. Based on 45 average scans per day, this equates to 7 near miss events per 13, 500 completed scans.

As part of the RCA, residents, nursing staff, MRI Team members and Information Technology staff discussed the near miss events and self-identified barriers to safe ordering, proper screening.

The following barriers were identified: EMR limitations, time constraints, incomplete physical exams, lack of education, electronic order inflexibility, unreliable history, and interruptions of ordering provider during order entry.

Conclusion/Clinical relevance: Based on the RCA, we identified breaks including limitations in our EMR, time constraints, incomplete history and physicals and interruptions in order entry. We were able to redesign a computerized hard stop. The new order entry will allow ordering providers to appropriately screen patients for pacemakers by creating a more responsive yes/no question system with branched questions if a provider selects a possible contraindication. In addition, we are creating and implementing a screening questionnaire**,** which will be done at the initial patient encounter to identify patients with MRI contraindications. This will redistribute some of the constraints on the ordering provider to verify all this information. Other interventions include a centralized phone number for clarifying device compatibility, survey directed towards ascertaining order practices and resident education on MRI safety.

ABSTRACT 7

Echocardiographic assessment of left ventricular size in newborns with patent ductus arteriosus by the bullet method.

Bayle, K; Galotti, G; Nielsen-Farrell, J; Nielsen, J; Panesar, L.

Background: The left ventricular diastolic volume (LVEDV) is a standard ECHO parameter used in volume-loaded lesions such as PDA. The LVEDV can be estimated by the ECHO-Bullet method using routinely obtained views of the left ventricle (LV). There are validated normative data for LVEDV in newborns and infants (BSA=0.20-0.60m^2), however normal values for LVEDV in premature newborns (BSA<0.20m^2) are unknown. This limits LVEDVs utility as a parameter in PDA physiology.

Objective: To define normative values for LVEDV in neonates with BSA<0.20m^2. Test the usefulness of LVEDV in this group by comparing the LVEDV in those with clinically significant PDA versus those without a PDA.

Study Design/Methods: LVEDV was measured retrospectively from clinically obtained Echocardiographic data yielding 69 normal and 12 PDA subjects. Subjects with congenital heart disease, poor image quality or LV dysfunction were excluded. Subjects younger than 72 hours with a PDA were included in the normal group as this is not adequate time for the LV to enlarge. The LVEDV was indexed (LVEDVi) to both BSA with the power of 1.0 and to 1.38 to test the best normalization method. The data is presented as mean±SD and analyzed using Pearson's correlation coefficient and Student T-test.

Results: The 69 normal subjects had a mean age and weight of 9±17.2 days and weight 2.08±1.0 kg, respectively. The mean BSA was 0.16m^2 with a range of 0.0-0.24m^2. The LVEDV when indexed to BSA^1.38 for this normal group was 63.8±12.8 ml/m^2.76 which is significantly different than the published normal value of 70.4±9.1 ml/m^2.76, p<0.001. The 12 PDA subjects had a mean age and weight of 17±7.7days and 0.87±0.3kg, respectively. The mean BSA was 0.088m^2 with a range of 0.06-0.11m^2. The LVEDV when indexed to BSA^1.0 demonstrated a residual relationship to BSA with a Pearson's r=0.53, p<0.001; indicating failure of this indexing method. When LVEDV is indexed to BSA^1.38, this residual relationship disappears, r=0.02, p=NS. The mean LVEDVi of the PDA group (96.0±26.8ml/m^2.76) was significantly larger than the normal group (63.8±12.8 ml/m^2.76), p=0.002.

Conclusions: Our data establishes normal values of LVEDV for premature neonates with a BSA<0.2m^2 which differs from current published data. The larger LVEDVi seen in our small cohort of PDA neonates suggests that LVEDV may be an important clinical parameter in PDA patients.

ABSTRACT 8

Assessing pediatric resident's knowledge of central line associated blood stream infections (CLABSI) prevention during insertion and maintenance of central lines in neonates

Jozan Brathwaite, M.D, Sridhar Shanthy , M.D. FAAP

Background: The NYS Perinatal Quality Collaborative NICU CLABSI's Reduction Project was deployed to all regional perinatal centers in 2008 after realizing the impact of CLABSI on morbidity and mortality of neonates. It is estimated that there are over 80,000 CLABSI per year leading to increased length of stay by 7 days on average, mortality rates of 4-20%, and resulting in an additional $ 3700 to $29,000 in costs per infection, Chardonet et al, 2013. CLABSI in the NICU was once thought to be inevitable given long dwell times needed in the neonatal population. In 2011, Joseph Schulman et al found that use of checklists during insertion and maintenance leads to a 67% reduction in the rates CLABSI. Since a multidisciplinary approach is necessary to prevent CLABSI, residents are key players in reduction of CLABSI's as we are also involved in insertion and maintenance of central lines. It is paramount to assess knowledge gaps and bridge them in order to decrease neonatal morbidity and mortality.

Hypothesis: Teaching residents about CLABSI prevention may result in decreased rates of CLABSI.

Objectives: Increase awareness about morbidity and mortality of CLABSI. Address deficits in knowledge about CLABSI prevention (hand hygiene, correct antiseptic, frequency of dressing changes). Increase awareness of central line checklists during insertion and maintenance of central lines. Reduce rates of central line infections

Study Design: A Survey, using a likert scale, aimed at assessing knowledge of evidence-based preventative practices during insertion and maintenance of central lines was created by the researcher and distributed 21 Pediatric residents. Collected data was then used to create a power point interactive lecture based on knowledge deficits identified from the survey. Lecture was given over a 1 hour period during weekly lecture day before block switch. Survey was re-distributed to 26 residents at end of session. Data from both pre and post intervention surveys were then analyzed using the Fisher T test and p values assigned using a 2-tailed approach.

Results: Post intervention, 69.2 % of residents strongly agreed that sterile gloves should be worn when accessing or handling central lines vs. 47.6% pre intervention, which was not statistically significant. 85.7% of residents pre intervention agreed that proper hand hygiene was required before and after palpating catheter sites vs.96.2% post intervention. Post intervention, 61.5% of residents strongly agreed that site selection is important for reducing CLABSI's vs. 28.5%, which was statistically significant. 73.1 % of residents strongly agreed post intervention thought that checklists may prevent CLABSI vs 52.4% pre-intervention. Post intervention 65% of residents stated that the correct antiseptic used on skin prior to PICC insertion or during dressing changes was 2% chlorhexidine vs. 38% of residents pre intervention, which was statistically significant. During study period (2013) there were 5 CLABSI which did not show a change from 2012.

Conclusions: Residents agreed that selection of proper site, correct selection of antiseptics, wearing sterile gloves, using checklists and constantly assessing need for central lines are key elements in the prevention of CLABSI's

ABSTRACT 9

Evaluation of Simulated Hand-Offs from Pediatric Residents to Faculty Using SBAR

Kim Derespina MD, Kimberly Fenton MD, Robyn Blair MD, Devin Grossman MD, Catherine Messina PhD, Rahul Panesar MD

Background: Physician hand-offs have significant variability. The Joint Commission's National Patient Safety Goals support a "standardized approach to hand-off communication." The Situation Background Assessment Recommendation (SBAR) tool provides a succinct, structured format for communicating critical information. High-fidelity simulation provides opportunities to study trainees' knowledge acquisition, retention and performance. Limited data exist on the efficacy of pediatric residency training of the SBAR hand-off from trainees to attending physicians in simulations.

Objective: To determine if pediatric resident education of the SBAR tool is effective in teaching hand-off technique in simulations of acutely ill pediatric patients.

Methods: Twenty five pediatric residents participated in simulations of two patients with differing severity of illness in a simulated PICU setting. A study investigator provided sign-out to residents and a brief summary to the PICU attending. Residents were asked by a "nurse" to evaluate the patients and provide diagnostics/therapeutics after which the attending called the resident for an update. This phone conversation was recorded and afterwards, the resident and intensivist scored how well the resident gave the hand-off, using validated Evaluation Forms. A study investigator scored the hand-off using objective SBAR criteria.

The residents then watched an IHI-based educational video on SBAR as the intervention.

To date, seven of the same residents have participated in similar simulations, and phone conversations were recorded. Post-intervention, the resident, intensivist, and study investigator completed the same scoring forms.

Data were analyzed using Pearson Chi-square of association test and the Mann-Whitney test.

Preliminary Results: Statistically significant improvements were noted in inclusion of situation and background, provider self-evaluation of communication skills, content, clinical judgment, and overall sign-out competence, and recipient evaluation of clinical judgment and overall sign-out competence.

Trends towards improvement were noted in inclusion of plan, prioritization of patient acuity, provider self-evaluation of professionalism, recipient evaluation of setting, organization/efficiency, and professionalism.

Conclusion: Routine pediatric resident education of SBAR techniques appears insufficient for adequate hand-offs in the simulated setting. Resident hand-offs lack prioritization of patient acuity, synthesis and communication of assessment. More intensive training in SBAR is warranted. High-fidelity simulation-based education may provide a valuable training method for this technique.

ABSTRACT 10

Distributing Spanish Education to Patients Whose Primary Language is Spanish in the Primary Care Setting

Feld S, Siu V, Khaliq M, Bykhovsky M, Fisher M, Khalsa AS, Abdullah RK, Spinnato

Background: The most important cause of health care disparities in the Hispanic population is the language barrier they face in the medical setting. Medical information is often not fully understood, even with appropriate translation. A set of studies have shown that Hispanic patients are interested in knowing more about their health and would read health information from providers if it were in Spanish. As part of the medical home and efforts to address healthcare disparities, there is an emphasis placed on providing patients with appropriate education pertaining to their chronic diseases upon discharge. In the setting of culturally competent care, an extension of this would be to provide education in the patient's self-identified primary language.

Methods and tools: We did a retrospective review of 100 charts with documented diagnoses of Diabetes, Hypertension and/or Hyperlipidemia who are seen in the Setauket General Primary Care Office. Patients who claimed Spanish as their primary language were identified via chart audit. Subsequently, we reviewed visits in 2014 and determined if patient education was provided for the aforementioned diagnoses and if it was provided in Spanish.

Results: Of the 100 patients sampled, preliminary data analysis suggests that only 14% of our Spanish-speaking patients with Hypertension, Diabetes and/or Hyperlipidemia receive any patient education. None of the patient education was in Spanish, their preferred language.

Conclusion/Clinical Relevance: Patient education as part of the depart process is designed to reinforced verbal instructions given during patient visits. Our preliminary data demonstrate a significant weakness in our primary care setting. In general, patients received education on their medical illness less than 20% of the time. None of our Spanish-speaking patients received education regarding their chronic disease in their reported native language. We plan to create a notification and reminder system in the practice to increase patient education, specifically in Spanish. This will be a natural extension of ongoing efforts to consistently provide patient information during the depart process. Specifically, we want to pursue this effort in a culturally sensitive manner. We hope that our efforts in the medical home can be modeled at an institution level and perhaps even wider in programs such as Delivery System Reform Incentive Payment (DSRIP).

IRB Exemption approval on 2/10/15 - IRB project # 708025-1

ABSTRACT 11

Research Day Abstract: Does parental knowledge about the flu and flu vaccine predict vaccination of their children?

Monica Hegedus, MD, Susan Walker, MD, MS, FAAP, Catherine Messina, PhD

Background: Influenza is known to cause morbidity and even death in children. Since the introduction of the influenza vaccine, many children have been protected from the flu. Both the AAP and CDC recommend all eligible children over 6 months of age get vaccinated annually. However, during the 2013-2014 flu season, 40% of children were not vaccinated, and in 2012-2013, 90% of children who died from influenza were unvaccinated. Several studies have examined parental beliefs regarding the flu and flu vaccine, but little is known about their level of knowledge and its relationship to vaccine behavior.

Objective: The objective of this study was to determine if parental knowledge level pertaining to the flu and flu vaccine correlates with flu vaccination of children.

Methods: We created a survey to assess vaccine behavior and parents' perceived knowledge/actual knowledge of the flu and flu vaccine. The knowledge-based question were derived from CDC's patient handouts. Surveys were distributed to English-literate parents of children aged 12 months to 17 years in three Stony Brook Pediatric clinics on Long Island. 103 surveys were collected over 4 months. Only 43 were included in data analysis, as 60 were incompletely filled out. Each patient's electronic medical record was accessed to confirm receipt of the flu vaccine during the prior 2013-2014 flu season. Questionnaires were scored on their percent correct to assess parents' knowledge. SPSS was used for statistical analysis.

Results: Sixty-two percent of parents were both recent and prior vaccinators, compared to 14.1% who had never vaccinated. The mean combined score for flu and flu vaccine knowledge was 75.8% (p-value 0.26); with a mean score of 87.3% on flu knowledge and 66.6% on flu vaccine knowledge. Those who never vaccinated had a mean overall score of 83.4%, while those who reported vaccinating in the past had an average score of 76.3% (p-value 0.26) Of those who recently vaccinated, 62.5% felt they know "a lot" about the vaccine, while 37.5% of those who did not vaccinate recently felt they know "a lot" (p-value 0.11). Of those who vaccinated in 2013-2014, 73.5% had vaccinated in the past. Those who did not vaccinate in 2013-2014, 87.5% reported never vaccinating (p-value 0.00).

Conclusions: There are still a number of children not being vaccinated, and knowledge gaps exist among parents. There is no clear correlation between knowledge level and vaccination behavior. This study supports that prior vaccination behavior correlates with future behavior. Future studies should be aimed at determining other factors driving their vaccination behavior. Identification of these factors can serve as target points for future educational tools.

ABSTRACT 12

Evaluation of Pediatric Resuscitation Team Performance in High-Fidelity Simulations using a Validated Assessment Tool

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Background: The benefits of simulation based medical education (SBME) have been reported in improving pediatric residents' skills, knowledge retention and core competencies. The Simulation Team Assessment Tool (STAT) is capable of scoring team performance of resuscitations in high fidelity simulations.

The use of a validated assessment tool to track the performance of resuscitation teams in high fidelity code simulations over the course of a pediatric residency has not yet been described in the literature. Further, the effect of nursing and more senior team members could prove influential on team performance.

Objectives:

1. Determine if the STAT reliably assesses pediatric resuscitation teams in high-fidelity mock code simulations.
2. To identify the effect of nursing presence and number of senior residents on team performance.

Methods: High-fidelity pediatric mock codes are recorded with written consent in the Clinical Skills Laboratory in the School of Medicine. From 2010 to 2014, 64 pediatric mock code videos were analyzed. Videos were cataloged according to scenario type, nursing presence and resident level. Each video was reviewed separately by 2 or 3 reviewers trained in using the STAT criteria. Reviewers scored an equal number of clinical scenarios. Each video was only allowed to be viewed in one sitting per reviewer. A third reviewer scored a video if a large discrepancy was found between two reviewers.

Reviewer interoperator reliability was assessed after each reviewer scored 30 videos to ensure agreement.

Results: Over the study period, there was no significant change in all STAT scores. The data showed an elevation in overall average score with nurses present in a simulation when compared to those simulations without a nurse present.

A greater number of senior residents on the team correlated with higher scores in every subsection of STAT with the exception of Airway/Breathing. The most notable area of improvement was found in the Circulation subsection.

Conclusion: The STAT provides an efficient assessment of team performance in mock code simulations over the course of a residency period. Team performance was not found to improve over the three-year period, suggesting consistency with STAT scoring using a 3-reviewer scheme. Nursing presence was found to improve overall scores. Presence of more senior residents was also found to correlate with higher scores. Future interventions using SBME can target areas for improvement and STAT can assess for changes using these data as baseline scores.

ABSTRACT 13

Is Excess Fluid Administration Shortly Following Birth in Very Low Birth Weight Neonates Associated With an Increased Rate of Patent Ductus Arteriosus Requiring Treatment?

Michelle B. Levinson MD, Catherine Messina PhD, Jonathan P. Mintzer MD

Background: In the NICU, fluid balance requires tight regulation in very low birth weight neonates (VLBW; < 1500 g BW). Shortly after birth, VLBWs receive fluids from multiple sources which may exceed intended fluid goals. Previous studies have shown an increased incidence of patent ductus arteriosus (PDA) in VLBWs receiving excess fluids shortly following birth. Very few studies have examined the effects of excess fluids in VLBWs during the first postnatal day. We hypothesize that in VLBWs, excess fluid in the first day of life beyond prescribed goals is associated with an increased incidence of PDA requiring treatment.

Objective: To determine whether excess fluid in VLBWs beyond prescribed fluid goals during the first postnatal day is associated with PDA requiring medical and/or surgical treatment, in addition to other common neonatal morbidities.

Design/Methods: This retrospective chart review included consecutive VLBWs with complete electronic records. Fluids administered in the first 24 postnatal hours were compared to documented fluid goals on admission. Subjects were categorized into excess vs. comparison fluid groups; excess was defined as infants who received a greater volume of fluid than prescribed. Percent excess fluid was defined as: [(Actual – Prescribed) / Prescribed] x 100. Infants in the excess fluid group were also categorized into varying levels of excess fluid intake (<15%, ≥15 to 40% and ≥ 40%) and compared to those with no excess (0%). Infants were then compared for the primary outcome of PDA requiring medical and/or surgical therapy. Secondary outcomes included multiple common neonatal morbidities. A logistic regression analysis was performed for the primary and secondary outcomes of interest to account for birthweight and gestational age.

Results: 166 infants received fluid in excess of prescribed amounts, while 34 infants received fluid equal to or less than prescribed. Prescribed fluid amounts were not statistically different between the varying levels of fluid excess. No statistically significant associations were observed with regard to excess fluids and PDA requiring medical and/or surgical intervention. Additionally, no associated effects of excess fluids were observed among secondary outcomes.

Conclusions: Excess fluid administration during the first postnatal day in VLBW neonates was not associated with any specific outcomes. Higher volumes of excess fluid may be required to affect neonatal morbidities. Decisions regarding fluid balance should be individualized to specific patient requirements with appropriate monitoring. Prospective cohort analysis of early fluid management is needed to determine whether fluid balance per se represents an independent risk factor for a variety of neonatal outcomes.

ABSTRACT 14

Does Laboratory Testing Predict Development of Coronary Artery Aneurysm in Kawasaki Disease?

William Mak D.O. and Jeffrey Hom M.D.

Background: Kawasaki disease (KD) is an acute vasculitis of childhood that is characterized by well-defined criteria. Coronary artery aneurysm (CAA) acquired from Kawasaki disease can occur in up to 25% of untreated patients and is a major cause of myocardial infarction in young adults. Diagnosis is made by clinical criteria and may be unreliable due to the acute nature of the disease. Furthermore, prognostic and management uncertainty exists in patients presenting with incomplete KD. Currently, laboratory testing routinely performed on patients presenting with suspected KD is not diagnostic and is of unclear prognostic utility. Current studies that address laboratory testing and development of CAA are have small sample sizes and heterogenous patient populations.

Objective: We aim to determine the utility of laboratory testing in predicting the development of CAA in patients with KD using data from existing studies. We may reduce testing burden on patients with KD and possibly guide treatment in patients with incomplete KD.

Methods: We conducted a meta-analysis of recent literature with reports of routine laboratory tests and coronary artery measurements. Using a PubMed search for main keywords and subject headings, articles were reviewed for inclusion criteria. Inclusion criteria included studies from 2004-2014, in pediatric patients with defined diagnosis of Kawasaki disease, laboratory testing performed at presentation, and coronary artery dimensions measured on echocardiogram. Statistical analysis was conducted with aid of a statistician to calculate effect size correlation and Cohen's d using means and standard deviations between groups. Forest plots were generated for select laboratory tests using these results.

Results: Six articles met inclusion criteria were reviewed and analyzed. In patients with KD who developed CAA, medium effect sizes were suggested for white blood cell count (WBC) and alanine aminotransferase (ALT) of 0.58 [95% Confidence interval (CI) 0.23-0.93] and 0.62 [95% CI 0.18-1.06] respectively. Small to negligible values were seen for hemoglobin, platelet counts, aspartate aminotransferase (AST), albumin, erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP), with 95% confidence intervals crossing zero.

Conclusions: Values in routine laboratory blood tests in patients with KD do not correlate well with the development of CAA on subsequent echocardiogram. Large heterogeneity in patient populations, patient treatment, and coronary measurement criteria are present in existing literature. This contributed to limitations of this study. Multi-centered studies should be considered to investigate biomarkers for the development of CAA.

ABSTRACT 15

Parental Perception of Video Game Use in Adolescents

Ruchika Mohla, MD MS; Margaret McGovern, MD PhD; Catherine Messina, PhD

Background: Video games are a popular source of entertainment among children and adolescents. Studies have reported negative effects related to video game use (decreased school performance, attention problems, aggressive behavior and potential for addiction). Little is known about parents' perceptions and concerns regarding video games. In addition, no studies have been reported to date comparing parental perceptions of video game use with the actual use as reported by their children themselves.

Objective: To learn about parental perceptions of video game use in adolescents (11-18 years old).

Study Design/Methods: Children ages 11-18 who were accompanied by parent or legal guardian for an appointment at the Stony Brook Children's Outpatient Clinics at Technology Park, Patchogue and East Moriches were eligible. A CITI-trained nurse/office manager at each site identified eligible patients and obtained consent and assent forms. The parent and adolescent received an iPad to complete a survey on Survey Monkey. Results were de-identified and each participant was given an individual and family identification number to complete descriptive statistical analyses.

Results: Results from 77 parent-child pairs were used. Some parents completed multiple surveys if they presented with multiple children. In these instances, only the first pair to answer was used to maintain consistency.

Most (63.6%) children reported playing in their bedroom vs. 59.7% in the living room/den, 24.7% at a friend's home and 7.8% at school. Participants were able to select multiple locations. Parent data tended to agree. Most children reported using more than one gaming system. The most commonly used device was the iPhone or iPad. Seventy-one percent of children reported using these either alone or in addition to other systems. The Xbox360 was the second most common (56.6%). Fifty-three percent used a computer, 32.5% used the Nintendo Wii, 31.2% use Playstation 2/3, 15.6% Nintendo DS, 15.6% Android and 3.9 % Playstation Vita.

Adolescents and parents had similar responses regarding how games were obtained. Responses were compared using the kappa coefficient to determine inter-rater agreement. Individuals were given the following options: (more than one answer accepted): parents buy, child buys, child downloads, child rents, child borrows, child receives as gift. Kappa statistics for each comparison demonstrated fair to moderate agreement except for the child borrows option which showed only slight agreement. This suggests there was overall fair to moderate agreement in responses for where children obtained games.

Conclusions: Prior studies have investigated the effects of excessive video-gaming in children; however, there are no studies to date that compare the perceptions of video-gaming held by parents and their adolescent children. Our study suggests that parents and children tend to hold the same perceptions regarding duration and location of game use and method of obtaining video games. Many parents have rules and concerns for playing video games and their children are noted to be aware. Knowing that parents and children tend to have similar insights into video game usage, providers can better provide recommendations for interventions when video-gaming becomes excessive or concerning.

ABSTRACT 16

Lymphomatoid granulomatosis following primary EBV infection in a 14 year old with Trisomy 8 mosaicism

Lenore Omesi, Christy Beneri, Katharine Kevill, Laura Monahan, Laurie Panesar, Rina Meyer

Lymphomatoid granulomatosis (LG) is a rare, EBV-driven, lymphoproliferative malignancy, most commonly diagnosed in immunocompromised patients. Typically, LG occurs in the 5th to 6th decade of life and has a male predominance. It usually presents with respiratory signs and symptoms, but can progress to multi-organ disease. Clinical presentation is nonspecific; patients may have constitutional symptoms, cutaneous nodules, hepatosplenomegaly or meningeal signs. Lung imaging is also nonspecific, but cavitary lesions or parenchymal nodules can be seen. Given its rarity, there is often a delay in diagnosis. Furthermore, LG can mimic Wegener's granulomatosis histologically and radiographically. Treatment is based on histologic grading and ranges from decreasing immunosuppression when applicable to chemotherapy regimens effective in B-cell lymphomas, such as R-CHOP (rituximab, cyclophosphamide, doxorubicin, vincristine, prednisone). Despite therapy, LG is often fatal with 5-year mortality of 63-90%. We report a 14 year old girl with Trisomy 8 mosaicism, repaired congenital heart disease and cardiomyopathy, diagnosed with LG after primary EBV infection. She presented with infectious mononucleosis and developed progressive respiratory failure; multiple pulmonary nodules were noted on chest imaging. To our knowledge, this is the 50th child ever reported with this condition and the first with an underlying chromosomal abnormality. Her lesions were Grade 3 histologically. She was treated with R-CVP (rituximab, cyclophosphamide, vincristine, prednisone), with two doses each of rituximab, vincristine, and a prolonged steroid course (anthracycline not used due to cardiomyopathy). She had progression of disease despite initial therapy. Directed radiation therapy to several pulmonary nodules and etoposide were added to her treatment. Although her pulmonary lesions showed histologic evidence of involution with necrosis and her EBV viral load decreased, she developed widespread CNS lesions and expired one month after diagnosis. We postulate that her chromosomal condition predisposed her to malignancy. We also postulate that she may have had an undiagnosed immunodeficiency, causing her primary EBV infection to drive the development of LG, similar to patients with X-linked lymphoproliferative disorder. Although rare, LG should be considered in the differential diagnosis of persistent pulmonary lesions of unclear etiology, especially in immunocompromised patients. Early biopsy may aid in diagnosis and enable prompt initiation of therapy.

ABSTRACT 17

Urine Protein testing in Hypertensive Patients – Quality Assurance

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Background: The relationship between proteinuria and the progression of chronic kidney disease (CKD) in hypertensive patients is well documented in the literature. According to Joint National Committee (JNC) 8, initiation of pharmaco-therapy for hypertension (HTN) depends on patient's comorbidities and age. Lea et al. concluded the presence of proteinuria is predictive of an annual decline in GFR and progression to end stage renal disease. JNC 7 recommended annual urinary protein screening. The 2014 national patient quality reporting system (PQRS) suggested to screen for proteinuria at least every 36 months. Boulware et. al also demonstrated that screening for urinary protein in hypertensive patients was highly cost effective in identifying patients at risk of CKD. With initiation of angiotensin converting enzyme inhibitor and angiotensin receptor blocker, progression towards CKD was reduced and found to be cost effective. Hence, it is important to screen hypertensive patients for proteinuria to initiate the appropriate interventions.

Objective: The objective of this quality assurance project is to determine the percentage of urinary protein screens being performed in our clinic on hypertensive patients.

Methods:A retrospective data analysis was done using the electronic medical record from our Internal Medicine Primary Care Clinic at Technology Park. We identified patients diagnosed with hypertension between 18 and 90 years of age. Patients not seen in the last 12 months and patients diagnosed with CKD or diabetes were excluded from the study. Ninety-six patients were randomly selected based on their medical record number and charts reviewed to determine if urinary protein testing (urinalysis, urine albumin, urine protein or urine microalbumin) was ordered during the period of 01/01/2014-12/31/2014.

Results: Out of 96 patients, fourteen patients had a form of urinary protein testing ordered. Out of the 14 patients, 71.4% were ordered for urine protein and 28.6% were ordered for urine microalbumin. Neither urine albumin nor urinalysis were ordered for patients with hypertension seen in their follow up visit.

Conclusion: The importance of urinary protein screening in hypertensive patients was under recognized in the resident clinic. This quality assurance study proves the need of providing additional education regarding the importance of urinary protein screening in hypertensive patient. We will create reminder card to be placed on the computer in the exam room and in the conference room. We will also incorporate reminders into our pre-visit planning huddle. In 6 months, we hope to increase screening by 50%.

ABSTRACT 18

Improvement in Compliance for Home Management Plan of Care on the Pediatric Inpatient Units Utilizing the Electronic Medical Record

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Background: Asthma is a significant source of morbidity and mortality in children, resulting in 1.8 million visits to emergency departments and 439,000 admissions annually. A comprehensive home management plan of care (HMPC) is a valuable resource for families. Completion of this form in a busy children's hospital can prove challenging.

Objective: In collaboration with our clinical team, information technology (IT) division and electronic medical record (EMR) vendor we sought to design an electronic HMPC that would be user friendly to physicians, reduce variability across patient encounters and improve education for patients.

Methods: A multidisciplinary group was formed to create a product that would be user friendly, meet Joint Commission (JC) specifications, and would continue to be a valuable tool for patients at home. Several iterative PDSA cycles were conducted to improve the process. In September 2013 residents were educated on completing the HPMC on EMR. Other cycles included direct review and education by pediatric chief residents, implementation of forced completion fields, group education during PGY-1 orientation in June 2014 and lastly development of a formal guideline. Once determined that the plan resulted in success, we standardized the HMPC and began to use it in the inpatient areas and the ED.

Results: Our electronic HMPC was rolled out on our general pediatric inpatient unit in September 2013. Full implementation was achieved with IT consultation, educational intervention and real time feedback to the residents through daily reports in Jan-14. Action Plan compliance rates show an absolute improvement through Dec-14 with eleven consecutive points above the mean. This mirrors our Joint Commission composite scores. The period of Oct-13 through Dec-14, including implementation, resides entirely above the baseline mean 94.1%, (95CI = 78.2%, 110.1%). Data for both HMPC use and JC compliance show a statistically significant change through 2014.

Conclusions: Standardization of the HMPC will enable physicians to provide patients with consistent asthma management recommendations throughout the continuum of care. Through a multidisciplinary group that engaged both IT and the end users for the product we were able to develop a product that was useful for both patients and clinicians. With a useful product in place, we have begun rollout in our pediatric emergency department with a current compliance rate of 85%. Discussions and training with our primary care and pulmonary teams are underway to begin the process of integrating the HMPC into the outpatient workflow for all asthmatic patients.

ABSTRACT 19

Incidence of Celiac Disease and Gluten Sensitivity in Pediatric Migraine Patients

James Brief MD, Rebecca Abell DO, Sameer Lapsia, MD, Jill Miller-Horn, MD, Louis Manganas, MD, Anupama Chawla, MD

Background: Studies have demonstrated an increased incidence of celiac disease in migraine patients compared to the general population. These patients have demonstrated improvement upon initiation of a gluten free diet.

Hypothesis: We anticipated that 5.5% of children with a diagnosis of migraine headache will also be diagnosed with celiac disease.

Methods: Fifty eight patients under the age of 21 with migraine headaches were consented for the study. Subjects obtained celiac serology titers, consisting of total IgA levels, tissue transglutaminase IgA and IgG. Some subjects, who had additional lab work added by their PMD, also had levels of anti-gliadin IgA & IgG as well as anti-endomysial antibodies drawn which are two older methods of serologic testing for celiac disease.

Results: Thirty two of the fifty eight enrolled patients obtained serologic titers. Three subjects demonstrated ttG IgA levels greater than 4 U/mL and 1 subject had an anti-gliadin IgG level with a level of 39 U/mL. In total, 4 of 32 (12.5%) of our subjects with migraine headaches were found to have elevated celiac serologies. Two underwent upper endoscopy with 1 showing evidence of celiac disease and 2 demonstrated normal duodenal anatomy. One additional patient with normal celiac serology was ultimately diagnosed with celiac disease after endoscopy. Overall, 2 out of 32 subjects (6.25%) were found to have celiac disease on endoscopy.

26 patients were lost to follow up with a change in pediatric neurologists at this institution. In addition, patients feared pain from the needle stick, some patients were no longer interested in study participation and others felt blood work was unnecessary since their child lacked symptoms.

Discussion: To date, no studies have investigated whether patients with known migraine headaches have serology findings consistent with celiac disease. Our study demonstrated that 12.5% of subjects with migraine headaches have elevated celiac markers and 6.25% of patients with migraine headaches had positive endoscopic findings of celiac disease. This is consistent to our expectation that 5.5% of patients with migraines would be found to have celiac disease. The majority of subjects in our study did not have an upper endoscopy to definitively diagnose celiac disease so the 5.5% remains a lower estimate of SBUH patients with migraines with celiac disease.

ABSTRACT 20

Ongoing Surveillance and Comprehensive Staff Training Further Reduces Unplanned Extubations in the Neonatal Intensive Care Unit

Bianca Karber MD, Aruna Parekh MD, Sharon Close RRT, Tram Dang NNP, Esther Speer MD

Background: Unplanned extubations (UEs) are a major risk factor for immediate hemodynamic and respiratory instability, cardiopulmonary resuscitation and long-term sequelae in NICU patients, with published rates of 0.14 to 5.3 per 100 ventilator days *(Silva P et al, Respir Care 2013)*. UEs are the fourth most common adverse event in NICUs in the United States *(Sharek P et al, Pediatrics 2006)*. The Vermont Oxford Network recommends less than 2 UEs per 100 ventilator days, whereas our NICU's rate was 8.9 in Nov/Dec 2012. After implementation of a comprehensive training program consisting of NeoBar usage (a commercial endotracheal tube [ET] holder), documentation of ET position and its confirmation on x-ray, our UE rate began to decline. This report provides longitudinal data to monitor the effect of our interventions.

Objective: The goal of our QI initiative is to reach the Vermont Oxford Network goal for UEs.

Methods: In 2013, we established a training module for NeoBar usage and standardized the x-ray confirmation of ET position and its documentation in patient records. During subsequent QI cycles, training of the entire NICU staff continued and further protocol and electronic documentation improvements including automatic reminders were implemented. We collected the following data annually for 2 to 3 months periods: unplanned extubation rate (daily IHI forms), NeoBar usage rate (prospective observation), ET position documentation on patient records, x-ray confirmation of ET position, nursing satisfaction (survey).

Results: There were 78, 391 and 238 ventilator days in Nov/Dec'12, Nov/Dec'13 and Nov'14 to Jan'15 respectively. Our UE rate declined from 8.9 (2012) to 6.1 (2013) and 5 (2014). NeoBar usage decreased from 90 to 70% in 2014, which was due to standard taping in 3 surgical and 4 extremely low birth-weight newborns. Electronic documentation of respiratory care sets were implemented in 2013. In 2014, the compliance rate for ET position documentation increased from 90 to 100%. Adequate x-ray confirmation of ET position (defined as head and chest in midline with clear view of the ET) was 80% (2012), 65% (2013) and 70% (2014). Nursing satisfaction with the NeoBar increased from 23 to 70%, and 100% of our staff felt adequately trained in its usage.

Conclusions: Standardizing ET securement with the NeoBar and ongoing staff training decreased our UE rate from 8.9 to 5 over two PDSA cycles, approaching the Vermont Oxford Network goal. In the next QI phase we will continue staff training with emphasis on x-ray quality with a newly developed teaching module.

ABSTRACT 21

A Rare Case of Congenital Ascites Secondary to Spinal Cord Glioma

Bianca Karber MD, Andrew Handel MD, Lenore Omesi MD, Sunny Chang MD, Monica Hegedus MD and Echezona Maduekwe MD

Background: Congenital ascites is rare when presenting as an isolated entity in neonates. But when it occurs, it requires consideration of several broad etiologies including urinary, gastrointestinal, chylous, cardiac, metabolic and infectious causes. Of these possibilities, urinary ascites secondary to an obstruction is the most common. We report the first documented case of a newborn infant with isolated congenital ascites from neurogenic bladder secondary to a spinal cord glioma.

Presentation: A 40 week gestation female, appropriate for gestational age, was born to a 44 year old G1P0 mother with adequate prenatal care. Ultrasound done at 40 weeks gestation following a failed induction showed an isolated massive fetal ascites with evidence of anhydramnios. This finding was inconsistent with a normal prenatal ultrasound at 36 weeks gestation. Maternal prenatal laboratories were normal. The infant was delivered via Caesarian section with Apgar scores of 7 and 8 at 1 and 5 minutes respectively and immediate postnatal examination confirmed prenatal ultrasound findings. She required minimal resuscitation and nasal CPAP because of respiratory difficulty secondary to massive ascites. Urethral catheter was placed on arrival to the neonatal intensive care unit. The removal of the catheter due to evidence of urinary leak led to the worsening of the ascites and anuria over the next 12hrs. The urethral catheter was replaced, but required syringe aspiration to empty the bladder. The abdominal ultrasound showed massive ascites with normal appearing kidneys at birth, and repeat during the first week of life showed hydronephrosis. The abdominal x-ray showed a distended abdomen with centrally located loops of bowel. Paracentesis was notable for a high albumin gradient with elevated creatinine(1.9) compared to the serum (1.2) suggestive of urinary ascites. Cystogram and cystoscopy did not show evidence of leakage or rupture. An abdominal MRI showed an ill-defined spinal mass. Subsequent focused MRI evaluation of the brain and spine showed a 0.9 x 1.4 x 0.8 cm lobulated mass with heterogeneous enhancement within the conus medullaris. An excision biopsy of the mass sent to specialized pathology diagnosed WHO grade III/IV malignant glioma.

Conclusion: We describe a rare presentation of urinary ascites from neurogenic bladder secondary to congenital spinal cord glioma. We conclude that even though to our knowledge, there is no reported case of spinal cord glioma in this age group, it should be considered as a very rare cause of fetal/neonatal urinary ascites.

ABSTRACT 22

ASSESSING INDEPENDENCE AND HEALTH RESPONSIBILITY: BRIDGE TO ADULT CYSTIC FIBROSIS CARE

Michelle Tobin MD, Anupama Chawla MD, Deborah Salvatore RD, Teresa Carney NP, Catherine Kier MD

Introduction: With significant advances in cystic fibrosis (CF) clinical care, median predicted age of survival is 37.8 years and 49% of CF patients in the US are adults. With changing demographics, transition to adult CF Care Centers are encouraged. Identification of problems unique to CF adults have been noted including diabetes, bone disease and psychosocial issues (ie: depression). There has been a great interest to probe into these emerging issues that may dictate treatment approaches and affect quality of life. Recent studies have assessed the safety of this process and readiness of adult CF patients to these changes.

Objective: The aim of our study is to assess the level of independence and personal health responsibility in CF teens and adults.

Method: We developed a questionnaire focusing on 4 domains: psychosocial, nutrition, sleep, exercise. During CF outpatient visits, patients 12 years and older completed the questionnaire to identify lifestyle, needs and to determine level of independence. Independence markers were examined including current residence, means of transportation, ability to shop/prepare own meals, education and employment status. Personal health responsibility were examined including nutrition, exercise, sleep hygiene, and enzyme administration.

Results: To date, 22 surveys are completed - age range 12 to 52 years, median age of 19 years, 55% male, 73% Caucasian and 82% at least reached high school.

For independence markers, 91% continue to live with their parents, 71%of parents still shop for and prepare their meals, although 81% of those age appropriate patients drive and 68% have a current or prior history of employment.

For personal health responsibility, 80% always take their enzymes with meals. Though, 40% often skip meals because of no appetite and/or busy schedule. All patients eat at least 1 snack per day and eat vegetables daily, 71% patients eat at least one fruit daily. Forty-three percent drink sweetened beverages, soda or juice multiple times per day. Thirty-five percent engage in regular physical exercise and 82% of the patients are well rested with no sleep complaints.

Conclusion: Preliminary data reveal that our CF patients aged 12 to 52 years have a delay in independence. Majority live with their parents who shop and prepare their food. They do not demonstrate personal health responsibility. Patients skip meals, make poor eating choices and minimally exercise. These findings may have implications on quality of life and may accelerate progression of disease. This initial assessment is helpful in our next steps comparing CF with other chronic diseases as they transition to adulthood, examine the causes for delay in independence and lack of prioritizing their personal health responsibility. We plan to analyze subgroups by different age strata and socioeconomic status, and establish correlations as we collect more data. Specific and streamlined educational programs will be developed in the future to effectively and appropriately address the identified problems.

ABSTRACT 23

The food additive Potassium Bromate inhibits cell cycle progression and induces cell death in intestinal epithelial cells

Michelle Tobin MD, Leahana Rowehl MS, Anupama Chawla MD, Grace Gathungu MD

Background: Increased epithelial permeability is observed in both Crohn's disease patients and in their healthy asymptomatic first degree relatives. However, gut permeability can be increased physiologically in response to luminal nutrients or pathogens. Lipopolysaccharide (LPS), a bacterial endotoxin, induces innate immune response and mucosal hyperpermeability in vivo. It serves as a mediator in inflammation in IBD. Potassium bromate (KBrO3), an oxidizing agent used to enhance food, cosmetic byproducts and disinfect water is neurotoxic, nephrotoxic and carcinogenic in animal studies. We explored KBrO3 as a potential trigger of intestinal inflammation. We have shown (unpublished data) that KBrO3 decreases transepithelial electrical resistance (TEER) on co-cultured intestinal epithelial cells (IECs) and increased the release of proinflammatory cytokines after 24hours of treatment in a dose dependent fashion. Cytokine release was enhanced with the addition of LPS. Interestingly, KBrO3 at higher doses showed a marked decrease in cytokine expression. We therefore proposed that KBrO3 induces IECs apoptosis.

Objective: To examine the cytotoxic effect of KBrO3 on intestinal epithelial cells.

Methods: Co-cultured human CaCo2-BBE and HT29 cell lines were grown to confluence for 14 days until the establishment of polarized epithelial monolayer. Cells were treated with KBrO3 0.5, 1, 5 and 10mM for 24hours. Proliferation and cellular viability was measured using AlamarBlue Reagent and an MTT assay. RNA was extracted from the IECs. Primers were designed for the P21 gene and verified using Primer-BLAST. Gene expression of p21 was determined by real time Polymerase Chain Reaction. Statistical analysis was conducted using repeated measures analysis of variance on Graph pad prism.

Results: Percentage of cellular proliferation decreased and percentage of cell death increased following treatment with KBrO3 in a dose dependent fashion. Expression of p21 increased and was significantly elevated following treatment with high doses of KBrO3 ($p=0.0009$). There was no synergistic effect on p21 expression with the addition of LPS.

Discussion: This in vitro human IECs model demonstrates that KBrO3 alters cellular proliferation and increases cellular toxicity in a dose dependent fashion. Increased expression of p21 due to KBrO3 treatment suggests that this food additive leads to arrest of cell cycle progression possibly through the mechanism of oxidative DNA damage. This process is not enhanced with the addition of LPS. We are examining the expression and distribution of thigh junctions at the protein level to further understand the role of KBrO3 in cell permeability and alteration of the intestinal epithelial barrier.

ABSTRACT 24

Kwashiorkor in upper middle class suburbia

Michelle Tobin MD, Denease Francis MD, and Anupama Chawla MD

Background: Malnutrition, kwashiorkor, is a major cause of death worldwide among children below 5 years. Previously a disease of the developing country is now in patients in the developed world due to faddism, or presumed food allergy. We describe a patient with kwashiorkor fed rice milk.

Case: An 11-month old Caucasian male with a 3-day history of progressively worsening generalized edema, decreased intake, and rash. He had not gained weight for 4 months. He drank Rice Dream and some pureed foods. Patient was exclusively breast fed for 6 months then took formula. He tried multiple formulas which caused gassiness and rash. He was seen by two allergists and diagnosed with dairy, soy, and sesame allergies. He was placed on rice milk.

On physical exam patient was irritable with a diffuse maculopapular rash, scattered vesicles and desquamation on the bilateral lower extremities and buttocks. A lacy erythematous papular rash was on the trunk. Patient had pitting edema of the extremities, scrotum, and periorbital region. He had hypoalbuminemia(1.4 g/dL), anemia(7.8g/dL), zinc (37) and copper deficient(43), and elevated liver enzymes(AST 144, ALT 448). Abdominal ultrasound demonstrated ascites with small bilateral pleural effusions.
While hospitalized, he received Albumin and nasogastric feeds with Elecare, zinc supplementation and a multivitamin. His edema and rash improved. He was discharged home on hospital day 6. Eight weeks later showed an average weight gain of 11 grams daily.

Discussion: Kwashiorkor is characterized by severe malnutrition, hypoalbuminemia, edema, irritability, and a rash. It is commonly reported in Africa and other developing countries and quite rare in the United States. Due to faddism, presumed food allergy or ignorance this condition is resurging, reported in infants receiving rice milk as their major source of nutrition.

Rice milk is an alternative treatment for milk protein allergy (MPA). However, not all products have the same nutritional value. A recent study, Vandenplas et al. (2014) examined 39patients with MPA fed an extensively hydrolyzed rice protein based formula called Novarice (21.9 calories and 0.6grams of protein per ounce), compared to typical infants formulas (20calories and 0.5g of protein per ounce). Results revealed normal growth in these patients. Novarice is available in Europe. Patients on rice based milk in our country drink Rice Dream milk (15 calories and 0.13g of protein per ounce). Its nutritional composition does not resemble that of other formulas. Infants who ingest this milk are at high risk of developing kwashiorkor with other nutritional deficiencies including zinc and copper like our patient.

It is clear from this case and others that consumers (parents and patients) and health care providers need educations on commercially available products as they are not nutritionally alike. Translating an evidence based study on the benefits of fortified rice milk into clinical practice needs to be performed cautiously since not all rice milk products are nutritionally alike.