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Joseph Bliss, MD, PhD  
Sharon Smith, MD

### Nominations Committee
Heber Nielsen, MD (Chair)

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Sharon McGrath-Morrow, MD  2009-2013  
Sharon Smith, MD  2009-2013  
Kirsten Bechtel, MD  2009-2013  
Iraj Rezvani, MD  2009-2013  
Kate G. Ackerman, MD  2010-2014  
Jason Z. Stoller, MD  2010-2014

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1996–1999  Ira H. Gewolb, MD  
1993–1996  Alan R. Fleischman, MD  
1991–1993  Marc Yudkoff, MD  
1989–1991  Joseph B. Warshaw, MD  
1988–1989  Laurence Finberg, MD

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Dear Colleagues,

Welcome to the 23rd Annual Meeting of the Eastern Society for Pediatric Research (ESPR) and to our host city of Philadelphia, the Cradle of Liberty!

The Eastern Society for Pediatric Research Council and Planning Committee are confident that you will enjoy our exciting program. Highlights include State-of-the-Art Plenary Talks and the highly popular Lunch with the Professor educational program for trainees, which has been expanded to cover two pertinent topics. High-quality original research is presented in subspecialty platform sessions with leading clinical and scientific authorities moderating the presentations and in two poster sessions.

The goals of the Eastern SPR Annual Meeting are to create a forum where: i) young investigators can present their research in a structured yet relaxed atmosphere, ii) regional clinicians can be exposed to cutting edge clinical and basic science, iii) timely educational programs addressing important topics in Pediatrics are presented and iv) trainees are able to interact with senior investigators and clinicians in an informal setting.

The continued success of our previous meetings has enabled an entirely web-based system for membership, registration and payments, in making timely announcements, in enhanced room booking services, and for the improvement in the overall ease of running the meeting. In addition, we again have centralized informatics enabling presenters to load their slide-show in advance at a speaker-ready station.

ACKNOWLEDGEMENTS: The organization of this meeting would not have been possible without the help of the administrative offices of the American Pediatric Society (APS) and the Society for Pediatric Research (SPR). We are especially grateful to: Debbie Anagnostelis (Executive Director), Kathy Cannon, Belinda Thomas, Jesse Osman and Lisa Thompson. We also recognize the energetic efforts of the Eastern SPR Planning Committee and Council Members for their guidance and vision in selecting this new venue and the efforts of Tulane University in New Orleans as our 2011 sponsor for the CME program. In addition, we thank various members of the regional pediatric community for reviewing the submitted abstracts and for moderating our platform sessions. Lastly, our corporate and leading academic sponsors were instrumental in making this meeting possible.

Most of all, we want to thank you for attending and for contributing your wisdom and experience in the pursuit of excellence. We hope that you enjoy and profit from the meeting, and look forward to your continued participation in future meetings!

Sponsorship Honor Roll

The ESPR would like to express appreciation to the following companies for their support:

**Corporate Sponsors**
- Abbott Nutrition
- Mead Johnson Nutrition

**Display Tables**
- Abbott Nutrition
- Cornerstone Therapeutics
- Ikaria
- Nutricia
- Pediatrix Medical Group

Help support our exhibitors by visiting their booths during these hours:
- Friday: 6:00 pm - 7:30 pm
- Saturday: 7:30 am - 8:30 am, 10:30 am - 10:45 am, 4:00 pm - 4:15 pm, 6:00 pm - 7:30 pm
- Sunday: 7:45 am - 8:30 am, 9:30 am - 9:45 am

**Academic Sponsors**
- Clifford W. Bogue, MD
  Yale University School of Medicine
  New Haven, CT
- Paul H. Dworkin, MD
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  Hartford, CT
- Margaret M. McGovern, MD, PhD
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  Stony Brook, NY
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  Albert Einstein College of Medicine,
  The Children’s Hospital at Montefiore
  Bronx, NY
- Teresa Quattrin, MD
  State University of New York at Buffalo
  Buffalo, NY
- John R. Schreiber, MD, PhD
  Floating Hospital for Children at Tufts Medical Center
  Boston, MA

Lawrence Nogee, MD
President

Edmund F. La Gamma, MD, FAAP
Secretary

George Porter, Jr., MD, PhD
Chair, Planning Committee
RECOGNITION OF NEW MEMBERS

The Council of the Eastern Society for Pediatric Research would like to recognize the following new members who have joined the society within the last year.

Membership in the Society reflects not only peer recognition of research achievements in pediatrics, but continuing commitment to pediatric research and fostering the career development of the next generation of pediatric researchers. The Council and Society members welcome active participation in the organization. Like our parent organization, the Eastern SPR seeks to promote the generation of new knowledge, the professional growth of the current and next generation of academic pediatricians, and the translation of research discoveries into treatments that will benefit children worldwide. We believe that membership and active participation in the Eastern Society for Pediatric Research can meaningfully contribute to professional success as an academic pediatrician.

To celebrate this achievement, new members will be recognized at the Opening Reception on Friday, March 25, 2011. Once again, congratulations and welcome to the Eastern Society for Pediatric Research.

Marc Auerbach, M.D., Yale University School of Medicine
Timothy Baba, M.D., Ph.D., Floating Hospital for Children at Tufts Medical Center
Helen Christou, M.D., Brigham and Women’s Hospital, Harvard Medical School
Caroline Chua, M.D., Geisinger Medical Center
Diva De Leon, M.D., The Children’s Hospital of Philadelphia
Roberta DeBiasi, M.D., Children’s National Medical Center
Gary Emmett, M.D., Thomas Jefferson University Hospital
Evan Fieldston, M.D., MBA, MSHP, The Children’s Hospital of Philadelphia
Joanna Floros, Ph.D., Penn State College of Medicine
Mamta Fuloria, M.D., Montefiore Medical Center of the Albert Einstein College of Medicine
Maida Galvez, M.D., MPH, Mount Sinai School of Medicine
David Greenberg, M.D., Sanofi Pasteur
Andrea Gropman, M.D., Children’s National Medical Center
Hasan Jafri, M.D., MedImmune
Murli Purswani, M.D., Bronx-Lebanon Hospital Center
Lisa Saiman, M.D., MPH, Columbia University
Samir Shah, M.D., MSCE, The Children’s Hospital of Philadelphia
Charles Stanley, M.D., The Children’s Hospital of Philadelphia
Alfin Vicencio, M.D., Cohen Children’s Medical Center of New York
Clyde Wright, M.D., The Children’s Hospital of Philadelphia
Meeting Services & CME Accreditation

Registration and CME Desk Hours
Registration will be held on the 3rd floor. Registration hours are as follows:
Friday, March 25 4:00pm - 7:00pm
Saturday, March 26 7:30am - 7:30pm
Sunday, March 27 7:30am - 1:00pm

Abstract Publication
All abstracts being presented at the 2011 Eastern SPR Annual Meeting are printed in this Program Guide, beginning on page 15.

Audio/Visual Information
All oral presentations must be made using PowerPoint. Computers and LCD projectors will be provided. Presenters should have submitted their presentations in advance, are still required to check in at Speaker Ready.

Speaker Ready (Chamber Board Room 4th floor)
Presentations will be loaded onto a central computer during the session prior to the session in which the presentation is to be made (i.e., Friday evening for Saturday morning presentations. Saturday morning for Saturday afternoon presentations, and Saturday afternoon for Sunday morning presentations). Please also bring your CD-ROM, ZIP drive or flash memory.

Business Center
The Business Center at the Doubletree Philadelphia is located on the 3rd floor.

Statement OfNeed
Research and technology are changing rapidly in medicine and it is important for physicians and healthcare professionals to critically evaluate the emerging developments. Physicians and healthcare professionals in pediatrics need to increase their competence in discerning which of the emerging research and technologies are applicable to their patient populations. Discussions and debates on these emerging data stimulate the development of new guidelines, appropriateness criteria and evidence-based changes in medical practice.

The ESPR annual meeting provides a forum for young investigators to share their translational and clinical research with mentors and senior investigators. This gives the junior investigators important feedback in a non-threatening environment, provides for critiques and opportunities to improve the presentation before presenting on a national stage, and fosters mentoring from senior investigators.

The senior investigators benefit from this educational format by engaging in discussions on how to translate the research into practice, debates on how the new information supports or discards the “old” information, and assists in the design of possible new research options and extensions.

The Eastern Society for Pediatric Research Annual Meeting addresses:
1. Young investigators need to increase their competence and performance in presenting their research in a structured yet relaxed atmosphere.
2. Regional clinicians need to increase their competence in evaluating and designing strategies to incorporate cutting edge clinical and basic science into practice.
3. Trainees need to increase their competence and performance in establishing collaborative relationships with mentors to address the barriers which may be interfering with research development.

Target Audience
Physicians within the pediatric specialties, internal medicine, family medicine.
Non-physicians: Scientific researchers in both translational and clinical research in pediatrics. Healthcare professionals engaged with the pediatric population.

Overview And Objectives
The overall goal of this meeting is to improve patient care by increasing learner competence in evaluating the emerging translational and clinical research in pediatrics and determining parameters for expansion and modification of promising research developments while fostering the preliminary research of young investigators.

Learner Objectives: At the conclusion of this educational activity, the participant should be able to:
• Critically evaluate the emerging translational and clinical research.
• Discuss new developments in pathophysiology of human disease with colleagues.
• Identify new areas of investigation which will inform research and improve patient care.
• Develop optimal strategies for clinical investigation and transmission of clinical research results.
• Develop relationships with mentors and peers to address the barriers which interfere with research development.

Predicted Outcomes:
• Determine whether appropriate changes need to be recommended in patient protocols as indicated in the emerging research data.
• Implement new tools for teaching, research and medical practice.
• Apply appropriate evidence based recommendations in my research, teaching and/or medical practice.
• Present research in a national forum.
• Establish collaborations to expand or address barriers which are identified

Accreditation:
Physicians
This activity has been planned and implemented in accordance with the Essentials and Standards of the Accreditation Council for Continuing Medical Education through the joint sponsorship of Tulane University Health Sciences Center and the Eastern Society for Pediatric Research. Tulane University Health Sciences Center is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

Tulane University Health Sciences Center designates this live activity for a maximum of 11.50 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Tulane University Health Sciences Center presents this activity for educational purposes only and does not endorse any product, content of presentation or exhibit. Participants are expected to use their own expertise and judgment while engaged in the practice of medicine. The content of the presentations is provided solely by presenters, who have been selected because of their recognized expertise.

Tulane Disclosure Policy
It is the policy of the Center for Continuing Education at Tulane University Health Sciences Center to plan and implement all of its educational activities in accordance with the ACCME’s Essential Areas and Policies to ensure balance, independence, objectivity and scientific rigor. In accordance with the ACCME’s Standards for Commercial Support, everyone who is in a position to control the content of an educational activity certified for AMA PRA Category 1 Credit™ is required to disclose all financial relationships with any commercial interests within the past 12 months that create a real or apparent conflict of interest. Individuals who do not disclose are disqualified from participating in a CME activity. Individuals with potential for influence or control of CME content include planners and planning committee members, authors, teachers, educational activity directors, educational partners, and others who participate, e.g. facilitators and moderators. This disclosure pertains to relationships with pharmaceutical companies, biomedical device manufacturers or other corporations whose products or services are related to the subject matter of the presentation topic. Any real or apparent conflicts of interest related to the content of the presentations must be resolved prior to the educational activity. Disclosure of off-label, experimental or investigational use of drugs or devices must also be made known to the audience.

How To Obtain Your AMA PRA Category 1 Credits™
Tulane and the Eastern Society for Pediatric Research are now using a secure electronic format for evaluation and credit verification. The evaluation remains anonymous but the link does allow you to give us your contact information which will be incorporated into the Certificate of Credit.

At the conclusion of the conference on Sunday, you will be sent a link to an electronic evaluation and credit verification form. If you do not receive this in your inbox on Sunday afternoon, check your spam/junk mailbox. You can contact cme@tulane.edu if you did not receive it and Tulane will send you another link for claiming your credits.

You will receive your certificate of credit by Wednesday, April 29, 2011. If you do not receive it by then, please notify Tulane University at cme@tulane.edu.

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You will receive your certificate of credit by Wednesday, April 29, 2011. If you do not receive it by then, please notify Tulane University at cme@tulane.edu.
### Eastern SPR Schedule-at-a Glance

#### Doubletree Philadelphia
March 25-27, 2011

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Friday, March 25, 2011

Poster Session I

General Pediatrics

6:00 PM-7:30 PM Symphony Ballroom

1. The Association of Vitamin D Deficiency and Asthma Severity in Children
   Archana Mehta, Janelle Sher, Mary J. Ward, Melanie Wilson-Taylor.
   – Abstract 1

2. The Impact of Teaching Metered-Dose Inhaler Administration to Residents and Medical Students
   Sharyn H. Miskovitz, Jason Fletcher, Sandra F. Braganza.
   – Abstract 2

3. Edinburgh Postpartum Depression Scale Score among Mothers of Infants in the NICU
   Cynthia O. Isedeh, Emily Valentino, Emelynn J. Fajardo, Sandra Rudnitzky, Ben H. Lee.
   – Abstract 3

4. Postpartum Depression Screening Program – The Attitudes and Acceptance of Pediatric Care Providers
   Sandeep K. Sadasiv, Kerry Kauffman, Andy C. Wang, Michael Janezcko.
   – Abstract 4

5. What Is My Neighborhood? Using Travel Patterns by Urban Minority Children and Their Families To Define Neighborhood
   Leigh S. Goldstein, Maida P. Galvez, Susan Teitelbaum, Kathleen McGovern, Mary S. Wolff, Barbara Brenner.
   – Abstract 5

6. Can Postnatal Weight Loss Predict Early Onset Neonatal Hyperbilirubinemia?
   – Abstract 6

7. Perceptions of English and Spanish-Speaking Caregivers about the Role of Pediatricians in Community Violence Prevention Counseling
   Mario Cruz, Raphael Rom, Saskia Spiess, Salmon Farsi, Daniel Taylor.
   – Abstract 7

8. Relationship between Health Literacy and Body Mass Index
   Roopa Chari, Joel Warsh, Tara Ketterer, Adam Badaczewski, Iman Sharif.
   – Abstract 8

9. Performance of the NVS and STOFLA in Children
   – Abstract 9

10. Preliminary Validation of the Newest Vital Sign in School-Aged Children
    Joel Warsh, Adam Badaczewski, Iman Sharif.
    – Abstract 10

11. Clearing the Air: Outdoor Fine Particulate Matter and Costs of Infant Bronchiolitis Hospitalizations
    Perry E. Sheffield, Angkana Roy, Kendrew Wong, Leonardo Trasande.
    – Abstract 11

12. Using Audience Response Systems To Determine Gaps in Pediatric Environmental Health Knowledge
    – Abstract 12

13. Developing a Best Practices Algorithm To Minimize Infant Risk of Bilirubin Encephalopathy
    Melissa A. Schneider, Claire Hoppenot, Gary A. Emmett.
    – Abstract 13

14. Are We Communicating with Primary Care Providers? – Assessment after Initiation of a Pediatric Hospitalist Program
    Sheila Liewehr, Lindsey Douglas.
    – Abstract 14

15. Pre-Menarchal Girls’ and Parents’ Perceptions about Urogenital Symptoms: Causes and Associations
    Cynthia W. DeLago, Carmen V. Vazquez, Claudia Clarke, Esther Deblinger, Martin Finkel.
    – Abstract 15

16. Health, Obesity, and Environment in East Harlem, NY
    Maida Galvez, Lawrence C. Kleinman, Carol Horowitz, Nita Vangeeppuram, Michelle Ramos, Thalia MacMillan.
    – Abstract 16

17. Mexican Children in East Harlem, NY Have Distinct Diet and Activity Behaviors Compared to Other Hispanic Children
    – Abstract 17

18. A Comparison of Dietary and Physical Activity Behaviors in New York City Children from Different Ethnic Minority Subgroups
    Nita Vangeeppuram, Nancy Mervish, Susan L. Teitelbaum, Maida P. Galvez, Barbara Brenner, Mary S. Wolff.
    – Abstract 18

Cardiovascular & Critical Care

19. Duration of Central Venous Line Is Not Associated with Increased Deep Venous Thrombosis in Critically Ill Children
    E. Vincent S. Faustino, Sheila J. Hanson, Karla A. Lawson, Renee A. Higgenson.
    – Abstract 19

20. Coronary Complications in Children with Kawasaki Disease in Association with Time of IVIG Treatment
    Deepa Prasad, Aswine Bal, Maria UmaliPamintuan, Elizabeth MannenPrasad, Anna Petrova.
    – Abstract 20

21. Cardiac Effects of CNS Stimulants in Patients with ADHD: Comparing the Recommendations of the American Heart Association with the American Academy of Pediatrics
    Deepak Patel, Karen Carpenter, Robert Escalera.
    – Abstract 21

22. Mitochondrial Function Is Limited in the Early Embryonic Heart Due to a Dysfunction in Complex I
    – Abstract 22

Neurobiology

23. Src Kinase-Mediated Mechanism of CREB Protein Phosphorylation during Hypoxia in Neuronal Nuclei of Newborn Piglets
    Cindy Soon, Simran Ablwawala, Anli Zhu, Om P. Mishra, Maria Delivoria-Papadopolous.
    – Abstract 23

24. Effect of Hypoxia on Caspase-3 Activation Following Src Kinase Inhibition in the Newborn Piglet Brain
    Amit M. Mukhia, Kirstie Marcello, Lynn Fuchs, Om P. Mishra, Maria Delivoria-Papadopolous.
    – Abstract 24

25. Mechanism of Increased Expression of CaM Kinase IV during Hypoxia in the Neuronal Nuclei of the Cerebral Cortex of Newborn Piglets
    Leslie A. Ridall, Qazi Ashraf, Amit Mukhia, Om P. Mishra, Maria Delivoria-Papadopolous.
    – Abstract 25
Effect of Neuronal Nitric Oxide Synthase (nNOS) Inhibition during Hyperoxia on Expression of CaM Kinase IV in Neuronal Nuclei of the Cerebral Cortex of Newborn Piglets
Janice Hobbs, Lynn Fuchs, David Fralingher, Om P. Mishra, Maria Deloviria-Papadooulos. – Abstract 26

Effect of Neuronal Nitric Oxide Synthase (nNOS) Inhibition during Hyperoxia on Expression of CaM Kinase-Kinase in Neuronal Nuclei of the Cerebral Cortex of Newborn Piglets
Janice Hobbs, Jarle Stone, Qazi Ashraf, Om P. Mishra, Maria Deloviria-Papadooulos. – Abstract 27

Mechanism of Tyr™ Phosphorylation of Calmodulin during Hyperoxia in the Newborn Brain
Justin R. Buland, Kirstie Marcello, Nicholas Obiri, Om P. Mishra, Maria Deloviria-Papadooulos. – Abstract 28

Effect of Chronic Postnatal Inflammation on Somatic and Brain Growth in Mice
Shadi N. Malaeb, Jonathan M. Davis, Olaf Dammann, Maribel Rios. – Abstract 29

Hypothermia Attenuates Hypoxic Neuronal Insults in C Elegans
Saima Aftab, Robert Kalb. – Abstract 30

Amplitude EEG (aEEG) Response during Surgical Ligation (SL) of a Patent Ductus Arteriosus (PDA) in Preterm Infants (PI) Is a Potential Measure of Pain Control
Ericalyn Kasdorf, Murray Engel, Jeffrey M. Perlman. – Abstract 31

Evaluation of Use and Parental Perception of In Disease Symptoms with Complementary and Alternative Medication in Patients with Attention Deficit Hyperactivity Disorder Currently Undergoing Conventional Treatment
Monideep Dutt, Jose Serruya, Arati Reddy, Louis Primavera, Fernanda Kupferman, Rusly Harsono, Kanchana Roychoudhury, Susana Rapaport, Partha Chatterjee. – Abstract 32

Traditional Pulmonary Function Testing Interpretation Underestimates Obstructive Airway Disease by Ignoring the Small Airway
Patricia Visbal Edmondson. – Abstract 33

Younger Infants with RSV Bronchiolitis: Should We Admit Them?
Gaston I Zylberg, Ramkumar Natarajan, Fernanda Kupferman, Lily Q. Lew, Susana Rapaport, Rusly Harsono. – Abstract 34

Novel Use of the Audience Response System To Improve Adherence to Transmission Precautions
Lisa Saiman, Lauren D. Rosenberg. – Abstract 35

Severity of Illness and Use of the ‘Medical Home’ during the First vs. Second Waves of 2009 Influenza a (H1N1) in a Pediatric Healthcare Facility
Saul R. Hymes, Amanda Buet, J. Scott Baird, Jonathan Sury, Patricia DeLaMora, Lisa Saiman. – Abstract 36

Increased LDL-Cholesterol (LDL-C) in HIV-Infected Children on Highly Active Antiretroviral Therapy (HAART)
Prabi Rajbhhandari, Sudeshan Subedi, Stefan Hagmann, Murlii Purswani, Milred Maldonado. – Abstract 37

Racial Variation in RSV Immunoprophylaxis
Erika F. Dennis, Corrine Fager, Scott A. Lorch. – Abstract 38

Role of CXCR2 and Heparan Sulphate Proteoglycan in CXCL5-Regulated Chemokine Clearance and Lung Inflammation
Junjie Mei, Ning dai, Yuhong Liu, Samithamy Jeyaseelan, Janet S. Lee, G. Scott Worthen. – Abstract 39

Less Is More: Cost Savings of Fluid Restriction in Transient Tachypnea of the Newborn
Annemarie Stroustrup, Leonardo Trasande, Ian R. Holzman. – Abstract 40

Effect of Perinatal Prophylaxis for Group B Streptococcus on Severity of Transient Tachypnea of the Newborn
Annemarie Stroustrup, Roxane Perez, Elissa DeLorenzo, Ian R. Holzman. – Abstract 41

The Development of a Decision-Aid To Guide Counseling of Parents Facing Imminent Extreme Premature Delivery
Ursula Guillen, Sanghee Sub, David Munson, Michael Posenec, Elissa Truitt, John Zupancic, Amiram Gafni, Haresh Kirpalani. – Abstract 42

Placental Transfusion Strategies in Preterm <1000 g BW: Meta-Analysis of Short and Long Term Outcomes
Sarvin Ghavam, Dushyant Batra, Helke Rabe, Mercer Judith, Kugelman Amir, Hosono Shigeharu, Haresh Kirpalani. – Abstract 43

Age Dependent Inter-alpha Inhibitor Protein (IAIP) Concentration in Plasma and Expression in Ovine Liver, Kidney and Heart
Mariya Spasova, Grazyna B. Sadowska, Yow-Pin Lim, Barbara S. Stonestreet. – Abstract 44

Transient In Utero Knockout (TIUKO) of the Cystic Fibrosis Transmembrane Conductance Regulator (CFTR) Gene Results in Gut Immaturity and Inflammation in Adult Sprague-Dawley Rats
John J. Tadros, Shetal I. Shah, Craig Cohen. – Abstract 45

Real-Time Cerebral, Splanchnic, and Renal Near-Infrared Spectroscopy (NIRS) in Very Low Birthweight Neonates: An Analysis of Baseline Variability
Jonathan P. Mintzer, Joseph Dayan, Monique Gardner, Michelle Master, Michael Chelala, Gad Alpan, Edmund F. LaGamma, Boriana Parvez. – Abstract 46

Complications Associated with Peripherally Inserted Central and Non-Central Catheters in the Newborn Intensive Care Unit
Kathryn E. Colacchio, Yanhong Deng, Veronika Northrup, Matthew Bizzarro. – Abstract 47

Breastmilk Science: Critical Review of Publications over the Last 30 Years
Angela Mulkherjee, Celia Thomas, Sheila Mak, Nancy Mejias-Cepeda, Ben H. Lee. – Abstract 48

Increased Odds of Mechanical Ventilation at 36 Weeks Gestation: Gestational Age Paradox
Romal K. Sekhon, Amy B. Mackley, David A. Paul. – Abstract 50

Red Blood Cell Storage Time and Morbidities of Prematurity
Jonathan R. Swanson, Elias Matta, Catherine Sawtell, Charles Matarazzo, Ben Lee. – Abstract 51

Late Preterm Infants’ Skill at First Oral Feeding Predicts Length of Hospital Stay
Kiran Bhat, Chantal Lau, Richard J. Schanler. – Abstract 52

Enhancement of Accuracy of the Umbilical Vein Catheter Tip Localization: Using Echocardiography and X-Rays
Aanoo Pulikal, Pradeepkumar Charlagorla, Sbesian Tume, Ali Nadroo, Manoj Chabra. – Abstract 53
Saturday, March 26, 2011

Neonatology - Pulmonary I

Platform Session

8:15 AM-10:30 AM Overture

Moderator: Phyllis Dennery, MD

8:15 AM Generation of Mice with Lung-Specific Expression of Nuclear Heme Oxygenase-1
Fumihiko Namba, Ping La, Amal P. Fernandez, Guang Yang, Phyllis A. Dennery. – Abstract 59

8:30 AM VEGF Heparin-Binding Isoform Attenuates Hyperoxia Via Neurupilin-1 in Explanted Embryonic Lung
Americo E. Esquibies, Alia Bassy-Asaad, Lloyd G. Cantley. – Abstract 60

8:45 AM S-Nitrosylation of Surfactant Protein-D Upregulates C-C Chemokine Ligand 2 (CCL-2) Expression in Macrophages
Rania El-Khawam, Changjiang Guo, Andrew Gow. – Abstract 61

9:00 AM Neonatal Hyperoxia Restricts Somatic Growth, Induces Chronic Lung Disease (CLD) & Pulmonary Hypertension (PH) in Adult Mice
Vasanth H. Kumar, Huaimei Wang, Daniel D. Swartz. – Abstract 62

9:15 AM NF-κB Is Essential in Regulating Rev-erba Promoter Activity in Hyperoxia
Guang Yang, Haiyan Xiao, Maurice D. Hinson, Ping La, Qing S. Lin, Clyde J. Wright, Phyllis A. Dennery. – Abstract 63

9:30 AM Angiogenesis in Neonatal Hyperoxic Lung Injury
Anne Chetty, Gong-jie Cao, Heber C. Nielsen. – Abstract 64

9:45 AM miR-221 and miR-130 Regulate Hox Genes Controlling Vascular and Epithelial Morphogenesis in Developing Lung
Sana Mujahid, Heber C. Nielsen, MaryAnn V. Volpe. – Abstract 65

10:00 AM Neonatal Hyperoxia Leads to Arrested Lung Development with Absent Compensatory Lung Growth in Adult Mice as Measured by Radial Alveolar Count (RAC)
Vasanth H. Kumar, Huaimei Wang, Rita M. Ryan. – Abstract 66

10:15 AM Hox Control of Vasculogenesis in Developing Mouse Lung
Thanhvuong Vong, Sana Mujahid, Heber C. Nielsen, MaryAnn V Volpe. – Abstract 67

GI / Hematology - Oncology / Nephrology / Nutrition

Platform Session

8:15 AM-10:30 AM Maestro B

Moderator: Susan Furth, MD, PhD

8:15 AM Changes in Vitamin D Status in Incident Pediatric Crohn Disease
Aaron R. Prosnitz, Mary B. Leonard, Justine Shults, Babette S. Zemel, Bruce W. Hollis, Robert N. Baldassano, Meena Thayu. – Abstract 77
Saturday, March 26 continued

8:30 AM  Preliminary Results of Phase II/III Study of Clofarabine (CLO) in Combination with Cytarabine (ARA-C) and Total Body Irradiation (TBI) Followed by Allogeneic Stem Cell Transplantation (alloSCT) in Children, Adolescents and Young Adults (CAYA) with Poor-Risk Acute Leukemia
Angela Ricci, Mark Geyer, Lauren Harrison, Diederie Duffy, Monica Bhattacharya, James Garvin, Diane George, Prakash Satwani, Alexa Cheever, Julie Talano, M. Feizi Ozyaynak, Theodore Moore, Joseph Schwartz, LeeAnn Baxter-Lowe, Mitchell S. Cairo. – Abstract 78

8:45 AM  Are Children with Elevated Body Mass Index at Increased Risk for Gastroesophageal Reflux? A Community-Based Study
Sowmya Angusamy, Babu Bangaru, Luis Primavera, Rapaport Susana, Fernandez Kupferman. – Abstract 79

9:00 AM  Thyroid Dysfunction in Children with Immune Thrombocytopenia (ITP)
Jennifer Hughes, Zoltan Antal, James Hurley, Mary J. James, James Bussell. – Abstract 80

9:15 AM  Bone Mineral Metabolism in Pediatric Kidney Transplant Recipients
PJ Galutira, S. Bessei, N. Samanti-Gaffney, M. DelRio, B. Goilav. – Abstract 81

9:30 AM  Coordinated Synthesis of Heme and Iron-Sulfur Clusters in Mammalian Cells: Implications for Cell Function
Ping La, Phylis A. Deneney. – Abstract 82

9:45 AM  Pediatric Pharmacokinetics (PK) of IV Busulfan (Bu) in Allogeneic Stem Cell Transplantation (alloSCT) Recipients: Dosing q12 Hours Schedules Are Safe and Comparable to q6 Hours Schedules
John LeGall, Michael Milone, Ian Waxman, Les Shaw, Lauren Harrison, Diederie Duffy, Olga Militano, Monica Bhattacharya, Prakash Satwani, Diane George, James H. Garvin, M. Brigid Bradley, Carmella van de Ven, Mitchell S. Cairo. – Abstract 83

10:00 AM  GA101, a Type II Glycoengineered Antibody Against CD20 Induces Significant In Vitro Cell Death of PreB-ALL (PBALL) and PreB Lymphoblastic Lymphoma (PLBLL)
Christina Cho, Janet Ayello, Andrew Stier, William Quish, Mitchell S. Cairo. – Abstract 84

10:15 AM  Vitamin D Levels and Bone Density of Children with IBD: Experience of a Pediatric Digestive Disease Center in Northern Virginia
Vahe Badalyan, Stacie Townsend, Samantha Fish, Ian Leibowitz. – Abstract 85

9:15 AM  Do Questions about Parent Concerns Provide Adequate Surveillance?
Emily N. Neger, Shela Merchant, Brandi S. Henson, R. Christopher Sheldrick, Ellen C. Perrin. – Abstract 90

9:30 AM  Comparison of Anthropometric Measures in the Longitudinal Assessment of Fat Mass
Thao-Ly T. Phan, Michelle M. Maresca, Hossain Jobayer, George A. Datto. – Abstract 91

9:45 AM  Improving Response Rate for Mailed Pediatric Questionnaires: Effect of Cover Letter Tone and Literacy Level
Andrew Adesman, Alison Cohn, Nina Kohn, Helen Papaiannou, Ruth Milanaik. – Abstract 92

10:00 AM  Development and Initial Validation of the Preschool Pediatric Symptom Checklist (PPSC)
Shela Merchant, Brandi S. Henson, R. Christopher Sheldrick, Ellen C. Perrin, J. Michael Murphy. – Abstract 93

10:15 AM  Doing the FDA’s Bidding: Off-Label Pediatric Drug Studies in the Medical Literature
Douglas Nassif, Luis Gamboa, Priya Bhasker, Susannah Olness, Karen Carpenter. – Abstract 94

General Pediatrics - Vulnerabilities Platform Session

8:15 AM-10:30 AM  Maestro A
Moderator: David Listman, MD

8:15 AM  Urine STD Screening of Pediatric Patients Presenting to the Emergency Department with Behavioral/Psychiatric Complaints. Are They at High Risk of Infection?
David A. Listman, Ashmita Monga, Jennifer Goodrich. – Abstract 95

8:30 AM  Impact of Shared Decision Making on Behavioral Impairment among US Children with Special Health Care Needs
Alexander Fiks, Russell Localio, Stephanie Mayne, Evaline Alessandrini, James Guevara. – Abstract 96

8:45 AM  Utilization of Onsite Domestic Violence Services at a Pediatric Hospital: A 4-Year Review
Mario Cruz, Patricia B. Cruz, Ryan McGorty, Maria D. McColgan. – Abstract 97

9:00 AM  Association of Shared Decision Making with Health Care Expenditures and Utilization among US Children with Special Health Care Needs
Alexander G. Fiks, Stephanie Mayne, James P. Guevara, Evaline Alessandrini, Russell Localio. – Abstract 98

9:15 AM  Cervical Dysplasia in Immunocompromised vs. Immunocompetent Adolescents
Amanda M. Jacobs, Melissa J. Fazzari, Susan M. Coupey. – Abstract 99

9:30 AM  Suicidal Ideation and Intent in a Community Sample of Preadolescent Youth: A Case-Control Study
Marcel Giannetta, Nancy Brodsky, Laura Betancourt, Matthew B. Wintersteen, Hallam Hurt. – Abstract 100

9:45 AM  Maternal Factors Associated with Medicaid/SCHIP Renewal for Low-Income, Minority Children
Omolara A. Thomas, Melissa S. Stockwell, Dodi Meyer. – Abstract 101

10:00 AM  Improving Teacher Knowledge of Safety in Preschoolers
Michael A. Ferguson, Nancy Miller, Jennifer Friderici, Margaux Frank. – Abstract 102

10:15 AM  Swaddling and Safe Sleeping Practices in an Inner City Population
Barbara A. Kelly, Monique Mondesir, Natalia A. Isaza, Matilde M. Irigoyen. – Abstract 103
Plenary & Asthma Platform Session

Moderator: Alfin Vicencio, MD

8:15 AM - 10:30 AM

An Intronic ABCA3 Mutation Responsible for Respiratory Disease
Amit Agrawal, Aaron Hamvas, F. Sessions Cole, Daniel Wegner, Carl Coghill, Keith Harrison, Lawrence Nogee. – Abstract 104

8:30 AM

Cryptococcus Neoformans-Specific IgA in Bronchoalveolar Lavage Fluid from Children with Poorly-Controlled Asthma
Alfin G. Vicencio, Kalliopi Tsirilakis, Xiaoxiao Lee, Arturo Casadevall, David L. Goldman. – Abstract 105

8:45 AM

Corticosteroid Timing and Length of Stay for Children with Asthma in the ED
Stephanie Davis, Georgia Burke, Emily Hogan, Sharon R. Smith. – Abstract 106

9:00 AM

Composite Clinical Respiratory Disease Scoring Tool: Does It Predict the Need for Hospitalization in Children with RSV Bronchiolitis?
Gaston I Zyliberg, Ramkumar Natarajan, Fernanda Kupferman, Susana Rapaport, Lily Q. Lew, Rusly Harsono. – Abstract 107

9:15 AM

Inhaled Corticosteroids Improve Short-Term Symptoms after a Pediatric Emergency Visit for Asthma: A Randomized Clinical Trial
Esther M. Sampayo, Joey Mechak, Amber Chew, Richard Scarfone, Joseph Zorc. – Abstract 108

9:30 AM

Relationship between Parental Health Literacy and Self-Efficacy with Managing Child Asthma

9:45 AM

The Role of Pre-Operative Pulmonary Function Testing as a Screening Tool in Patients with Adolescent Idiopathic Scoliosis
Gina T. Coscia, Joshua P. Needledman, Lisa S. Ipp, Mary J. Ward. – Abstract 110

10:00 AM

Exercise Improves Lung Function & Habitual Activity in Children with Cystic Fibrosis
Shruti M. Paranjape, Laura A. Barnes, Kathryn A. Carson. – Abstract 111

10:15 AM

Intrauterine Growth Restriction Alters Lung Morphology and Function during Postnatal Growth in Rats
Catalina Bazacliu, Melissa F. Carmen, Satyan Lakshminrusimha, Julie Basu-Ray, Rita M. Ryan, Daniel D. Swartz. – Abstract 112

10:30 AM

Break

Plenary Session I

Moderator: Fraz A Ismat, MD

10:45 AM - 11:45 AM

Plenary Lecture - “Pediatric Workforce: Can Research Impact Policy?”
Gary Freed, MD, MPH, University of Michigan Health System, Ann Arbor, MI

Meet the Professor Lunch

12:00 PM - 1:00 PM

Gary R. Fleisher, MD and Gary L. Freed, MD, MPH

12:00 PM - 1:00 PM

Nuts and Bolts of Writing an IRB Proposal
Iman Sharif, MD, MPH

Eastern SPR Business Meeting

12:00 PM - 1:00 PM

Cardiovascular & Critical Care Platform Session

Moderator: Gary R. Fleisher, MD, Children’s Hospital Boston, Boston, MA

1:10 PM - 4:00 PM

Mentor of the Year Presentation
Fever, Fellows, and Positive Cultures
Gary R. Fleisher, MD, Children’s Hospital Boston, Boston, MA

Young Investigator Presentations

2:00 PM

Validation of a Pediatric Resident Disaster Triage Evaluation Tool
Mark X. Cicero, Antonio Riera, Veronika Norhrup, Fangyong Li, Marc Auerbach, Carl R. Baum. – Abstract 113

2:15 PM

Reiterated Roles for Jun in the Second Heart Field and Neural Crest during Heart Development
Jason Z. Stoller, Tao Zhang, Eldrose B. Thekkethottiyil, Julie De Mesmaeker, Shoumo Bhattacharya, Jue Zhang, Fen Wang. – Abstract 114

2:30 PM

Cell Death after Oxidant Stress Is Determined by Inhibitory Proteins of the NF-κB Activation Cascade
Clyde J. Wright, Fadeke Agboke, Masana Muthu, Phyllis A. Dennyer. – Abstract 115

2:45 PM

Break

3:00 PM

Epidemiology of Refractory Kawasaki Disease: Analysis of 42 US Pediatric Hospitals from 2005 to 2008
Sunil J. Ghelani, Kavita Parikh. – Abstract 116

3:15 PM

Staphylococcus aureus Infections in Women and Neonates Following Late Pregnancy Anovaginal Colonization
Karina A. Top, Amanda Buet, Jiang Yao, Susan Whittier, Adam J. Rattner, Lisa Saiman. – Abstract 117

3:30 PM

Blood Cultures in the Emergency Department Evaluation of Childhood Pneumonia
Maria H. Dugan, Joshua P. Metlay, Louis M. Bell, Robert W. Grundmeier, Todd Florin, Elizabeth Hines, Samir S. Shah. – Abstract 118

3:45 PM

Superoxide Anions Mediate Increased Pulmonary Arterial Contractility in 100% O2 Resuscitated Asphyxiated Lambs
Jayasree Nair, Stephen Wedgwood, Bobby Mathew, Robin Steinhorn, Satyan Lakshminrusimha. – Abstract 119

4:00 PM

Break

4:15 PM - 5:45 PM

Outcomes of Tight Glycemic Control in Critically Ill Children
Sarah B. Kandil, E. Vincent S. Faustino. – Abstract 120

4:30 PM

Spontaneous and Pharmacological Closure of PDAs in ELBW Infants Is Influenced by Thrombocytopenia
Kiran Dwarkanath, Narendara R. Dereddy, Divya Chabra, Christine Schabacker, Johanna Calo, Lance A. Parton. – Abstract 121

4:45 PM

Developmental Expression of Pepsinogen C in a Gene Trap Mouse Model
Maria V. Fraga, Brittany Perry, Peggy Zhang, Susan H. Gutentag. – Abstract 122

5:00 PM

Mutation of Ryanodine Receptor Type 1 Causes Fetal Heart Failure and Demise
Matthew R. Kaufmann, Meier Olivia, Shey-Shing Sheu, George A. Porter, Jr. – Abstract 123
5:15 PM  The Embryonic Mitochondrial Permeability Transition Pore Controls Cardiac Myocyte Mitochondrial Maturation and Differentiation

5:30 PM  Prostaglandin E2 Receptor Gene Polymorphisms Are Associated with Reduced Spontaneous Closure of Ductus Arteriosus in ELBW Infants
Kristen Aland, Kiran Dwarkanath, Johanna M. Calo, Lance A. Parton. – Abstract 125

General Pediatrics - Medical Education & Quality Improvement Platform Session
4:15 PM-5:45 PM  Maestro A
Moderator: Marina Reznik, MD, MS

4:15 PM  Framework for Quantifying & Matching Workload & Workforce in Healthcare Settings
E. Fieldston, L. Zaoutis, P. Hicks, D. Geiger, E. Sladek, P. Agosto, L. Bell. – Abstract 126

4:30 PM  Qualitative Analysis of Student Attitudes towards Teaching and Counseling: Three Student Profiles Emerge
Judith A. Turow, Amy Rothkopf, Stacy Henderson, Lindsey Lane. – Abstract 127

4:45 PM  New Pediatric Interns’ Infant Lumbar Puncture Skills
David O. Kessler, Todd P. Chang, Joshua M. Sherman, Nikhil B. Shah, Geetanjali B. Srivastav, Christopher G. Brother, Kajal Khanna, Michael Holder, Stephen J. Cico, Renuka S. Mehta, Matei Petrescu, Jennifer Reid, Kiran B. Hebbar, Noel S. Zuckerbraun, Martin B. Pusic, Marc Auerbach. – Abstract 128

5:00 PM  Resident Medication Reporting Errors during Pre-Rounding
Misha Bhat, Kathleen M. Donnelly, Swati Agarwal. – Abstract 129

5:15 PM  Reliability of Parental Self-Report of Inhaled Corticosteroid Adherence in Inner-City Children with Persistent Asthma
Marina Reznik, Philip O. Ozuah. – Abstract 130

5:30 PM  Do Caregivers of Children with Persistent Asthma Know How To Use Metered Dose Inhaler Plus Spacer Device?
Yu Cao, Jacquelyn Dorsky, Marina Reznik. – Abstract 131

Infectious Diseases & Immunology Platform Session
4:15 PM-5:45 PM  Aria A
Moderator: Elijah Paintsil, MD

4:15 PM  The Etiology of Respiratory Infection and Severity of Illness
Therese Canares, Paul Chambers, Kathryn Scharbach. – Abstract 132

4:30 PM  Time to and Predictors of CD4+ T-Lymphocytes Recovery in HIV-infected Children Initiating Antiretroviral Therapy in Ghana
Meghan Prin, Lorna Renner, Fang-Yong Li, Bamenla Goka, Veronika Northrup, Elijah Paintsil. – Abstract 133

4:45 PM  Simulation of Nosocomial and Occupational Risks of Hepatitis C Virus Transmission
Elijah Paintsil, Brett D. Lindenbach, Robert Heimer. – Abstract 134

5:00 PM  The Utility of Rapid RSV and Influenza Testing Versus a Multiplex PCR Viral Assay in Cohorting Hospitalized Patients
Therese Canares, Kathryn Scharbach. – Abstract 135

5:15 PM  Distribution of Respiratory Syncytial Virus (RSV) Subtypes A and B among Infants Presenting to the Emergency Department (ED) with Lower Respiratory Tract Infection (LRI) or Apnea
Hasan S. Jafri, Kelly J. Henrickson, Xionghua Wu, Doris Makari, Hanaa Elhefni. – Abstract 136

5:30 PM  Genetic Variation in Antimicrobial Peptide, Human-
β-Defensin-1 (DEFB1) Is Associated with Recurrent Staphylococcus aureus Skin Infection in Children
Hitesh S. Deshmukh, Howard R. Faden, Lucy C. Holmes, Steven R. Gill. – Abstract 137

Neonatology - Clinical Studies I Platform Session
4:15 PM-5:45 PM  Overture
Moderator: Bobby Mathew, MBBS, MRCP (UK)

4:15 PM  Low Vagal Tone Is Associated with Impending Necrotizing Enterocolitis in the Preterm Infant
Kim Kopenhaver Haidet, Charles Palmer. – Abstract 138

4:30 PM  Intrauterine Growth Restriction Alters Vascular Reactivity in Adult Female Rats
Melissa F. Carmen, Catalina Bazacliu, Bobby Mathew, Sylvia Gugino, Satyan Lakshminrusimha, Daniel D. Swartz. – Abstract 139

4:45 PM  Location of Spontaneous Intestinal Perforation (SIP) – Role of Initial Perilatals
Bobby Mathew, Jayasree Nair, Melissa F. Carmen, Daniel D. Swartz, Sylvia F. Gugino, Satyan Lakshminrusimha. – Abstract 140

5:00 PM  Randomized Controlled Trial of Early Total Parenteral Nutrition (TPN) Cycling To Prevent Cholestasis in VLBW Infants (VLBW)
Agnes Salvador, Michael Janeczko, Rachel Porat, Romal Sekhon, Anja Mowes, David Schutzman. – Abstract 141

5:15 PM  Enteral Feeding and Antenatal Betamethasone Alternate Mesenteric Vascular Reactivity in Late Preterm Lambs
Jayasree Nair, Bobby Mathew, Melissa Carmen, James Russell, Satyan Lakshminrusimha. – Abstract 142

5:30 PM  The Proinflammatory Role of Serotonin in a Murine Model of Necrotizing Enterocolitis
Maria M. Talavera, Kara Gross, Sam Li, Korey Stevanovic. – Abstract 143

Neonatology - Epidemiology & Follow Up Platform Session
4:15 PM-5:45 PM  Concerto
Moderator: Jane E. McGowan MD

4:15 PM  Variation in NICU Late Preterm Admission Rates without Identifiable Cause
Kathryn Ziegler, David A. Paul, Matthew Hoffman, Jonathan Cohn, Robert Locke. – Abstract 144

4:30 PM  Very Early Language Skills of Late Preterm Compared to Term Infants at Birth and 44 Weeks Corrected Age
Katharine Johnson, Bonnie Stephens, Richard Tucker, Betty Vohr. – Abstract 145

4:45 PM  Adult-Infant Conversations in the NICU Are Associated with Higher Cognitive and Language Scores at 7 Months in Very Preterm Infants
Melinda A. Caskey, Bonnie Stephens, Richard Tucker, Betty Vohr. – Abstract 146

5:00 PM  Can Prenatal Steroids Be a Risk Factor for Preterm Delivery?
Claudia Halaby, Ellen Gurzenda, Yuko Arita, Morgan Peltier, Nazeeh Hanna. – Abstract 147
15 PM Longitudinal Neurodevelopmental (ND) Outcome in Congenital Diaphragmatic Hernia (CDH) Survivors during the First 3 Years of Life
Enrico Danzer, Marsha Gerdes, Jo Ann D’Agostino, Casey Hoffman, Judy Bernbaum, Michael W. Bebbington, Jennifer Siegle, Natalie E. Rintoul, Holly L. Hedrick. – Abstract 148

3:00 PM The Increase in Neonatal Morbidity Associated with Cesarean Birth Varies with Gestational Age among Full Term Neonates
Shahon Sengupta, Vivien Carrion, Rita Ryan, James Shelton, Ralph Wynn, Satya Lakshminrusimha. – Abstract 149

Neurobiology I Platform Session

4:15 PM-5:45 PM Maestro B
Moderator: Jeffrey Pearlman, MB Ch B

4:15 PM Notch Receptors and Their Ligands in Intraventricular Hemorrhage
Sabrina Malik, G. Vinokunda, F. Hu, P. Ballabh. – Abstract 150

4:30 PM The Effect of Src Kinase Inhibition and EGFR Inhibition on Caspase 9 Activity Following Post-Hypoxic Recovery
Kirstie Marcello, Jarle Stone, Anli Zhu, Om P. Mishra, Maria Delivoria-Papadopoulos. – Abstract 151

4:45 PM Overexpression of Extracellular Superoxide Dismutase (EC- SOD) Has a Protective Role Against Hypoxia Induced Brain Injury in Neonatal Mice
Nahla Zaghloul, Mansour Nassim, Hardik Patal, Champa Codipilly, Philippe Marambaud, Stephen Dewey, Mohamed Ahmed. – Abstract 152

5:00 PM Hypothermia Following Hypoxia-Ischemia in the Neonatal Rat Has a Biphasic Response: Increased Infarct or Selective Hippocampal Damage
Matthew A. Rainaldi, Susan J. Vannucci, Jeffrey M. Perlman. – Abstract 153

5:15 PM DNA Methyl-Transferase Activity during Hypoxia in Neuronal Nuclei of Newborn Piglets
Amit Mukha, David Fralinger, Anli Zhu, Om P. Mishra, Maria Delivoria-Papadopoulos. – Abstract 154

5:30 PM Behavioral and Neurodevelopmental Changes in a Neonatal Rat Model of Inflammation and Global Hypoxia – “Dual Hit Model”
Lamia M. Soghier, Solomon Moshe, Aristea Galanopoulou. – Abstract 155

Poster Session II General Pediatrics

6:00 PM–7:30 PM Symphony Ballroom

1 Teaching Airport Personnel about Children with Autism
Yahaira I. Marquez, Rebecca B. Jackel, Roger Ideishi, Angela Jones, Clara E. Notredame, Matilde M. Irigoyen, Wendy J. Ross. – Abstract 156

2 Development and Initial Validation of the Baby Pediatric Symptom Checklist (BPSC)
Shela Merchant, Brandi S. Henson, R. Christopher Sheldrick, Ellen C. Perrin, J. Michael Murphy. – Abstract 157

3 Exploring the Risks, Trends, and Opportunities for Improvement Regarding Security for Hospitalized Children at Baystate Children’s Hospital
Jackey Jacob, Karine Issa-El-Khoury, Linda George, Jennifer Friderici, Nancy Miller. – Abstract 158

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Sunday, March 28, 2010

Plenary Session III & Presentation of The Young Investigator Awards

8:30AM-9:30AM Overture

8:30AM Presentation of The Young Investigator Awards

8:40AM Plenary Lecture - Marfan Syndrome and Related Disorders; From Molecules to Medicines
Hal Dietz, MD, Johns Hopkins University School of Medicine, Baltimore, MD

9:30 AM Break
10:30 AM Does the IVC Diameter Correlate with Central Venous Pressure (CVP) in the Assessment of Intravascular Volume in Children?
Lorraine Ng, Benjamin Taragin, Jeffrey Avner, Michael Ushay, Denise Nunez. – Abstract 226

10:45 AM Little Fingers, Big Trouble: Child Self-Unbuckling
Lila B. Reyes. – Abstract 227

11:00 AM Training Experiences of Pediatric Emergency Medicine Fellows before Fellowship
Kevin Ching, Marc Auerbach, Frank Overly, Linda Brown, Chaoyan Dong, Colleen Gillespie, Michael Falk, Nikhil Shah, Eric Weinberg, David Kessler. – Abstract 228

11:15 AM Analgesia Use for Infant Lumbar Puncture by Interns after an Educational Intervention
Daniel M. Fein, Jeffrey R. Avner, Marc O. Auerbach, Eileen J. Klein, Geetanjali Srivastava, Elizabeth B. Seelbach, Joshua A. Rocek, Christopher Strother, David O. Kessler. – Abstract 229

11:30 AM Electrocardiograms in Children with Lyme Meningitis: Should We Screen for Lyme Carditis?
Elizabeth J. Welsh, Keri A. Cohn, Lise E. Nigrovic, Amy D. Thompson, Elizabeth M. Hines, Samir S. Shah. – Abstract 230

11:45 AM Just in Time Simulation-Based LP Training: A Qualitative Evaluation
Gunjan Kamdar, Lindsey Tilt, David Kessler, Kajal Khanna, Geetanjali Srivastava, Todd Chang, Amanda Krantz, Stephen Cico, Mike Holder, Jennifer Reid, Martin Pusic, Kevin Ching, Marc Auerbach. – Abstract 231

Neonatology - Clinical Studies II Platform Session
9:45 AM-12:00 PM
Overture
Moderator: Haresh Kirpalani, MD

9:45 AM Prospective Randomized Controlled Trial of Restrictive Fluid Management in Transient Tachypnea of the Newborn
Annemarie Stroustrup, Ian R. Holzman. – Abstract 232

10:00 AM Quality of Reporting in Neonatal Clinical Trials
Sara B. DeMauro, Annie Giaccone, Haresh Kirpalani, Barbara Schmidt. – Abstract 233

10:15 AM Reciprocal Vocalizations between Female Caregivers and Their Infants Surpass Those of Male Caregivers in the First Months of Life
Katharine Johnson, Bonnie Stephens, Richard Tucker, Betty Voehr. – Abstract 234

10:30 AM A Novel Murine Model of Preterm Birth Based on the Genetic Ablation of Decorin and Biglycan
Megan Calmus, Elyse E. Macksoud, Renato V. Iozzo, Richard Tucker, Beatrice E. Lechner. – Abstract 235

10:45 AM Effects of Bilirubin on Neutrophil Inflammatory Responses in Newborn Infants
Suganya Kairuravan, Faith E. Archer, Anna M. Vetran0, Daniel S. Hirsch, Barry I. Weinberger, Thomas Hegyi. – Abstract 236

11:00 AM Elevated Blanket Temperatures during Whole Body Cooling with Servo-Controlled Blanketrol III
Mario Zichella, Dorothy McElwee, Susan Adeniyi-Jones. – Abstract 237

11:15 AM Yield of Surveillance Cultures for Infants Transferred to the NICU
Theodore Macnow, Dana O’Toole, Lisa Saiman, Jennifer Duchon. – Abstract 238

11:30 AM Gas Exchange in the First Minute of CPR Following Asphyxial Cardiac Arrest in Newborn Piglets
Bobby Mathew, Daniel D. Swartz, Melissa Carmen, Sylvia F. Gugino, Jayasree Nair, Rita M. Ryan, Satyan Lakshminrusimha. – Abstract 239

11:45 AM Maternal Microchimerism in the Fetuses
Arlene E. Balubayan, Rakhi Mehrotra, Heber C. Nielsen, Christiane E.L. Dammann. – Abstract 240

Neonatology - Pulmonary II Platform Session
9:45 AM-12:00 PM
Concerto
Moderator: Christiane Dammann, MD

9:45 AM Effect of FiO2 and NO on Oxygenation and Pulmonary Vascular Resistance at Birth
Satyan Lakshminrusimha, Daniel D. Swartz, Bobby Mathew, Sylvia F. Gugino, Stephen Wedgwood, Robin H. Steinhorn. – Abstract 241

10:00 AM Age-Dependent In Vitro Mouse Lung Type II Cell Behavior
Rony O. Dey Hazra, Cristina Scapin, Oya Guengoeze, Katja Zscheppang, Heber C. Nielsen, Christiane E.L. Dammann. – Abstract 242

10:15 AM How Accurate Are Measures of Tidal Volume, Compliance and Resistance on Neonatal Ventilator Displays?
Soraya Abbasi, Emidio Sivieri, Robin Roberts, Haresh Kirpalani. – Abstract 243

10:30 AM Intravenous Sildenafil Improves Oxygenation and Suppresses PDE5 Activity in Lambs with PPHN
Satyan Lakshminrusimha, Stephen Wedgwood, Kathryn N. Farrow, Sylvia F. Gugino, James A. Russell, Robin H. Steinhorn. – Abstract 244

10:45 AM Effect of Inspired Oxygen and Inhaled Nitric Oxide (iNO) on Oxygen Uptake from the Lung and Arterial Oxygen Content in Newborn Lambs and Lambs with Persistent Pulmonary Hypertension of the Newborn (PPHN)
Melissa F. Carmen, Bobby Mathew, Sylvia Gugino, Jayasree Nair, Daniel D. Swartz, Satyan Lakshminrusimha. – Abstract 245

11:00 AM Vascular Endothelial Growth Factor in Tracheal Aspirates from Preterm Infants: Effect of Surfactant Therapy
Avinash Purohit, Rajeev Mehta, Anna Petrova. – Abstract 246

11:15 AM Hyperoxia Modulates Bacterial Lipo polysaccharide-Induced Inflammation and Nitric Oxide Synthase
Mohammed Rashed Shareef, Tudevdagva Gerelsaikhan, Pavan Vasa, Joseph DeCristofaro, Avinash Chander. – Abstract 247

11:30 AM Antenatal Betamethasone Improves Pulmonary Transition in Late Preterm Lambs Delivered by Elective Cesarean Section
Pritha Nayak, Daniel D. Swartz, Bobby Mathew, Sylvia F. Gugino, Karen A. Wynn, Stephen Wedgwood, Robin H. Steinhorn, Satyan Lakshminrusimha. – Abstract 248

11:45 AM Inhibition of Pro-Inflammatory Cytokine Release from Macrophages of the Newborn: Insensitivity to Glucocorticoids Compared to Interleukin-10
Olena Predestynska, Hardik Patel, Ivana Vancurov, Dennis Davidson, Kavita Kasat. – Abstract 249

Endocrinology / Obesity Platform Session
9:45 AM-12:00 PM
Minuet
Moderator: Diva D De León-Crutchlow, MD

9:45 AM Is There a Different Relationship between Vitamin D 25-OH and Parathyroid Hormone in Children with Type 1 Diabetes (T1D)?
Emily Frydman, Crystal Wittcopp, Holley F. Allen, Paul Visintainer, Edward O. Reiter, Nancy S. Dunbar. – Abstract 250
Sunday, March 27 continued

10:00 AM  Effects of the GLP-1 Receptor Antagonist Exendin-(9-39) on Postprandial Hypoglycemia after Fundoplaty  
Andrew Calabria, Stephanie Givler, Paul Gallagher, Diva De Leon.  – Abstract 251

10:15 AM  Screening Patients with Type 1 Diabetes for Celiac Disease and Hypothyroidism  
Irena E. Glick, Kathleen M. Link, Patrick W. Mason, Karen R. Carpenter.  – Abstract 252

10:30 AM  Sex Steroids: Better Indices of Pubertal Suppression Than Gonadotropins in Histrelin Treated Patients?  
Michelle Klein, Molly Regelmann, Elizabeth Chacko, Sharon Hyman, Dennis Chia, Elizabeth Wallach, Robert Rapaport.  – Abstract 253

10:45 AM  Vitamin D Deficiency Is Associated with Cardiovascular Disease Risk Factors but Not Obesity in Pediatric Type 1 Diabetes  
Chelsea Gordner, Chrystal Wittcopp, Nancy Dunbar, Elsina E. Hagan, Holley Allen, Paul Visintainer, Edward O. Reiter.  – Abstract 254

11:00 AM  Counter-Regulatory Hormonal Responses to Single vs Recurrent Hypoglycemia and Its Effect on Catecholamine Synthesis  
Necla Kirtok, Bistra Nankova, Owen Chan, Edmund F. La Gamma.  – Abstract 255

11:15 AM  IGF-BP3 Is a Good Predictor of Response to GH and Increlex in Non-GHD Patients with Low IGF1  
O. Lazareva, I. Predescu, S. Malik, A. Bhangoo, S. Ten.  – Abstract 256

11:30 AM  BP/Height Ratios: Simple and Accurate Method of Detecting Elevated Blood Pressure in Children  
Minu M. George, Sudhakar Basetty, Iuliana Predescu, Anil Mongia, Svetlana Ten, Amrit Bhangoo.  – Abstract 257

11:45 AM  HNF1A Is a Frequent Reason of Insulin Dependant Diabetes in Children with and without Islet Cell Antibodies with Good Response to Sulfonylurea Therapy  
Steven Ghanny, Lina Nic, Djuuan Tan, Sheila Perez, Sonal Bhandari, Felicita Laebawan, Amrit Bhangoo, Svetlana Ten.  – Abstract 258

Neurobiology II
Platform Session

9:45 AM-12:00 PM  Maestro B
Moderator: Barbara Stonestreet, MD

9:45 AM  Mechanism of Ca\(^{2+}\)-ATPase Activation during Hyperoxia in Neuronal Nuclei of the Cerebral Cortex of Newborn Piglets  
Nicholas Obiri, Kirstie Marcello-Donnelly, Meredith Monaco, Om P. Mishra, Maria Delivoria-Papadopoulos.  – Abstract 259

10:00 AM  The Effect of a Common Hemochromatosis Gene Mutation in the Survival of Mice Exposed to Hypoxia  
Asha Ittoop, Elizabeth Neely, Wint Nander, Charles Palmer, James Connor.  – Abstract 260

10:15 AM  Effect of Nitric Oxide Synthase Inhibition on Activation of Caspase-9 during Hyperoxia in Newborn Piglets  
Meredith L. Monaco, Altina T. Phaire, R. Kirkland Sallas, Om P. Mishra, Maria Delivoria-Papadopoulos.  – Abstract 261

10:30 AM  Tract Based Spatial Statistics Diffusion Tensor Imaging Shows Anatomic Differences in White Matter Tracts in Subjects with Ornithine Transcarbamylase Deficiency (OTCD)  
Nathaniel Robbins, Kyle Shattuck, John vanMeter, Andrea L. Gropman.  – Abstract 262

10:45 AM  Necrostatin-1 Modulates BDNF Levels in Forebrain Following Neonatal Hypoxia-Ischemia  

11:00 AM  Effect of Hyperoxia on Increased Expression of Bax Protein in the Cerebral Cortex of Newborn Piglets  
Erica W. Mandell, Qazi Ashraf, Simran Ahluwalia, Om P. Mishra, Maria Delivoria-Papadopoulos.  – Abstract 264

11:15 AM  Head Growth and Neurodevelopmental Outcome (ND) in Infants Treated with Head Cooling (SHC)  
Raquel Gomez, Marcy Gringlas, Susan Adeniyi-Jones.  – Abstract 265

11:30 AM  Interleukin-6 Reduces the Expression of the Tight Junction Protein Occludin in Isolated Cerebral Microvessels from Young and Adult Sheep  
Susan S. Cohen, May Min, Erin E. Cummings, Xiaodi Chen, Grazyna Sadowska, Surendra Sharma, Barbara S. Stonestreet.  – Abstract 266

11:45 AM  Effect of Epidermal Growth Factor Receptor (EGFR) Kinase Inhibition during Hypoxia on Phosphorylation of Ca\(^{2+}\)/Calmodulin-Dependent Protein Kinase IV (CaM Kinase IV) in Neuronal Nuclei of Newborn Piglets  
Mark Michael, R. Kirkland Sallas, David Fralingser, Om P. Mishra, Maria Delivoria-Papadopoulos.  – Abstract 267
The Association of Vitamin D Deficiency and Asthma Severity in Children

Archana Mehta, Janelle Sher, Mary J. Ward, Melanie Wilson-Taylor.

Pediatrics, Komansky Center for Children’s Health/ NY Weill Cornell Medical Center, New York City, NY; Pediatrics, Weill Cornell Medical College, New York City, NY.

BACKGROUND: Asthma is a major public health problem in the United States affecting approximately 10% of children and 150,000 pediatric hospitalizations annually. Researchers have proposed that vitamin D plays a role in modulating the immune response in asthma by inhibiting pulmonary inflammatory responses and enhancing innate defense mechanisms against pathogens. The role of vitamin D modulation of asthma severity in children is currently unknown.

OBJECTIVE: Describe the association between asthma severity and vitamin D deficiency in children. Hypothesis: More severe asthma is associated with vitamin D deficiency.

DESIGN/METHODS: Unrestricted, public data were obtained from the National Health and Nutrition Examination Survey (NHANES 2005-6). Subjects were selected for age between 2 and 18 years. The following variables were included in this analysis: (1) serum 25(OH)D level (deficient = level <11 ng/ml; sufficient = level >30), (2) asthma severity (derived from annual number of asthma attacks, ER visits, unexpected asthma visits and nighttime symptoms), (3) age, (4) family income.

RESULTS: The sample included 616 subjects. Figure 1 has descriptive data.

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<td>Age (y)</td>
<td>11.2 (5.0)</td>
<td>2-18.9</td>
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<tr>
<td>Age at asthma dx (y)</td>
<td>4.6 (4.1)</td>
<td>1-17</td>
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<tr>
<td>25 (OH)D (ng/dl)</td>
<td>29.8 (8.0)</td>
<td>0.2-59</td>
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Asthma prevalence % of sample

- Mild intermittent: 6
- Mild persistent: 2
- Moderate persistent: 1
- Severe persistent: 5
- Past asthma: 5
- Wheezing: 5

Prevalence of asthma was 11%; mild intermittent was the most common form. 5% of the sample experienced periodic wheezing but did not have asthma. Prevalence of vitamin D deficiency was 10%; 11% of the sample was vitamin D sufficient.

Vitamin D deficiency was significantly less likely in children with moderate to severe asthma than in those with milder asthma (35% vs. 64%; p<.05; OR=1.8, p<.05). Vitamin D was negatively correlated with age and positively correlated with annual family income (p’s < .001). Age, vitamin D level, and family income were not associated with asthma severity. 

CONCLUSIONS: The data show a significant negative correlation between vitamin D deficiency and asthma severity. Children who had lower vitamin D levels were less likely to have asthma.

The Impact of Teaching Metered-Dose Inhaler Administration to Residents and Medical Students

Sharyn H. Miskovitz, Jason Fletcher, Sandra F. Braganza.

Children’s Hospital at Montefiore, Albert Einstein College of Medicine, Bronx, NY; Department of Family and Social Medicine, Albert Einstein College of Medicine, Bronx, NY.

BACKGROUND: For optimal asthma care, the National Heart, Lung and Blood Institute (NHLBI) recommends that clinicians teach their patients proper metered-dose inhaler (MDI) technique. Despite these guidelines, pediatric healthcare provider knowledge and skill of MDI and spacer administration crucial to the treatment partnership is often lacking. Several studies have demonstrated healthcare professionals’ lack of knowledge and skill involving MDIs and residency training programs often do not incorporate MDI administration education as part of their curriculum.

OBJECTIVE: 1) To establish current medical student and resident (pediatric and family medicine) baseline knowledge regarding the use of MDIs, 2) to evaluate the effect of a training curriculum on medical student and resident knowledge of MDI use, and 3) to determine the change in confidence in discussing asthma management and teaching MDI administration technique.

DESIGN/METHODS: We created a unique one-hour educational curriculum that included a presentation, video demonstration, and interactive tool that involved role-playing. This curriculum was taught to medical students, pediatric residents, and family medicine residents. Each participant completed pre- and post-intervention surveys. Participant knowledge administration was assessed by nine multiple choice questions. Participant confidence on discussing asthma management and teaching MDI administration technique was assessed by three five-point Likert scale questions. Changes were examined using paired groups t-tests.

RESULTS: Forty-six subjects (67% pediatric residents, 11% family medicine residents, and 22% medical students) completed the surveys. Resident average knowledge score increased from 44% to 86% (p<.001). Medical student average knowledge score increased from 48% to 90% (p<.001). Participant average confidence score on discussing asthma management and teaching MDI administration technique increased from 3.3 to 4.3 (p<.001).

CONCLUSIONS: Medical students and pediatric and family medicine residents lack adequate knowledge regarding the administration of MDIs to properly treat their patients with asthma. However, a brief curriculum can help remedy this by improving knowledge of MDI use and confidence in discussing asthma management and teaching MDI administration technique.

Education on MDI administration should be formally incorporated into training programs so providers will be more effective in educating their patients with asthma.

Edinburgh Postpartum Depression Scale Score among Mothers of Infants in the NICU


Department of General Pediatrics, Morristown Memorial Hospital at Atlantic Health, Morristown, NJ; Atlantic Neonatal Research Institute, MidAtlantic Neonatology Associates and Atlantic Health, Morristown, NJ; Department of Social Work Services, Morristown Memorial Hospital at Atlantic Health, Morristown, NJ.

BACKGROUND: Postpartum depression affects 10%-20% of women after giving birth. Recent studies report that mothers of preterm infants in the NICU have a higher incidence of postpartum depression with a rate of 28-70%. Since 2007, the Edinburgh Postpartum Depression Scale (EPDS) has been implemented at Morristown Memorial Hospital to identify mothers who have an increase risk of postpartum depression and therefore require psychiatric consultation. The hypothesis is that mothers with infants admitted to the NICU will have higher EPDS scores when compared to mothers who have newborns admitted to the well baby nursery. OBJECTIVE: The purpose of this study is to investigate if mothers with infants admitted to the NICU have higher EPDS scores when compared to mothers with infants admitted to the well baby nursery.

DESIGN/METHODS: We collected the documented EPDS scores of mothers who gave birth to infants that were directly admitted to the NICU and well baby nursery at Morristown Memorial Hospital from March 2007 to August 2009. Key variables such as infant’s birth weight, infant’s gestational age, maternal age, maternal insurance, maternal marital status and maternal parity were obtained from chart review. Mothers were excluded if death of the infant occurred and if maternal scores were unknown. The data was analyzed using Statistical Program for the Social Sciences 15.0 software.

RESULTS: The sample was composed of 211 infants admitted to the NICU and 722 infants admitted to the well baby nursery. Of the 211 NICU infants, 28% of the mothers’ EPDS score (score >9) were significant for risk of postpartum depression. Of the 211 NICU infants, 72% of the mothers scored less than 9. Of the 722 infants in the well baby nursery, 8% of the mothers’ scores were significant for risk of postpartum depression. The NICU mothers had a mean EPDS score of 6.40 with standard deviation of 5.217. The well baby mothers had a mean EPDS score of 3.54 with standard deviation of 3.303. CONCLUSIONS: The study reveals that there is a significant difference in EPDS scores between the study groups. A large percentage of mothers with infants in the NICU group had EPDS score less than 9. This may be due to inaccuracy of EPDS to identify mothers at risk for postpartum depression. Therefore, a better assessment specifically targeted to mothers with infants in the NICU is needed in order to accurately determine when psychiatric consultation is necessary.

Postpartum Depression Screening Program – The Attitudes and Acceptance of Pediatric Care Providers

Sandeen K. Sadashiv, Kerry Kauffman, Andy C. Wang, Michael Janezko.

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BACKGROUND: Identifying postpartum depression (PPD) is an important component of postpartum maternal care, as well as infant health and safety. Universal screening for PPD prior to discharge using Edinburgh Postnatal Depression Scale (EPDS) was initiated in the post partum unit of our hospital. It was unclear how this initiative was perceived and influenced subsequent pediatric care.

OBJECTIVE: To establish current medical student and resident (pediatric and family medicine) knowledge of MDI use, and 2) determine both the primary care pediatrician’s attitudes toward and knowledge of PPD screening, and willingness to further identify mothers and children requiring interventions.

DESIGN/METHODS: We identified 194 neonates discharged from the nursery from 2/1/10 until 2/28/10 and conducted retrospective chart review for documentation of the PPD screening in the postpartum unit and the pediatric clinic.

RESULTS: Screening was documented in 97% of maternal records indicating 4% in high risk (EPDS score >14) and 5% in intermediate risk (EPDS score 10-13) for PPD. By contrast, only 4%...
of newborn records at discharge had a documented EPDS. Of the 59 infants seen at the pediatric clinic 17% had documentation of PPD screening (post partum EPDS score or other screening). Most pediatric providers (97%) considered detection of PPD important. Two thirds of the providers discussed symptoms of PPD with mothers in the clinic and the remaining one third did not routinely screen for PPD. About 14% were uncomfortable discussing about PPD or screening for PPD in the clinic. The majority (73%) had never used EPDS screening tool and a further 19% were not aware of EPDS. A fifth (19%) felt it was not their responsibility for providing information to mothers with PPD.

CONCLUSIONS: Pediatric care providers acknowledge the importance of identifying PPD and intervening with those families to optimize child health, safety and development. However, many feel uncomfortable, unprepared and poorly equipped to play an active role. Development of guidelines, training for providers and awareness of locally available resources are key strategies to improve screening in the pediatric outpatient setting.

5

Medical Student

What Is My Neighborhood? Using Travel Patterns by Urban Minority Children and Their Families To Define Neighborhood

Leigh S. Goldstein, Maida P. Galvez, Susan Tettelbaum, Kathleen McGovern, Mary S. Wolff, Barbara Browner

Mount Sinai School of Medicine, New York, NY; Department of Preventive Medicine, Mount Sinai School of Medicine, New York, NY; Department of Pediatrics, Mount Sinai School of Medicine, New York, NY.

BACKGROUND: The role of neighborhood in children’s health has been a growing area of research. Distances traveled to neighborhood resources may help elucidate definition of neighborhood. Little is known about socioeconomic influences on travel patterns, particularly for urban, minority families who are at high risk for health disparities.

OBJECTIVE: Describe differences in travel patterns by race/ethnicity, primary language and income based on most frequently used food stores, food establishments (restaurants and fast food) and physical activity resources.

DESIGN/METHODS: Distances traveled by East Harlem, NY children (n=334) and their families to frequently used neighborhood resources were calculated using ArcGIS. Differences in distances according to race/ethnicity (Black or non-Black Hispanic), interview language (English or Spanish) and annual income (< or ≥$25K) were assessed using t-tests.

RESULTS: Mean distances traveled by Blacks and by English interview were significantly farther than Hispanics and Spanish interview respectively for both food stores and food establishments. Those with a family income ≥$25K traveled farther to food stores than those earning <$25K; this relationship was not seen for food establishments. Distances traveled by children to neighborhood physical activity resources did not differ significantly by race/ethnicity, language or income.

CONCLUSIONS: Increases in PWL increased the risk of severity of hyperbilirubinemia. A PWL as low as 3.5 significantly predicted a likelihood of placement in a higher (G2-G4) risk group. Our average PWL graph predicted an analogous trend when plotted against average BL. A novel PWL graph is a reliable alternative to BN in predicting EONH.

Socioeconomic Demographics and Distance Traveled to Neighborhood Resources

Geographical clustering did not appear to account for these associations. Neighborhood defined by resource use was far smaller than researcher-defined neighborhood for this project, 6 vs 10 blocks.

CONCLUSIONS: These data suggest that race/ethnicity, primary language and income are associated with children’s families’ choice of food store and food establishment within their community but not with choice of child’s physical activity resource. Further research is needed to assess how differences in travel patterns influence dietary behaviors and physical activity levels.

6

Can Postnatal Weight Loss Predict Early Onset Neonatal Hyperbilirubinemia?

Nidhi Agarwal, Raudy Harsono, Fernanda Kupferman, Lourdes Cohen, Shirley Pinero, Louis Primavera, Susana Rapaport

Pediatrics, Flushing Hospital Medical Center, Flushing, NY; Psychology, Touro College, New York, NY.

BACKGROUND: Neonatal bilirubin nomogram (BN) is currently used to follow trends in bilirubin levels (BL), assess risks, and time interventions. Studies have shown weight loss to be associated with children’s families’ choice of food store and food establishment within their community but not with choice of child’s physical activity resource. Further research is needed to assess how differences in travel patterns influence dietary behaviors and physical activity levels.

CONCLUSIONS: Increases in PWL increased the risk of severity of hyperbilirubinemia. A PWL as low as 3.5 significantly predicted a likelihood of placement in a higher (G2-G4) risk group. Our average PWL graph predicted an analogous trend when plotted against average BL. A novel PWL graph is a reliable alternative to BN in predicting EONH.

Perceptions of English and Spanish-Speaking Caregivers about the Role of Pediatricians in Community Violence Prevention Counseling

Mario Cruz, Raphael Rom, Saskia Spiess, Salman Farsi, Daniel Taylor

General Pediatrics, St. Christopher’s Hospital for Children, Philadelphia, PA; Drexel University College of Medicine, Philadelphia, PA; School of Public Health, Drexel University, Philadelphia, PA.

BACKGROUND: Community Violence (CV) remains a recognized threat to the health and well-being of children. In response the AAP has called for pediatricians to screen for CV and provide anticipatory guidance during well-child visits. Little is known about how these perceptions may differ by culture and ethnicity.

OBJECTIVE: The objectives were: 1) to examine caregivers’ perceptions of the role of pediatricians in CV prevention counseling during well-child visits; and 2) to identify differences in these perceptions between English and Spanish-speaking caregivers.

DESIGN/METHODS: During the 2-month study period self-administered surveys were completed by English and Spanish-speaking caregivers of children ages 0-21 who presented to an inner-city-based primary care clinic. The survey assessed perceptions about the pediatrician’s role in CV prevention counseling, interest in discussing CV prevention with the pediatrician, neighborhood safety, risk and protective factors for CV exposure, and strategies to avoid CV exposure.

RESULTS: 276 out of 306 caregivers participated. 46% identified as Black, 43% as Latino, 5% as multi-racial. 57% of Latinos were Puerto Rican, 23% Dominican, and 20% Mexican, Central American or South American. 56% of Latinos were predominantly English-speaking. 82% of caregivers identified as the patients’ mother, 11% as the father. 59% were unaware that their pediatrician could advise them about CV prevention. 30% were interested in discussing CV prevention with their pediatrician. Spanish-speaking caregivers were more interested in discussing CV-related topics with their pediatrician compared to English-speaking caregivers (67% vs 24% for CV prevention, 62% vs 29% for discipline techniques, 68% vs 33% for appropriate television programming)[all p<0.01].

CONCLUSIONS: The majority of caregivers at an inner-city clinic did not want to discuss CV prevention with their pediatrician. Most did not recognize their doctor as a CV prevention resource. Spanish-speaking caregivers were more interested in discussing CV with the doctor than were English-speaking caregivers. Acculturation and differences in the perceived scope of physician’s practice may explain these findings. Future research should quantitatively assess caregiver barriers to discussing CV with their pediatrician.

Relationship between Health Literacy and Body Mass Index

Roopa Chari, Joel Warsh, Tara Ketterer, Adam Badaczewski, Iman Sharif

General Pediatrics, Nemours/A.I. duPont Hospital for Children, Wilmington, DE.

BACKGROUND: In a previous published study of overweight children, we reported a relationship between child’s own health literacy and child’s body mass index (BMI). No studies have explored the relationship between either child literacy or parental health literacy and body mass index amongst a general population of normal weight and overweight/obese children and adults. The Newest Vital Sign (NVS), is a commonly used screen for health literacy in adults. Because the NVS tests the subject’s ability to read and interpret a nutrition label, we hypothesized that it may
be a particularly useful correlate of BMI as a health outcome. OBJECTIVE: To test the relationship between child and parental health literacy and child BMI. DESIGN/METHODS: We conducted a cross-sectional survey amongst a convenience sample of child-parent dyads in the outpatient waiting areas of a pediatric hospital. To measure literacy, we administered the Newest Vital Sign (NVS) to each child and parent. Amongst 46 overweight/obese children, higher child BMI was associated with lower parental NVS (rho=0.48, p=0.001) and lower child NVS (rho=0.37, p=0.01). Parental BMI and child BMI percentile were associated (rho=0.36, p=0.03).

CONCLUSIONS: There was no relationship between child or parent literacy and child BMI percentile across the study population. There was no relationship between parental and child BMI. Amongst 46 overweight/obese children, higher child BMI was associated with lower parental NVS (rho=0.48, p=0.001) and lower child NVS (rho=0.37, p=0.01). Parental BMI and child BMI percentile were associated (rho=0.36, p=0.03).

Performance of the NVS and STOFHLA in Children

Iman Sharif, Laurie Bauman, Debra Roter, Tara Ketterer, Roopa Chari, Deepa Rastogi, Sandra Braganza, Mary Ann Abrams, Katherine Freeman, Arthur F. Blank, Ruth E.K. Steen, Benard P. Dreyer

Pediatrics, Nemours/A. I. duPont Hospital for Children, Wilmington, DE; Pediatrics, Albert Einstein College of Medicine/Children’s Hospital at Montefiore, Bronx, NY; Johns Hopkins Bloomberg School of Public Health, Baltimore, MD; Pediatrics, NYU School of Medicine, New York, NY; Iowa Health System, Des Moines, IA.

BACKGROUND: Health literacy is critical to the effective management of childhood asthma, but no validated measurement tools for health literacy are available. We piloted the use of two widely used adult measures, the Newest Vital Sign (NVS) and the Short Test of Functional Health Literacy (STOFHLA) in school-aged children.

OBJECTIVE: To test whether the NVS and STOFHLA are feasible and valid in children with asthma, as evidenced by a) higher scores with age, b) correlation with each other, and c) correlation with better disease outcomes.

DESIGN/METHODS: We analyzed baseline data from an ongoing cohort study of children with asthma, ages 8 and up. Children completed the NVS (6 items interview) and the STOFHLA (36 item, timed). Using a MicroLoop Spirometer, we measured lower area obstruction (% predicted FEV1/FVC for age and sex) at 2 weeks follow-up. Parental literacy (TOFHLA) and years of education were also measured.

Literacy measures were used as ordinal scores, as well as literacy categories according to adult criteria: NVS limited: 0-1; possibly limited: 2-3; adequate: 4-6; STOFHLA (inadequate: 0-16; marginal: 17-22; adequate: 23-36). We used spearman correlation to test the relationship between the two tests, and between each test with other variables.

RESULTS: We collected data for 40 children. Mean age was 9.48 (SD 1.8); 62% were male. The NVS was completed by 38 children; 2566% scored limited; 1129% possibly limited; and 1834% adequate; and 1129% possibly limited; and 255% adequate literacy. On the STOFHLA, 2152% scored inadequate, 923% marginal, and 1025% adequate. Older age was associated with higher NVS (rho=0.37, p=0.02) and STOFHLA (rho=0.68, p=0.0001).

NVS and STOFHLA was not significantly correlated (rho=0.28, p=0.10). Higher NVS (rho=0.38, p=0.03) and STOFHLA (rho=0.40, p=0.02) were related to better % predicted FEV1/FVC. There was no relationship between airway obstruction and parental literacy (rho=-0.15, p=0.42), or education (rho=0.21, p=0.12).

CONCLUSIONS: The NVS and STOFHLA were feasible to administer. Scores were concentrated in the low literacy categories, suggesting the need to add or revise some items to improve the distribution. With these preliminary data, the measures show promising validity in children. With modest revisions and formal validation studies, these scales may prove suitable to measure health literacy in children.

10 Medical Student Preliminary Validation of the Newest Vital Sign in School-Aged Children

Joel Warsh, Adam Badaczewski, Iman Sharif

Division of General Pediatrics, Nemours/A.I. duPont Hospital for Children, Wilmington, DE.

BACKGROUND: Studies in adults have demonstrated positive associations between health literacy and health outcomes. In children, similar studies have been hampered by lack of measures of child health literacy. The ability to measure the association between child health literacy and disease outcomes can aid the design of interventions to improve self-management of common chronic childhood diseases such as asthma and obesity. We piloted the Newest Vital Sign (NVS), a commonly used screen for health literacy amongst adults, in school-aged children.

OBJECTIVE: To obtain an initial relationship between children’s performance on the NVS and the Gray Silent Reading Test (GSRT), a test of reading comprehension that has established reliability and validity between ages 7-25.

DESIGN/METHODS: We surveyed a convenience sample of school-aged children in the pediatric outpatient clinics of a children’s hospital. Children were administered the NVS, followed by the Gray Silent Reading Test. For the NVS, children looked at a food label, while a trained interviewer asked them 6 questions that measure reading comprehension and numeracy skills. We scored the NVS according to adult standards: Limited (0-1); possibly limited(2-3); adequate (4-6) literacy.

For the GSRT, children read a series of 13 passages, each followed by 5 reading comprehension questions. We used the raw score (0-65) in all analyses. We used spearman correlation to test the relationship between the NVS and the GSRT raw score. We used analysis of variance to compare the GSRT score for limited/possibly limited/adequate literacy on the NVS.

RESULTS: We surveyed 38 children; mean age 11.2 (SD 2.3); 58 male. On the NVS, 39% scored limited literacy; 39% scored possibly limited literacy, and 21% scored adequate literacy. GSRT scores ranged from 1 to 51, with a mean of 21(SD 14). Older age was associated with better performance on the NVS (rho=0.34; p=0.04) and GSRT (rho=0.77; p<0.0001).

The NVS and GSRT were correlated (rho=0.64, p=0.00001).

CONCLUSIONS: The NVS has good correlation with the GSRT in children. The NVS may be a useful tool for measuring health literacy in children. Additional data may enable the identification of appropriate age-related categorization of NVS scores for use in children.
and associations with genital irritants in pre-menarchal girls.

DESIGN/METHODS: We consecutively enrolled 5-12 y/o pre-menarchal girls arriving for well-child visits at an urban, hospital-based pediatric office and a suburban pediatric office. Parent/child pairs were provided a survey about genital symptoms. Parents/children were asked about genital soreness exposure to genital irritants (tight-fitting clothes, nylon underwear/leggings, bike or horseback riding, bubble baths, soap, shampoo, genital hygiene and trauma). Medical records were reviewed for Tanner stage, BMI, and medical conditions.

RESULTS: We surveyed 191 parent/pre-menarchal 5-12 y/o girl dyads (91 urban, 100 suburban; 41.6% Mexican; 51.3% 5-8 y; 48.7% 9-11 y; 19% 12-15 y; 17% male; mean age 8 y). 46% of parent/child pairs reported their girls had histories of urogenital symptoms vs. 50% of girls. Of these, 29% of parents attributed symptoms to poor hygiene vs. 14% of girls, 20% vs. 20% soap products, 13% vs. 2% UTIs, but 24% vs. 53% could not identify a cause. Analysis of symptoms vs. associated irritant exposures showed poor hygiene was associated with dysuria, soreness, and pruritus; tight underwear/pants, soap, or shampoo was associated with dysuria and genitl soreness; and bubble baths were associated only with parent-reported genital soreness (all ps<0.05). No associations were found with nylon underwear/leggings, bike or horseback riding. No irritants were associated with a vaginal discharge. Race, ethnicity, eczema, obesity/overweight were not associated with symptoms.

CONCLUSIONS: Urogenital symptoms vary by race/ethnicity. When parent/child pairs could not identify a cause or infections are excluded, physicians should focus on improving genital hygiene and eliminating exposures to soap products and tight-fitting clothing. Elimination of bike/horseback riding or nylon underwear/leggings is not indicated. Persistent symptoms despite treatment or a vaginal discharge warrants further evaluation.

Health, Obesity, and Environment in East Harlem, NY
Maida Galvez, Lawrence C. Kleinman, Carol Horowitz, Nita Vangeepuram, Michelle Ramos, Thalia MacMillan.
Mount Sinai School of Medicine, New York, NY; Communities IMPACT Diabetes Center, New York, NY.

BACKGROUND: Obesity is prevalent in urban minority communities. The Sector of Excellence for the Elimination of Disparities (SEED) is a 2 census tract area of East Harlem, NY (HC).

OBJECTIVE: As part of baseline assessment for a community-partnered project to reduce diabetes-related disparities in the SEED, we conducted multiple assessments of the health and environment of children.

DESIGN/METHODS: We administered surveys (English/Spanish) at community sites in the SEED to 117 adult caregivers and 291 adult children regarding social capital and collective efficacy (SC/CE). We oversampled at schools and after school programs. We also performed a block by block assessment of the neighborhood, including food stores, restaurants, green spaces, and sidewalks.

RESULTS: Most respondents (83%) were mothers. The average child was 7 years (range 3-15). Parents reported the health of 36% of children as only good, fair, or poor. Asthma was prevalent (31%) but did not explain these low health scores. 55% of children were overweight or obese (O/O) by BMI. Mean screen time was 2.0 hours daily (IQ range 1-3) and median time walking or running 2.0 hours/day. There was an average of 1 park or playground every 7 blocks: parks were more frequently than playgrounds. Parents report low (0.5) median intake of soda, no diet soda, 2.0 servings of milk (49% whole or chocolate), 1.0 of juice, and only 0.4 servings of salad or green vegetables daily. 63% agreed that the family often watched TV while eating, and only 39% averaged at least one family meal per day. A typical child had 1 fast food meal and one food purchase from a bodega per week. Favorite purchases included pizza, fries, chips, and ice cream. A majority of food stores surveyed carried healthy foods-43% had apples, 38% tomatoes, and 19% fat-free milk. Of 21 restaurants surveyed, 52% were either national fast food chains, pizza, or Chinese take out. Most (67%) of restaurants had at least one healthy item (usually salad). Sidewalks were not always easily walkable, with 51% in disrepair and 21% obstructed. The number of trees per block face varied widely, with mean=3.9 and SD=4.2. Measures of SC/CE for the entire project were widely blocked to block.

CONCLUSIONS: Even in a 2 census tract area of EH, environment varies from block to block. Children’s health status is concerning, as are rates of O/O. Multiple aspects of the food, built, and environmental environments may combine to produce high rates of local childhood O/O.

Mexican Children in East Harlem, NY Have Distinct Diet and Activity Behaviors Compared to Other Hispanic Children
Mount Sinai School of Medicine, NY, NY; Lighthouse International, NY, NY.

BACKGROUND: Low-income minority children have high rates of obesity. While studies have examined racial differences in diet and physical activity, no studies have looked at differences in Hispanic subgroups.

OBJECTIVE: To examine racial/ethnic differences in diet and physical activity in children from an ethnic minority community.

DESIGN/METHODS: Community and academic partners administered a field survey in English or Spanish to parent/guardians of children residing in the Sector of Excellence for the Elimination of Disparities, a two census tract area in East Harlem, NY, identified for targeted interventions to decrease diabetes related disparities. Diet and physical activity behaviors and perceived health were compared using Chi Square and t-tests.

RESULTS: The 116 children had a mean age of 7 years (range 3-15), 48% were female, 26% non-Hispanic Black, 29% Puerto Rican, 26% Mexican, and 19% other/mixed ethnicity. The overall difference in behaviors between Hispanic and Black children was higher mean daily servings of green vegetables among Black children (0.7 servings vs. 0.2 servings, p=0.006). However, there were many significant differences between Mexican and non-Mexican Hispanic children. Compared to non-Mexican Hispanic respondents, Mexican respondents reported their children participate less frequently in organized school activities (40% versus 61%, p=0.07) and rated their children’s overall health less favorably (20% vs. 43% reported their child’s health as excellent and 27% vs. 7% as fair or poor, p=0.01). However,
A Comparison of Dietary and Physical Activity Behaviors in New York City Children from Different Ethnic Minority Subgroups

Nita Vangeeaprum, Nancy Mervish, Susan L. Teitelbaum, Maida P. Galvez, Barbara Brenner, Mary S. Wolff.

Mount Sinai School of Medicine, NY, NY.

BACKGROUND: Low-income minority children have high rates of obesity. While studies have examined racial differences in diet and physical activity, no studies to date have included Hispanic subgroups.

OBJECTIVE: To examine racial/ethnic differences in diet and physical activity in mixed ethnic minority New York City (NYC) children.

DESIGN/METHODS: Cross-sectional data from a community based study of 505 6-8 year old NYC children were used. Dietary intake was obtained by 24-hour diet recalls using the Nutrition Data System for Research. Physical activity was assessed via questionnaire. Diet and activity were compared across groups using Chi Square and ANOVA tests.

RESULTS: Mean ages and gender distribution were similar across racial/ethnic groups. Obesity rates were lowest in non-Hispanic Black children (18%) and among Hispanics were lowest in Mexican children (25%). There were racial/ethnic differences in mean daily servings of certain food groups (healthiest groups in bold and unhealthiest underlined):

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Mexican</th>
<th>Dominican</th>
<th>Puerto Rican</th>
<th>Other/mixed Hispanic</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meats</td>
<td>1.2</td>
<td>1.3</td>
<td>0.3</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Fruits</td>
<td>1.2</td>
<td>1.1</td>
<td>1.1</td>
<td>0.8</td>
<td>1.0</td>
</tr>
<tr>
<td>Whole grains</td>
<td>0.3</td>
<td>0.5</td>
<td>0.7</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Refined Grains</td>
<td>0.6</td>
<td>0.7</td>
<td>0.4</td>
<td>4.2</td>
<td>4.2</td>
</tr>
<tr>
<td>Low fat dairy</td>
<td>1.2</td>
<td>1.0</td>
<td>1.0</td>
<td>0.9</td>
<td>0.9</td>
</tr>
<tr>
<td>Regular meats</td>
<td>1.3</td>
<td>1.5</td>
<td>2.7</td>
<td>2.6</td>
<td>2.6</td>
</tr>
<tr>
<td>Regular Oils</td>
<td>1.5</td>
<td>1.6</td>
<td>2.3</td>
<td>3.6</td>
<td>3.6</td>
</tr>
<tr>
<td>Dairy/meats</td>
<td>2.0</td>
<td>1.7</td>
<td>1.0</td>
<td>1.1</td>
<td>1.1</td>
</tr>
<tr>
<td>Total calories</td>
<td>1193</td>
<td>1423</td>
<td>1091</td>
<td>840</td>
<td>758</td>
</tr>
</tbody>
</table>

Mean total sedentary hours were lower in Mexican children (3.3) compared to Dominican (4.3), Puerto Rican (4.6), and Black (4.8) children, p<0.05. There were other activity differences:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Mexican</th>
<th>Dominican</th>
<th>Puerto Rican</th>
<th>Other/mixed Hispanic</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participating in organized activities (n=485)</td>
<td>21.7</td>
<td>31.7</td>
<td>34.7</td>
<td>41.8</td>
<td>39.1</td>
</tr>
<tr>
<td>Playing video games 1-3 hours daily (n=484)</td>
<td>6.3</td>
<td>4.9</td>
<td>18.0</td>
<td>3.0</td>
<td>9.7</td>
</tr>
<tr>
<td>Daily computer use (n=435)</td>
<td>12.4</td>
<td>39.5</td>
<td>27.6</td>
<td>31.7</td>
<td>29.8</td>
</tr>
<tr>
<td>Watching &gt;2 hours television daily (n=484)</td>
<td>26.8</td>
<td>31.7</td>
<td>38.0</td>
<td>23.9</td>
<td>38.8</td>
</tr>
</tbody>
</table>

CONCLUSIONS: Dietary and physical activity behaviors varied across racial/ethnic subgroups among NYC children, and may in part contribute to obesity disparities. Targeted interventions in different ethnic groups might be warranted to address specific behaviors.

Cardiovascular & Critical Care Poster Session

Friday, March 25, 2011
6:00 PM-7:30 PM

Duration of Central Venous Line Is Not Associated with Increased Deep Venous Thrombosis in Critically Ill Children

E. Vincent S. Faustino, Sheila J. Hanson, Karla A. Lawson, Renee A. Higginson, Pediatrics, Yale University School of Medicine, New Haven, CT; Pediatrics, Children’s Hospital of Wisconsin and Medical College of Wisconsin, Milwaukee, WI; Pediatric Services, Dell Children’s Medical Center of Central Texas, Austin, TX; Pediatric Intensive Care Unit, Dell Children’s Medical Center of Central Texas, Austin, TX.

BACKGROUND: Presence of a central venous line (CVL) is a known risk for deep venous thrombosis (DVT) in children. CVL insertion damages the endothelium and initiates thrombus formation. Other factors may be important in the development of CVL-related deep venous thrombosis (DVT) in critically ill children.

OBJECTIVE: To determine risk factors in the development of symptomatic CVL-related DVT in critically ill children.

DESIGN/METHODS: We performed a nested case control study involving children previously enrolled in a multicenter study on symptomatic venous thromboembolism (VTE). Patients less than 18 years old with CVL inserted during the admission who developed a CVL-related DVT were classified as cases. Each case was matched by age, gender and hospital of origin to 4 control patients who did not have any VTE. Bivariate and multivariate comparisons were performed using conditional logistic regression analysis.

RESULTS: Symptomatic CVL-related DVT was diagnosed in 29 patients. The majority (n=17, 58.6%) of the DVT was detected within 1 week of CVL insertion. Patients with symptomatic CVL-related DVT were appropriately matched to control patients, with similar characteristics. Compared to the 116 control patients, duration of CVL: (OR: 1.02; 95% CI: 0.98, 1.06; P=0.352) and severity of illness (OR: 1.15; 95% CI: 0.89, 1.49; P=0.274) were not associated with CVL-related DVT. There was a trend toward higher increased DVT in children with trauma (odds ratio [OR]: 8.64; 95% confidence interval [CI]: 0.87, 86.23; P=0.066) but decreased DVT in patients with acyanotic congenital heart disease (OR: 0.27; 95% CI: 0.06, 1.11; P=0.069). Other factors not associated with CVL-related DVT include race and ethnicity, operative status, use of mechanical ventilation, and presence of cancer, congestive heart failure, or sepsis.

CONCLUSIONS: The lack of association between duration of CVL use and CVL-related DVT and the early development of DVT suggest that insertional factors (e.g. number of venous puncture and size of the CVL) or patient characteristics (e.g. age, underlying illness and co-morbidities but not its severity, and presence of coagulopathy disorders) may be more important in the development of CVL-related DVT. The use of early thromboprophylaxis in critically ill children with CVL should be further investigated.

Coronary Complications in Children with Kawasaki Disease in Association with Time of IVIG Treatment

Deepa Prasad, Aswine Bal, Maria UmalPamintuan, Elizabeth MammenPrasad, Anna Petrova.

Pediatrics, Jersey Shore University Medical Center, Neptune, NJ.

BACKGROUND: Kawasaki disease is the leading cause of acquired heart disease in children in developed countries. Approximately 20-25% of untreated children develop coronary aneurysm (CA). Treatment with IVIG within 10 days of onset of fever reduces the risk to 2-4%. Currently there are no studies indicating the effectiveness of IVIG therapy after 10 days of onset of fever.

OBJECTIVE: To determine the risk of CA lesions in children with KD treated with IVIG after 10 days of onset of demographics, clinical and laboratory presentation of disease on development of cardiac complications in children with KD was analyzed.

DESIGN/METHODS: Medical charts and ECHO (at time of admission, 3, 6, 9 weeks, and 6-12 months) of children with KD were reviewed. The association between CA lesions at 3 weeks and administration of IVIG within and after 10 days was statistically analyzed.

RESULTS: Among 71 children with KD, 11 (15.5%) developed CA lesions at 3 weeks. IVIG therapy after 10 days was more likely to be associated with CA lesions (54.6% vs. 11.7%, P<0.01).

The significant association between the development of CA lesions and IVIG administration after 10 days was confirmed in the regression model that included patients age, WBC, platelet count, and IVIG administration as dichotomous variable (Wald Statistics: P<0.05). The IVIG group was found to have higher mean leukocyte and platelet counts in patients with CA complications.

No significant association was observed between the time of IVIG administration and time for normalization of coronary complications. All patients with coronary complications were detected by echocardiogram between 1-3 weeks of onset of fever. 81.8% (9 out of 11) of children with coronary abnormality had normalization of coronary aneurysm by 3 months. The two children who had residual coronary abnormality beyond 3 months had giant, saccular coronary aneurysm which got significantly smaller by one year.

CONCLUSIONS: Late (after 10 days) treatment of KD with IVIG results in more CA lesions at 3 weeks of onset of KD but is not associated with longer resolution of CA. CA lesions after IVIG on or before 10 days is an independent factor that impact better coronary outcome in children with KD. This study shows that patients with KD treated with IVIG after 10th day of illness may still benefit in terms of the time to normalization of coronary abnormality. A large prospective study will be beneficial to address this issue.

Cardiac Effects of CNS Stimulants in Patients with ADHD: Comparing the Recommendations of the American Academy of Pediatrics

Deepak Patel, Karen Carpenter, Robert Escalera.

Pediatrics, Inova Fairfax Hospital for Children, Falls Church, VA; Pediatric Cardiology Associates PC, Fairfax, VA.

BACKGROUND: Attention deficit/hyperactivity disorder (ADHD) is a common disorder affecting up to 8 to 10 percent of all school-aged children. Stimulant drugs are effective in improving behavior in these patients. Reports of sudden unexpected deaths (SUD) among patients taking stimulant drugs have led to a debate between the AHA and the AAP concerning the safety of CNS stimulants in children with undiagnosed at-risk congenital heart disease and/or arrhythmias prior to starting stimulant medications.

OBJECTIVE: To examine patients with ADHD referred to a pediatric cardiologist for the prevalence of 1) cardiac abnormalities identified via cardiovascular screening (CVS) and 2) cardiac arrhythmia that was identified that was not associated with longer resolution of the KD. We investigated the interaction of stimulant medications with IVIG on or before 10 days is an independent factor that impact better coronary outcome in children with KD. This study shows that patients with KD treated with IVIG after 10th day of illness may still benefit in terms of the time to normalization of coronary abnormality. A large prospective study will be beneficial to address this issue.

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House Officer
CONCLUSIONS: There is no value in performing a routine EKG patient prior to starting a CNS stimulant. In those patients who are symptomatic (symptoms and/or family history of SUD), cardiology consultation is indicated. Stimulation medication significantly increases the prevalence of cardiac symptomatology. We recommend patients with cardiac symptoms be referred for a cardiology evaluation. Patients on stimulant medication need to be questioned by their physician regarding cardiac symptomatology at each follow-up visit.

Mitochondrial Function Is Limited in the Early Embryonic Heart Due to a Dysfunction in Complex I

Division of Pediatric Cardiology, University of Rochester Medical Center, Rochester, NY.

BACKGROUND: Proper cardiac function is crucial to ensure embryonic survival. The heart is the first organ to become functional during embryonic development, with the onset of beating at 8 days post fertilization (E8). Within the next 2 days (E10.5), blood begins to circulate providing nutrients to the developing embryo. Early defects in the embryonic heart can result in embryonic death or severe deformities leading to death during or shortly following birth. Although structural cardiac anomalies rarely cause demise, functional cardiac defects are much more devastating in utero.

In the adult heart, mitochondria play an important role in proper function. Mitochondrial dysfunction can result in cardiac dysfunction and eventually death. While mitochondrial function is well studied in the adult heart, which relies on complex I as its primary source of electron entry, little is known about mitochondrial function in the developing embryonic heart.

OBJECTIVE: This study employs established bioenergetic and mitochondrial proteotoxic techniques, which have been adapted and applied in whole embryonic hearts and cardiomyocytes during cardiac organogenesis (E9.5, E11.5, E13.5) to support the hypothesis that at early stages of embryonic cardiac development, mitochondrial function is limited due to an immature complex I, thus resulting in decreased ATP and increased potential for oxidative stress. The primary objective of this study is to determine the cause for the complex I dysfunction observed in E9.5 hearts, and determine its role in cardiac development.

DESIGN/METHODS: This study utilizes novel and established methods in mitochondrial bioenergetics to assess complex I functionality in primary embryonic heart culture, and whole hearts. These methods include: Clear Native PAGE, Blue Native PAGE (one and two dimensional), Epiphoresis microscopy, andometry using the Seahorse Bioscience XF24 Extracellular Flux Analyzer.

RESULTS: Data generated in this lab show that at the early stages of embryonic development (E9.5) mitochondrial membrane potential (ΔΨm) is low, and the potential for increased oxidative stress is high. A minimal change in ΔΨm is observed at E9.5 upon the addition of the complex I inhibitor rotenone. This observation is contrasted in E13.5 myocytes, which exhibit a higher sensitivity of ΔΨm to rotenone.

CONCLUSIONS: In concert, data presented suggest that at E9.5 complex I of the mitochondrial electron transport chain is non-functional.

Srin Kinase-Mediated Mechanism of CREB Protein Phosphorylation during Hypoxia in Neuronal Nuclei of Newborn Piglets

Cindy Soon, Simran Ahluwalia, Anil Zhu, Om P. Mishra, Maria Delivoria-Papadopoulos.
Dept. of Pediatrics, Drexel University and St. Christopher’s Hospital for Children, Philadelphia, PA.

BACKGROUND: Previously we have shown that hypoxia results in increased phosphorylation of cyclic-AMP response element binding (CREB) protein in the cerebral cortex of newborn piglets. It is known that intracellular Ca2+ regulates nuclear functions such as Ca2+-dependent CREB protein mediated transcription of apoptotic proteins. We have also shown that Src kinase inhibitor PP2 blocks the hypoxia-induced increase in Calcium/calmodulin dependent protein kinase IV (CaM Kinase IV) activity, which is responsible for phosphorylation of CREB protein at serine 133 in the cerebral cortex of newborn piglets.

OBJECTIVE: The present study tests the hypothesis that hypoxia-induced activation of caspase-3 is mediated by Src kinase via phosphorylation of CREB protein at Serine 133.

RESULTS: ATP (µmoles/g brain) was 4.5±0.8 in the Nx group, 2.2±0.3 in the Hx group and 3.5±1.5 in the Hx+PP2. PCR (µmoles/g brain) was 3.0±0.7 in the Nx group, 1.1±0.4 in the Hx group, and 1.8±0.79 in the Hx+PP2 group (p=NS). Caspase-3 activity (µmoles/mg protein/hr) was 1.8±0.29 in Nx, 2.1±0.75 in Hx (p=0.05 vs Nx) and 1.6±0.25 in Hx+PP2 (p=0.05 vs Hx) group. The data show that hypoxia results in increased activity of caspase-3 in the cytosolic fraction of the cerebral cortex of newborn piglets and pretreatment with Src kinase inhibitor PP2 prevents the hypoxia-induced increased caspase-3 activity.

CONCLUSIONS: Hypoxia-induced activation of caspase-3 is mediated by Src kinase. Src kinase mediated tyrosine phosphorylation of anti-apoptotic proteins, such as Bcl-2 and Bcl-xl leads to increased activation of caspase-3 and subsequent activation of caspase-3. Therefore, Src kinase inhibitor would prevent hypoxia-induced activation of CREB protein by preventing tyrosine phosphorylation of anti-apoptotic proteins, and thereby decreasing the pro-apoptotic potential of the cell. (NIH-HD-20337)

Mechanism of Increased Expression of CaM Kinase IV during Hyperoxia in the Neuronal Nuclei of the Cerebral Cortex of Newborn Piglets

Leslie A. Ridall, Qazi Asif Ashraf, Amit Mukhia, Om P. Mishra, Maria Delivoria-Papadopoulos.
Dept. of Pediatrics, Drexel University and St. Christopher’s Hospital for Children, Philadelphia, PA.

BACKGROUND: Previous studies have shown that hyperoxia results in increased calcium/calmodulin-dependent protein kinase IV (CaM Kinase IV) activity and increased phosphorylation of cyclic-AMP response element binding (CREB) protein in neuronal nuclei of the cortex of newborn piglets. We have also shown that hyperoxia results in increased generation of nitric oxide free radicals as demonstrated by increased nitration of neuronal proteins.

OBJECTIVE: The present study aims to investigate the mechanism of increased CaM Kinase IV expression during hyperoxia in the cerebral cortex of newborn piglets and tests the hypothesis that the hyperoxia-induced increased CaM Kinase IV expression is mediated by neuronal nitric oxide synthase (nNOS)-derived nitric oxide.

RESULTS: Piglets were assigned to normoxic (Nx, n=3), hyperoxic (Hx, n=3) and hyperoxic pretreated with a highly selective inhibitor of nNOS, 7-nitro-indleazo-sodium salt (Hx+7-NINA, n=3) groups. The Nx group was exposed to FiO2 of 0.21 for 1 hour. The Hx group were exposed to FiO2 of 1.0 and maintained at a PaO2 > 400 mmHg for 2 hours. Cerebral tissue levels of ATP and phosphorylcreatine (PCr) were measured biochemically to determine cerebral tissue energy status. Neuronal nuclei were isolated and separated by Western blot analysis and probed with a specific CaM Kinase IV antibody. Protein bands were detected by enhanced chemiluminescence, analyzed by imaging densitometry and band density expressed as (OD/mm²).

RESULTS: ATP (µmoles/g brain) was 4.9±1.1 in Nx, 5.1±0.5 in Hx (p<NS), and 4.8±0.7 in Hx+7-NINA (p<NS). PCr (µmoles/g brain) was 3.3±0.6 in Nx, 3.2±0.5 in Hx (p<NS), and 3.1±0.4 in Hx+7-NINA (p<NS). The density of CaM Kinase IV was 387.92±25.87 in Nx, 387.92±25.87 in Hx (p<0.05) and 373.98±21.95 in Hx+7-NINA (p<0.05 vs Hx). The data show that administration of 7-NINA prior to hyperoxia prevents the hyperoxia-induced increase in CaM Kinase IV expression.

CONCLUSIONS: The hyperoxia-induced increased expression of CaM Kinase IV is mediated by nitric oxide derived from nNOS. NO mediates modification through lipid peroxidation of neuronal nuclear membrane high affinity Ca2+-ATPase leading to increased cellular Ca2+ influx and activation of CaM Kinase IV. CaM Kinase IV results in increased phosphorylation of CREB protein that in turn further increases the expression of CaM Kinase IV protein. (NIH-HD-20337)
Effect of Neuronal Nitric Oxide Synthase (nNOS) Inhibition during Hyperoxia on Expression of CaM Kinase IV in Neuronal Nuclei of the Cerebral Cortex of Newborn Piglets

Janice Hobbs, Lynn Fuchs, David Frawley, Om P. Mishra, Maria Delivoria-Papadopoulos.

Dept. of Pediatrics, Drexel University and St. Christopher’s Hospital for Children, Philadelphia, PA.

BACKGROUND: We have shown that nitric oxide (NO) free radicals generated either in vivo or in vitro result in increased nuclear Ca2+ influx. Calcium/calmodulin dependent protein kinase IV (CaM kinase IV), located in the nucleus, is activated by increased Ca2+ influx in the neuronal nuclei of piglets. We have also shown that hyperoxia results in increased CaM kinase IV activity in neuronal nuclei.

OBJECTIVE: The present study tests the hypothesis that hyperoxia-induced increased activation of CaM kinase IV in the neuronal nuclei of the cerebral cortex of newborn piglets is mediated by NO.

DESIGN/METHODS: Piglets were divided into normoxic (Nx, n=5), hyperoxic (Hyx, FIO2 >400mmHg for 2 hrs, n=5), hyperoxia-pretreated with a non-specific NOS inhibitor, N-nitro-L-arginine, to demonstrate if CaM kinase IV activation is NO mediated (Hyx+N-NLA, 40 mg/kg i.v., 60 min prior to hyperoxia, n=5) and hyperoxia pretreated with a highly selective neuronal, NOS inhibitor 7-nitro-indazole- Na, to determine if NO is derived from nNOS (Hyx+7-NINA, 1 mg/kg i.v., 60 min prior to hyperoxia, n=3) groups. Hyperoxia was induced by exposure to FiO2 of 0.1 to maintain PaO2 >400 mmHg for 2 hrs. ATP and phosphocreatine (PCr) were determined to determine cerebral tissue energy status. Nuclear tissue was isolated and CaM kinase IV activity was determined by cell-based calcium flux assay.

RESULTS: ATP (μmol/g brain) was 4.9±1.1 in the Nx, 5.1±0.5 in the Hyx group (p=NS), 4.6±0.9 in the Hyx+N-NLA and 4.8±0.7 in the Hyx+7-NINA group (p=NS). PCR (μmol/g brain) was 3.3±0.6 in Nx, 3.2±0.5 in Hyx group (p=NS), 3.3±0.5 in Hyx+N-NLA and 3.1±0.4 in the Hyx+7-NINA group (p=NS). The activity of CaM Kinase IV (μmol/mg protein/hr) was 2117.9±1 in Nx, 2821±85 in Hyx (p<0.05 vs Nx), 2332±99 in Hyx+N-NLA (p<0.05 vs Hyx, p<0.05 vs Nx) and 2061±100 in Hyx+7-NINA group (p=0.05 vs Hyx, p<0.05 vs Nx). The data show that no specific neuronal NOS inhibitors prevent the hyperoxia-induced increased activity of CaM kinase IV in neuronal nuclei. The increased expression of CaM Kinase IV during hyperoxia is mediated by NO derived from neuronal nitric oxide synthase. NO-mediated Src and EGF tyrosine kinase-dependent tyrosine phosphorylation of calmodulin (CaM kinase activator) at Tyr286 may interact with calmodulin binding domain of CaM Kinase IV resulting in its activation during hyperoxia. (NIH-HD 20337)

Mechanism of Tyr286 Phosphorylation of Calmodulin during Hyperoxia in the Newborn Brain

Justin R. Buland, Kirstie Marcellino, Nicholas Obiri, Om P. Mishra, Maria Delivoria-Papadopoulos.

Dept. of Pediatrics, Drexel University and St. Christopher’s Hospital for Children, Philadelphia, PA.

BACKGROUND: Studies have shown that calmodulin, a Ca2+ binding protein, activates enzymes including neuronal nitric oxide synthase (nNOS). We have shown that hyperoxia results in increased Tyr286 phosphorylation of calmodulin. Calmodulin is an activator of NOS. Tyrosine phosphorylation of calmodulin occurs at Tyr286. We have also shown that hyperoxia results in increased nitration of neuronal proteins indicating generation of nitric oxide (NO) free radicals in the cerebral cortex.

OBJECTIVE: The present study aims to investigate the mechanisms of calmodulin modification during hyperoxia and tests the hypothesis that hyperoxia-induced increased Tyr286 phosphorylation of calmodulin in the cortex of newborn piglets is mediated by NO derived from nNOS.

DESIGN/METHODS: Piglets were divided into normoxic (Nx, n=3), hyperoxic (Hyx, n=5) and hyperoxia-pretreated with a highly selective nNOS inhibitor 7-nitro-indazole sodium salt (Hyx+7-NINA, 1mg/kg i.v., prior to hyperoxia, n=3) groups. Hyperoxia was induced by exposure to FiO2 of 0.1 to maintain PaO2 >400 mmHg for 2 hrs. ATP and phosphocreatine (PCr) were determined to determine cerebral tissue energy status. Nuclear tissue was isolated and tyrosine phosphorylation of calmodulin was determined by Western blot analysis using anti-phospho-(Tyr286)-calmodulin antibody. Protein bands were detected, analyzed by densitometry and expressed as absorbance.

RESULTS: ATP (μmol/g brain) was 4.9±1.1 in the Nx, 5.1±0.5 in the Hyx group (p=NS), and 4.8±0.7 in the Hyx+7-NINA group (p=NS). PCr (μmol/g brain) was 3.3±0.6 in the Nx, 3.2±0.5 in the Hyx group (p=NS) and 3.1±0.4 in the Hyx+7-NINA group (p=NS). The density of pTyr286 calmodulin (ODnm) was 460.50±52.47 in Nx, 669.99±13.05 in Hyx and 449.02±39.56 in Hyx+7-NINA. The data show that administration of nNOS inhibitor 7-NINA prior to hyperoxia prevented the hyperoxia-induced increased Tyr286 phosphorylation of calmodulin.

CONCLUSIONS: The hyperoxia-induced Tyr286 phosphorylation of calmodulin is mediated by NO derived from nNOS. NO free radicals generated during hyperoxia lead to inactivation of protein tyrosine phosphatases SHPTP1 and SHPTP2 resulting in increased tyrosine phosphorylation of calmodulin. Tyrosine phosphorylated calmodulin, as compared to the non-phosphorylated moiety, binds with a higher affinity at the calmodulin binding domain of nNOS leading to increased activation of nNOS and increased generation of NO. (NIH-HD 20337)

Effect of Chronic Postnatal Inflammation on Somatic and Brain Growth in Mice

Shadi N. Maleeb, Jonathan M. Davis, Olaf Dammann, Maribel Rios.

Pediatrics, The Floating Hospital for Children, Boston, MA; Neuroscience, Tufts University, Boston, MA.

BACKGROUND: Perinatal systemic inflammation is associated with damage to the developing brain. Intraperitoneal (IP) Lipopolysaccharide (LPS) administration to newborn mice pups has been used as a model for systemic inflammation. There is paucity of data to show the effect of postnatal inflammation on brain growth in newborn mice.

OBJECTIVE: Test the hypothesis that daily IP administration of LPS for 10 days significantly affects body and brain weights in juvenile mice pups.

DESIGN/METHODS: C57BL/6J mice pups in the experimental (LPS; N=22) group received daily IP injections of 0.3µg/gm LPS (E. coli O55B5; Sigma-Aldrich) between day 3 and day 13 of life. Pups in the control group (N=26) received equivalent volumes of vehicle solution IP. Three litters were included in each group. The pups were sacrificed under isoflurane anesthesia on day 14. Total body weight, wet brain weight, and brain to body weight ratios were compared between the 2 groups by t-test.

RESULTS: A total of 13 pups in the LPS group, and 19 pups in the control group survived to day 14 (59% vs. 73%; P=NS). Pups in the LPS group weighted 5.98±0.45g and pups in the control group weighted 5.71±0.22 g at day 14 (M±SEM; P=NS). Pups in the LPS group had an average daily weight gain of 0.22±0.01 g/day, and pups in the control group had an average daily weight gain of 0.15±0.01 g/day (M±SEM; P<0.03). The average brain weight was 0.34±0.007 g for pups in the LPS group, and 0.38±0.007 for pups in the control group (M±SEM; P<0.01). The brain to body weight ratio was 10.5% less in pups in the LPS compared to pups in the control group (P<0.01; Figure).

CONCLUSIONS: Chronic postnatal systemic inflammation was associated with an increased rate of somatic growth and reduced brain weight at two weeks of age in mice. This has important implications in newborn infants with sepsis or other conditions associated with inflammation and could explain longer term neurodevelopmental impairments.
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**Fellow in Training**

**Hypothermia Attenuates Hyposcopic Neuronal Insults in C Elegans**

Saima Ahab, Robert Kalb.


BACKGROUND: The neonatal brain is extremely vulnerable to hypoxia. Previous human and animal studies have demonstrated that hypothermia decreases the severity of brain injury after a hypoxic ischemic insult. Hypothermia is a therapeutic modality now used to limit the severity of brain injury in neonatal hypoxic ischemic encephalopathy. The effect of hypothermia on the individual neuron specifically at a time point remote from the initial hypoxic insult is not well characterized. The soil nematode Caenorhabditis elegans (C. elegans) has several useful features that enable investigation of neuroprotective effects of hypothermia after a hypoxic insult.

OBJECTIVE: To study the effect of hypothermia on the degree and severity of hypoxic neuronal injury in C. elegans.

DESIGN/METHODS: In our previous work we have demonstrated that C. elegans neurons are selectively vulnerable to hypoxic insults. We obtained worm strains in which green fluorescent protein (GFP) was expressed in the neurons known to be most vulnerable to hypoxia. These were AFD, ADE and PDE neurons. We subjected synchronized larval stage L4 worms to 48 hrs of anoxia (FiO2<0.5%) at 20°C followed by return to normoxia at either 20°C or at a hypothermic temperature 15 °C. The integrity of individual neurons was examined at these two different temperatures at 24 and 72 hr time points. The degree of neuronal injury was graded from normal to severe injury in each of the individual neurons.

RESULTS: We noted an overall similar survival in the groups at the two different temperature conditions. Examination of the morphology of neurons revealed a difference in the severity of axonal injury between the hypothermia group and the group that recovered at normal temperature. At 24 hrs all three neuron types showed a significantly less severe degree of neuronal injury for the worms placed in a hypothermic environment after the anoxic insult than the worms that were left at normothermic conditions (p<0.05). This protective effect of hypothermia was sustained when these neurons were again examined at the 72 hrs time point.

CONCLUSIONS: Hypothermia attenuates the degree of hypoxic neuronal injury in C. elegans, and the worm is a unique model system to study mechanisms and pathways effecting hypoxic neuronal injury.

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**Fellow in Training**

**Amplitude EEG (aEEG) Response during Surgical Ligation (SL) of a Patent Ductus Arteriosus (PDA) in Preterm Infants (PI) Is a Potential Measure of Pain Control**

Erycinal Kasdorf, Murray Engel, Jeffrey M. Perlman.

Pediatrics, Weill Cornell Medical College-New York Presbyterian Hospital, New York, NY; Neurology, Weill Cornell Medical College-New York Presbyterian Hospital, New York, NY.

BACKGROUND: Recent studies have demonstrated increased risk of neurodevelopmental impairment following SL of a PDA, the mechanisms of which are unclear. Intra-operative stress as a consequence of inadvertent pain may be a contributing factor. Hypothesis: Pain, as evidenced by an ↑ in heart rate (HR) and blood pressure (BP), during surgical PDA ligation will be accompanied by an elevation in aEEG voltage (µV).

OBJECTIVE: To characterize changes in aEEG signal in preterm neonates undergoing surgical PDA ligation, and to determine whether these changes are accompanied by ↑ in HR and BP.

DESIGN/METHODS: A prospective, observational, cohort study of preterm infants with PDA requiring SL. Cerebral function monitoring was used to obtain aEEG for 40 min. prior to, during surgery, and for two hours post-op. HR and BP were similarly recorded. All patients were paralyzed and administered fentanyl. Data were analyzed using Student’s t-tests.

RESULTS: Mean±SE: ∆ heart rate (HR) and blood pressure (BP), during surgical PDA ligation will be accompanied by an elevation in aEEG voltage (µV).

<table>
<thead>
<tr>
<th>Intra vs. Pre-op</th>
<th>Post vs. Intra-op</th>
<th>Post vs. Pre-op</th>
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<tr>
<td>Mean Δ HR BPM</td>
<td>18.3 ± 12.5*</td>
<td>30.0 ± 7.9*</td>
</tr>
<tr>
<td>Mean Δ BP mm Hg</td>
<td>5.4 ± 5.6**</td>
<td>2.6 ± 4.1 NS</td>
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BPM= beats per minute; NS = non-significant

CONCLUSIONS: HR and BP ↑ significantly during SL of a PDA in PI. The aEEG became suppressed with anesthesia, however at maximum heart rate there was a concurrent elevation in the aEEG. In many cases maximum HR occurred during skin closure, suggesting a response to pain. The aEEG may be a powerful adjunct in optimizing pain control during surgical procedures such as PDA ligation. Local anesthetic should be considered for skin closure.

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**Evaluation of Use and Parental Perception of Improvement in Disease Symptoms with Complementary and Alternative Medicine in Patients with Attention Deficit Hyperactivity Disorder Currently Undergoing Conventional Treatment**

Monideep Dutt, Jose Serruya, Arati Reddy, Louis Primavera, Fernanda Kupferman, Rusly Karsano, Kanchana Rovchoudhury, Susana Rapaport, Partha Chatterjee.

Pediatrics, Flushing Hospital Medical Center, Flushing, NY; Pediatrics, Jamaica Hospital Medical Center, Flushing, NY; Graduate School of Psychology and Health Sciences, Touro College, New York, NY.

BACKGROUND: Attention deficit hyperactivity disorder (ADHD) affects 3-12% of school-aged children and up to 30% of patients treated with stimulant medications experience side effects. Parental concern with long-term use of these controlled substances may make them seek complementary and alternative medication (CAM) that are “more natural and safer.” Literature review shows usage of CAM in ADHD but more knowledge is needed.

OBJECTIVE: To understand and evaluate use of CAM and parental perception on improvement in symptoms in patients with ADHD.

DESIGN/METHODS: This was a descriptive prospective study. A questionnaire was offered to parents of children between 6-18 years with ADHD. Demographic data, source of information for specific CAM, its providers and reasons for use were obtained. Perceptions of improvement in symptoms were recorded. Data were analyzed using percentages for descriptive statistics and Pearson’s Chi square (p<0.05 being significant) for comparisons between CAM use and the independent variables recorded.

RESULTS: Of 68 children, 82.4% used CAM and 73.2% used more than one CAM. Only 37.5% informed their primary doctor of CAM use. Usage of CAM was more prevalent when ADHD diagnosis was made by subspecialists, namely neurologists and developmental specialists (p<0.04). No significant difference was noted between use of CAM and ADHD subtypes, time since diagnosis, type of conventional medication; patient age, gender, country of descent; parental education, duration of stay in US, income, health insurance; child’s educational proficiency, class placement and disciplinary actions (p=0.05). Conventional medication was discontinued by 30.4% of subjects, of which 88.2% used only CAM. Among those, 76.5% used CAM because of parental beliefs and 53% used it because the parents themselves did. Up to 41% of parents feared side effects of conventional medication. The parental perception of improvement in symptoms were between 20-100% using different CAM.

CONCLUSIONS: CAM was widely used among ADHD patients. Parents perceived significant improvement in symptoms with CAM. A minority of parents share information on CAM with the primary doctor and CAM was more likely to be used in patients diagnosed by subspecialists.

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**Traditional Pulmonary Function Testing Interpretation Underestimates Obstructive Airway Disease by Ignoring the Small Airway**

Patricia Vidal Edmondson.

Pediatrics, Division of Pediatric Pulmonology, Flushing Hospital Medical Center, Flushing, NY.

BACKGROUND: Reduction in forced expiratory flow between the 25% and 75% of the forced vital capacity (FEV1-75%FVC) has been almost completely ignored in pulmonary function testing (PFT) literature, despite recent emphasis on the importance of the small airway, the historical definition of obstructive airway disease (OAD) - a reduction in forced expiratory flow in 1 sec (FEV1) & reduction of the FEV1/FVC vital capacity ratio (FEV1/FVC) - continues to be used, & FEV2-75% remains ignored, leading to OAD underdiagnosis. We have noted this trend in our own institution where PFTs are read by 2 pediatric pulmonologists(APs).

OBJECTIVE: To analyze pediatric PFT data at FFMC from 1/03-9/10, and compare official interpretations by APs vs the pediatric pulmonologist [AP(P)/PVE] who re-interprets data on the patients seen in our pediatric out and in-patient departments, and determine the incidence of missed diagnosis of OAO.

DESIGN/METHODS: 110 patients, age range 6 to 18 yrs with a history of (hx/o) or possible asthma, performed 118 PFTs, (spirometry, lung volume measurement, and diffusion capacity).

RESULTS: 6:00 PM-7:30 PM

**Pulmonary & Asthma**

**Poster Session**

Friday, March 25, 2011

6:00 PM-7:30 PM

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**Traditional Pulmonary Function Testing Interpretation Underestimates Obstructive Airway Disease by Ignoring the Small Airway**

Patricia Vidal Edmondson.

Pediatrics, Division of Pediatric Pulmonology, Flushing Hospital Medical Center, Flushing, NY.

BACKGROUND: Reduction in forced expiratory flow between the 25% and 75% of the forced vital capacity (FVC), reflecting small airway obstruction has been almost completely ignored in pulmonary function testing (PFT) literature. Despite recent emphasis on the importance of the small airway, the historical definition of obstructive airway disease (OAD) — a reduction in forced expiratory flow in 1 sec (FEV1) & reduction of the FEV1/FVC vital capacity ratio (FEV1/FVC) — continues to be used, & FEV2-75% remains ignored, leading to OAD underdiagnosis. We have noted this trend in our own institution where PFTs are read by 2 pediatric pulmonologists (APs).

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RESULTS: 6:00 PM-7:30 PM

**PFT Diagnosis, AP vs PP**

**PFT Diagnosis**

<table>
<thead>
<tr>
<th>Read by AP</th>
<th>Read by PP</th>
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<tr>
<td>BAD (AD)</td>
<td>117%</td>
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<tr>
<td>Incorrectly read as NL</td>
<td>73 (65%)</td>
</tr>
<tr>
<td>Correctly read as NL</td>
<td>20 (18%)</td>
</tr>
<tr>
<td>(23 (20%)</td>
<td></td>
</tr>
</tbody>
</table>

**PFT Diagnosis**

**Read by AP**

**Read by PP**
Out of 112 PFTs: 85(76%) were read as OAD by PP vs only 12(11%) by AP. 73(65%) were erroneously read as normal(NL) by ignoring the presence of decreased FEF25-75 and or increased RV, & 10(1%)as limited vs 0 by PP. Only 36(32%) were correctly interpreted as NL(20(18%) OAD(12) [1%] or limited(4.4%) by AP. 23(20%) were NL by PP. Further, 16(14%) were erroneously read as limited but read as OAD(13 [11%]), & NL(3, [0.3]).

CONCLUSIONS: The majority of pediatric PFTs were erroneously read as NL by APs yielding the wrong diagnosis in 70 patients. It is likely that the historical tradition of ignoring abnormal FEF25-75, which is present in the majority of our patients, continues to undermine the presence of OAD. The pediatric practitioner must be aware of this deficit by interpreters of PFTs and review the data themselves to aid in their diagnosis, treatment and follow-up of patients with OAD.

34

House Officer
Younger Infants with RSV Bronchiolitis: Should We Admit Them?
Gaston I Zyberg, Ramkumar Narayanan, Fernanda Kupferman, Lily Q. Lew, Susana Rapaport, Rusly Harsono.

Pediatrics, Flushing Hospital Medical Center, Flushing, NY.

BACKGROUND: Studies have shown that infants < 3 months of age are at risk for severe respiratory syncytial virus (RSV) infection. Although RSV infection is often mild and self-limited, the clinical course for infants with mild or severe disease is difficult to predict at onset. As a result, practitioners hospitalize infants less than 3 months of age with RSV regardless of their respiratory symptom severity.

OBJECTIVE: To identify the relationships between chronological age and clinical severity, the need for hospitalization in children <2 years of age admitted for RSV infection.

DESIGN/METHODS: We reviewed medical records of previously healthy children < 2 years of age with confirmed RSV infection that were admitted to our hospital for 2 consecutive RSV seasons (Oct'08 - Apr'10). Clinical severity was done using 6 different composite clinical respiratory disease scores (CST).

CONCLUSIONS: Chronological age does not necessarily determine severity of RSV respiratory disease. Age does not serve as single determinant to admit children with RSV infection. Composite clinical respiratory disease score may help identify children potentially having more than mild disease.

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Severity of Illness and Use of the ‘Medical Home’ during the First vs. Second Waves of 2009 Influenza A (H1N1) in a Pediatric Healthcare Facility

Department of Pediatrics, Columbia University College of Physicians & Surgeons, NY, NY; National Center for Disaster Preparedness, Mailman School of Public Health, Columbia University, NY, NY; Department of Pediatrics, Weill Cornell Medical College, NY, NY; Department of Infection Control & Prevention, New York-Presbyterian Hospital, NY, NY.

BACKGROUND: We previously reported the severity of illness and the distribution of home zip codes of children hospitalized at our pediatric healthcare facility in New York City (NYC) during the first wave of the 2009 Influenza A (H1N1). We hypothesized that during the second wave the severity of illness would increase and the distribution of home zip codes of hospitalized children would be more diverse as the pandemic spread.

OBJECTIVE: To compare severity of illness and distribution of home zip codes of hospitalized children in the first vs second wave of the 2009 Influenza A (H1N1).

DESIGN/METHODS: We reviewed the electronic medical records of patients < 18 years old with positive laboratory test(s) for influenza A hospitalized from May 2009-April 2010. Differences in the severity of illness in the first vs second wave were assessed by means and proportions using appropriate statistical tests. Cartographic representations and spatial cluster analyses of cases by home zip code were performed.

RESULTS: During the second vs. first wave, fewer children were hospitalized (76 vs. 115), but a comparable portion were admitted to the Pediatric ICU (20 vs. 30%), had bacterial superinfections (13 vs. 3.5%) and/or died (0% vs. 0.9%). In both waves, cluster analysis revealed that a similarly high number of hospitalized children lived in zip codes close to the uptown children’s hospital. During the second vs. first wave, more hospitalized children were from zip codes outside of NYC (17/76, 22.4% vs. 8/115, 7.0%, p<0.002). Of these 25 children, 13 (52%) had been seen previously at our facility for chronic medical conditions. CONCLUSIONS: At our pediatric facility in NYC, fewer children were hospitalized with 2009 Influenza A(H1N1) during the second wave, but both waves had a similar illness severity, low mortality, and geographic clustering. However, more patients from distant zip codes were hospitalized during the second wave, 50% of whom had been previously treated at our facility for comorbid conditions. These findings suggest that as the pandemic spread beyond NYC, affected children with comorbid conditions continued to appropriately seek care at their ‘medical home’.

These findings have important implications for future pandemic planning and resource allocation in pediatrics.

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Increased LDL-Cholesterol (LDL-C) in HIV-Infected Children on Highly Active Antiretroviral Therapy (HAART)
Prab Raisbhandari, Sudeshan Subedi, Stefan Hagnann, Murli Purserwa, Milted Maldonado.

Department of Pediatrics, Bronx-Lebanon Hospital, Bronx, NY.

BACKGROUND: HAART has converted pediatric HIV into a chronic disease. As the number of HIV + children survive into adulthood, the adverse effects of HAART has surfaced. A wide range of lipid abnormalities has been described in HIV infected adults on HAART but fewer data exist in children.

OBJECTIVE: To measure the prevalence of elevated LDL-C in HIV-infected children on HAART attending our pediatric ID clinic and identify associated risk factors.

DESIGN/METHODS: A retrospective chart review was done for all HIV-infected children on HAART(0-18 years old) attending our Pediatric ID Clinic from Jan,08- Dec,08. The data on variables including gender, age, race, BMI, HIV RNA count, CD4 count and antiretroviral medications were collected. These factors in association with elevated LDL-C were then investigated using logistic regression analysis. NCEP(National Cholesterol Education Program) guideline was used to compare the elevated LDL-C levels.
RESULTS: All 27 patients, 18 yrs on HAART who attend our pediatric ID clinic were included.

Demographics
No of HIV infected patient on HAART

| GENDER | | | |
| Male | 15 | | |
| Female | 12 | | |

MODE OF TRANSMISSION
a) Vertical transmission | | |
| Horizontal transmission | | |

RACE
a) Hispanic | | |
| African-American | | |
| Asian | | |
| Other | | |

TYPE OF ANTIRETROVIRAL
a) PI regimen | | |
| NNRTI/NNRTI regimen | | |

RESULTS: All 27 patients, 18 yrs on HAART who attend our pediatric ID clinic were included.

11/27(41%) were found to have a BMI >85 percentile. 7 of these 11(64%) had BMI of >95 percentile. 15/27(42%) were found to have LDL-C > 160,11/27(32%) had LDL-C between 130-160mg/dl and 74/27(26%) had levels <130 mg/dl. No statistical association was seen between elevated LDL-C and elevated BMI (p=0.97), CD4 count (p=0.2) and type (PI/RTI/RTNI) of ART (p=0.7). Race, age and gender did not show a statistical correlation with elevated LDL-C. Only HIV viral load of <75/ ml showed a trend towards statistical association with elevated LDL-C (p=0.07, CI 0.6-89.7).

CONCLUSIONS: The prevalence of dyslipidemia in HIV infected children on HAART as defined by elevated LDL-C in our population was 26%(95% CI, 11.1%-46.3%). Only undetectable HIV-viral load indicating excellent adherence to antiretroviral medication showed a trend towards statistical association with elevated LDL-C.

Further analyses with a larger sample size will be needed to confirm our findings and evaluate factors influencing lipid changes. Further research in this area will form the basis for management guideline.

Neonatology
Poster Session
Friday, March 25, 2011

Less Is More: Cost Savings of Fluid Restriction in Transient Tachypnea of the Newborn
Annemarie Stroustrup, Leonardo Trasande, Jan R. Holzman.
Division of Newborn Medicine, Kravis Children’s Hospital, Mount Sinai Medical Center, New York, NY; Department of Pediatrics, Kravis Children’s Hospital, Mount Sinai Medical Center, New York, NY; Department of Preventive Medicine, Mount Sinai Medical Center, New York, NY; Mount Sinai School of Medicine, New York, NY.

BACKGROUND: Transient tachypnea of the newborn (TTN) is a self-limited respiratory distress syndrome of the first days of life. Respiratory distress increases medical intensity and overall hospital charges and therefore cost of hospitalization. Although TTN is a common diagnosis of term and late preterm neonates, little data underlie current management of TTN. We executed a successful prospective randomized controlled trial to demonstrate the clinical utility of mild fluid restriction for neonates with TTN. Here we evaluate the financial implications of our fluid management strategy.

OBJECTIVE: To determine whether fluid restriction in neonates with TTN leads to decreased cost of hospitalization.

DESIGN/METHODS: Term and late preterm neonates with TTN were randomized to either standard fluid management or restricted fluid management mimicking early breast feeding. The primary study outcome was total charges generated during the birth hospitalization. Secondary outcomes included component charges such as physician, nursing, hospital direct, and hospital indirect charges. Charges were defined as total billable amount before negotiated discounts, not amount actually received for services.

RESULTS: The financial records of 61 study patients were available. There were no significant demographic or clinical differences between the standard and restricted fluid groups. No adverse events due to fluid restriction occurred. Analysis by t-test demonstrated no difference in costs for the study cohort as a whole. Those patients with severe TTN who received fluid restriction had mean total hospital charges of $29,406.54 while patients with severe TTN who received standard fluid management had mean hospital charges of $46,706.92 (p=0.003). This significant decrease in charges for fluid restricted neonates with severe TTN was seen in physician billing, hospital direct, and hospital indirect charges (p=0.001 to p=0.012).

CONCLUSIONS: This is the first study to demonstrate a potentially cost-saving treatment for TTN. Transient tachypnea of the newborn is a common disease with an estimated 2% incidence among 4 million US births annually. Approximately 40% of cases are severe. If the $17,000 average savings we saw in our study are replicated nationally, the savings could reach a potential $544 million annually in the US alone. Mild fluid restriction may not only improve care for patients with severe TTN, but also may reduce health care costs as well.

Effect of Perinatal Prophylaxis for Group B Streptococcus on Severity of Transient Tachypnea of the Newborn
Annemarie Stroustrup, Roxane Perez, Elissa De Lorenzo, Jan R. Holzman.
Division of Newborn Medicine, Kravis Children’s Hospital, Mount Sinai Medical Center, New York, NY; Department of Pediatrics, Kravis Children’s Hospital, Mount Sinai Medical Center, New York, NY; Department of Preventive Medicine, Mount Sinai Medical Center, New York, NY; Mount Sinai School of Medicine, New York, NY.

BACKGROUND: Inflammatory response to group B streptococcus (GBS) cell wall phospholipids causes respiratory distress in baby lambs. Newborn humans born to appropriately managed GBS positive mothers are exposed to GBS cell wall components at the time of delivery what when antibiotics prevent colonization of the newborn. Although GBS is a common cause of early onset TTN, studies have shown conflicting results.

OBJECTIVE: To determine the role of exposure to GBS cell wall phospholipids in the clinical course of TTN.

DESIGN/METHODS: This is a retrospective case-control study of newborns admitted to the NICU with TTN between 2001 and 2006. Student’s-t, linear regression and analyses of variance were performed to determine the relationship between perinatal exposure to GBS, exposure to antibiotics, and severity of TTN. Severity of TTN was defined by number of hours of continuous positive airway pressure (CPAP) support, number of hours of supplemental FIO2, and duration of admission in the NICU.

Role of CXCR2 and Heparan Sulphate Proteoglycan in CXCL5-Regulated Chemokine Clearance and Lung Inflammation
Junjie Mei, Ning Dai, YuHong Liu, Samithambam Jeyaseelan, Janet S. Lee, G. Scott Worthen.
Neonatology, Children’s Hospital of Philadelphia, Philadelphia, PA; Pathobiological Sciences, Louisiana State University School of Veterinary Medicine, Baton Rouge, LA; Pulmonary, Allergy, and Critical Care Medicine, University of Pittsburgh School of Medicine, Pittsburgh, PA.

BACKGROUND: Our previous work demonstrated that CXCL5/LIX elevates KC and MIP-2 levels in plasma at least in part through binding to DARC and inhibiting its chemokine scavenging in blood, thus leading to CXCR2 desensitization and unfavorable chemokine gradients from blood to the lungs. Impaired neutrophil migration and bacterial clearance in the lungs, and increased mortality in a severe E.coli pneumonia model (odds ratio 5.45, 95% CI, 2.62-11.4). An up-to-date general immunization status was the only other factor that was associated with completion of a Syngene course (odds ratio 5.45, 95% CI, 2.62-11.4).

RESULTS: There were 3,362 infants in this cohort and 42% (n=1,419) received at least one injection of Synagis. There were racial differences in rates of successful immunoprophylaxis between African Americans and Whites, with 15.7% of Whites and 29.9% of African Americans failing to complete their recommended course of Synagis once initiated (p=0.001). After controlling for other confounding factors, multivariable analysis revealed that African American patients were less likely to complete the course relative to Whites (odds ratio 0.56, 95% CI, 0.34-0.93). Further analyses with a larger sample size will be needed to confirm our findings and evaluate factors influencing lipid changes. Further research in this area will form the basis for management guideline.

CONCLUSIONS: There are racial differences in the rates of successful RSV immunoprophylaxis that are independent of markers of socioeconomic status and gestational age.

6:00 PM-7:30 PM

6:00 PM-7:30 PM

2011 ESPR Abstracts
RESULTS: During the study period, 875 term and late preterm neonates were identified in our local discharge diagnosis database as having TTN. Only 478 (55%) had TTN confirmed on medical record review. Perinatal GBS exposure was known for 272 patients. Antibiotic exposure was known for all. One hundred seventy-nine patients with known maternal GBS status were exposed to antibiotics in the perinatal period. Of these, 61 were GBS-exposed and 118 were not. There was no difference in severity of TTN amongst neonates with GBS and antibiotic exposure, antibiotic exposure alone, or neither GBS nor antibiotic exposure.

CONCLUSIONS: In our patients with TTN, exposure to GBS and antibiotics does not correlate with increased severity of respiratory illness. This retrospective study indicates that it is unlikely that human neonates experience clinically significant respiratory symptoms due to exposure to GBS cell wall phospholipids. Additionally, this study demonstrates the inadequacy of discharge diagnosis databases for case identification of patients with TTN.

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The Development of a Decision-Aid To Guide Counseling of Parents Facing Iniemnt Extreme Premature Delivery

Children’s Hospital of Philadelphia, Philadelphia, PA; Harvard Medical School, Boston, MA; McMasters University, Hamilton, Canada.

BACKGROUND: Greater parental autonomy in decision-making at lower limits of neonatal viability warrants effective communication of complex information at a time of high stress. Transparent decision-aids may assist this goal.

OBJECTIVE: To develop and assess the validity of a decision-aid for parents facing extreme prematurity delivery.

DESIGN/METHODS: Semi-structured interviews were conducted until saturation was reached, to define the content and presentation formats of a decision aid. Interviews with health care professionals and with parents of premature infants <26 wks GA identified items and formats of information valued by parents when making resuscitation decisions. Standard methods of item development, selection and reduction distilled items into a novel decision aid. Validity was evaluated by testing the hypothesis that an effective decision-aid would improve knowledge in a group of ‘experienced’ parents (previous premature delivery) and a group of healthy women with no prior (‘naïve’) knowledge of premature infants. Sample size estimations were 10 per group (power 90%, α 0.05, with clinically relevant knowledge increment of 30%).

RESULTS: 31 health care workers (nurses, neonatologists, obstetricians) and 30 parents were interviewed to obtain saturation of themes. Both clinicians and parents identified a visual format as preferable for presenting complex information on survival, short-term morbidity, and long-term outcomes. Parents also stressed a need for numeric figures. Accordingly, a set of six 13cm × 22cm cards covered: size and appearance of an extremely premature infant; BPD; IVH; and ROP. A horizontal icon array depicted survival rates from 22+0 to 25+6 wks and risk for the individual components of neurodevelopmental impairment at 24 months. Pre- and post-test knowledge in a hypothetical counseling session showed significant improvement in a group of 13 ‘experienced’ parents (p=0.04); and an even greater improvement in a group of 11 ‘naïve’ women (p=0.0001). Moreover, in a 5-question survey, most participants found the cards useful and easy to understand.

CONCLUSIONS: A decision-aid used at the time of counseling prior to delivery of an extremely premature infant was constructed that conveyed both numeric and qualitative information that could be understood. Such aids may improve the transfer of complicated information from clinicians to parents.

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Fellow in Training
Placental Transfusion Strategies in Preterms <1000 g BW: Meta-Analysis of Short and Long Term Outcomes

Neonatology, Children’s Hospital of Philadelphia, Philadelphia, PA; Neonatology, Brighton and Sussex University Hospital, Brighton, Sussex, United Kingdom; College of Nursing, University of Rhode Island, Kingston, RI, Department of Neonatology, Bnai-Zion Medical Center, Haifa, Israel; Department of Pediatrics and Child Health University School of Medicine, Tokyo, Japan.

BACKGROUND: Delayed umbilical cord clamping (DCC) or umbilical cord milking (UCM) in neonates <1000 g BW carries promise to minimize transfusions. NRP now recommends DCC in term infants, but there is little information on outcomes of preterms <1000g BW with DCC/ UCM.

OBJECTIVE: To perform a meta-analysis of short and long term outcomes of infants <30 weeks GA and <1000 g BW randomized to either DCC or UCM as opposed to immediate cord clamping (ICC).

DESIGN/METHODS: We searched for trials that randomized preterm infants to either experimental (DCC or UCM) or control (ICC) groups. Inclusion criteria included infants <1000 g BW. Primary outcome was survival. Secondary outcome was number of transfusions. Two independent investigators conducted searches with full agreement. Additional information was requested of authors. Data was summarized by RevMan5 as weighted mean difference (WMD) and 95% CI.

RESULT: Searches yielded 15 studies, of which 6 were included, describing 108 infants. Short term benefits of DCC/UCM included: mean blood pressure on admission (WMD -4.9 CI -5.58, -4.22) and increased hemoglobin on admission (WMD 3.71 CI 3.94, 3.47). Clinically relevant, statistically significant short term benefits included reduced number of blood transfusions and shortened number of days on ventilator (see Figure). Data on NDI was limited and could not be pooled. One study (Mercer J) recorded Bayley at 7 months for 27 infants (WMD MDI -4.49 CI -18.02, +9.22; p=NS). Another study (Hosono) followed survivors to 24 months using a Japanese scale. This study found no significant differences in rates of disability (UCM 3/16 19% vs ICC 4/15 27%; p=NS).

CONCLUSIONS: Only one study reports 24 month NDI, and no pooling is possible. Short term benefits of DCC include rise in hemoglobin, decreased number of transfusions and shorter days on ventilator.

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Fellow in Training
Age Dependent Inter-alpha Inhibitor Protein (IAIP) Concentration in Plasma and Expression in Ovine Liver, Kidney and Heart
Marya Spasova, Grzyna B. Sadowska, Yow-Pin Lim, Barbara S. Stonestreet.

Pediatrics, Women and Infants Hospital, Brown University, Providence, RI; ProThera Biologics, East Providence, RI.

BACKGROUND: IAIPs are a family of protein inhibitors that reduce proinflammatory cytokines during sepsis, increase survival in newborn mice with sepsis, and reduce ischemic brain injury in rats. Low plasma IAIP levels predict necrotizing enterocolitis and sepsis in premature infants. We have shown that the 125 kDa and 250 kDa proteins are expressed in brain throughout ovine development. The 250 kDa protein is higher in adult than newborn and fetal brain and 125 kDa expression lower in newborn brain than all other ages.

OBJECTIVE: To determine IAIP levels in plasma and protein expression in liver, kidney, and heart at different stages of ovine development.

DESIGN/METHODS: We developed an ELISA for ovine plasma IAIPs and measured levels in fetuses at 70% and 90% gestation, newborn, and adult sheep. Liver, heart, and kidney samples were frozen, protein expression determined by Western immunoblot, densitometry performed, and results expressed as a ratio to an internal control.

RESULTS: Plasma IAIP concentrations were higher (P=0.05) in newborns (110±30 µg/ml) than fetuses at 70% (64±29) and 90% (55±29) gestation, and higher in adults (102±30) than fetuses at 90% gestation. IAIPs were detected as 250 kDa and 125 kDa proteins in liver, kidney, and heart in fetal, newborn, and adult shear. The 250 kDa IAIP expression was higher (P=0.05) in liver and kidney of adults than fetuses and newborns, but did not differ among age groups in heart. The 125 kDa expression was highest in liver in fetuses at 90% gestation, higher in kidney in fetuses at 70% gestation, adults than fetuses at 90% gestation, and higher in heart in fetuses at 70% gestation than 90% gestation, newborns, and adults.

CONCLUSIONS: Plasma IAIP levels increased after birth in sheep. IAIPs were detected in liver, kidney and heart throughout ovine development as 250 kDa and 125 kDa proteins. Similar to our findings in brain, expression of the 250 kDa proteins was higher in adults than fetuses and newborns in kidney and liver, but not heart. We have shown for the first time that this immunomodulatory protein is present in ovine liver, kidney, and heart, and the proteins exhibit organ specific patterns of developmental regulation. Although the functions of IAIPs are not known, their presence in large amounts raise the possibility that they represent endogenous anti-inflammatory molecules with organ specific differential production or modulation during development.

45

Fellow in Training
Transient In Utero Knockout (TIUKO) of the Cystic Fibrosis Transmembrane Conductance Regulator (CFTR) Gene Results in Gut Immaturity and Inflammation in Adult Sprague-Dawley Rats

Neonatology, Stony Brook University Hospital, Stony Brook, NY.

BACKGROUND: CFTR mediates stretch-induced transmembrane flow, signalling organ development. The 125 kDa and 250 kDa proteins are expressed in brain throughout ovine development. The 250 kDa protein is higher in adult than newborn and fetal brain and 125 kDa expression lower in newborn brain than all other ages.

OBJECTIVE: To determine gut maturation & intestinal inflammation in adult Sprague-Dawley Rats (SDR) exposed to TIUKO.

DESIGN/METHODS: 2 litters of time-pregnant SDR underwent in-utero injection of replication-deficient adenoviral vector containing the antisense CFTR. (AS CFTR) gene fragment or Enhanced Green Fluorescence Protein control on embryonic day e15. At 18 months, intestines were harvested in both the fed & 24hr fasting states. Polymorphonuclear cells (PMNs) were counted in 15 high power fields at 40x magnification from from upper, middle & lower intestine. Hydrolorses secretion staining was performed. Immunohistochemistry of CD25, TNFα, IL1β & TGF β for Synaptophysin & Synaptic Vesicle Protein 2 (SV2) was performed. Digital image analysis was used for quantification. ANOVA testing with Bonferroni correction was used for analysis.
RESULTS: CSF-treated intestine demonstrated increased levels of SV2, Synaptophysin & CD 25. AS CSF upper intestinal segments in the fed state had increased levels of PMNs/hpf than fed controls (p<0.001). In the middle intestinal segments, PMNs were increased in AS CSF fed animals compared to control (p<0.01) but were not different from fasting groups. PMNs were increased in the lower intestine of the fed AS CSF group compared to control (p<0.05), but were lower than from AS CSF fasting group. PMNs were increased in the AS CSF fasting group compared to controls in the upper intestine (p<0.001). Levels in the lower intestine were highest in the AS CSF feeding group compared to both the AS CSF fasting & control feeding groups (p<0.001 for both). AS CSF fasting animals had increased TNF-alpha levels in the upper intestine compared to control fasting animals (p<0.05). No differences were seen between AS CSF in the middle and lower intestines.

CONCLUSIONS: Alterations of stretch-induced differentiation during TIUCO of CSF resulted in delayed intestinal development & intestines more prone to PMN infiltration during feeding and increased acute inflammation with prolonged fasting.

46 Fellow in Training
Real-Time Cerebral, Splanchnic, and Renal Near-Infrared Spectroscopy (NIRS) in Very Low Birthweight Neonates: An Analysis of Baseline Variability
Jonathan P. Mintzer, Joseph Dayan, Monique Gardner, Michelle Master, Michael Chelala, Reed Alban, Edmond F. LaGampa, Boriana Parvey.
Division of Newborn Medicine, Maria Fareri Children’s Hospital at Westchester Medical Center - New York Medical College, Valhalla, NY.

BACKGROUND: Suboptimal O2 delivery at global or vascular bed-specific sites has been shown to increase morbidity and mortality in critically ill patients. Current methods for assessing adequacy of tissue oxygenation are not able to detect alterations in regional perfusion status. NIRS is emerging as a vascular bed-specific monitoring tool but neonatal normative data is sparse. Knowledge of baseline NIRS signal stability and variability is necessary before assigning clinical relevance of a given alteration in NIRS signals over time. Our study is the first to address the use of differing epoch lengths in assessing signal variability.

OBJECTIVE: To determine the baseline stability and variability of multi-site NIRS measurements

DESIGN/METHODS: This is a prospective, observational, non-interventional study of preterm neonates with BW of 500-1250g. Continuous real-time cerebral, renal and splanchic NIRS was recorded for 7d beginning in the first 72h after birth. Demographic, cardiopulmonary & NIRS data was collected. Variability analyses of NIRS were performed during periods of relative quiescence for four different time epochs for each site as well as between sites using ANOVA.

RESULTS: Subjects (n = 14, GA 26 ± 1 wk; BW 920 ± 170g; ± x:±x) had average coefficients of variation (CoV) calculated for 4 time epochs from each NIRS site.

Average Coefficients of Variation

<table>
<thead>
<tr>
<th>Site</th>
<th>5-min*</th>
<th>15-min*</th>
<th>30-min*</th>
<th>60-min*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cerebral</td>
<td>0.030</td>
<td>0.032</td>
<td>0.036</td>
<td>0.038</td>
</tr>
<tr>
<td>Renal**</td>
<td>0.153</td>
<td>0.188</td>
<td>0.206</td>
<td>0.219</td>
</tr>
<tr>
<td>Splanchnic**</td>
<td>0.175</td>
<td>0.185</td>
<td>0.201</td>
<td>0.209</td>
</tr>
</tbody>
</table>

Regardless of epoch lengths, cerebral CoVs were smallest as compared to renal & splanchic sites. All between-site comparisons for each monitoring epoch were statistically significant (p<0.01). Shorter epochs showed significantly smaller CoVs at the renal (**p<0.001) & splanchic (**p<0.001) sites. The splanchic site exhibited the highest CoV over all epochs with a SD representing 15-22% noise relative to its mean.

CONCLUSIONS: NIRS signal variability as a function of monitoring epoch length has important implications for the interpretation of regional NIRS measurements. This site-specific degree of variability should be taken into account when designing studies utilizing this technology.

47 Complications Associated with Peripherally Inserted Central and Non-Central Catheters in the Newborn Intensive Care Unit
Kathryn E. Colacchio, Yanhong Deng, Veronika Nornthrup, Matthew Bizzarro. Pediatric GEE, Yale University School of Medicine, New Haven, CT; Biostatistics, Support Unit, Yale Center for Clinical Investigation, New Haven, CT.

BACKGROUND: Peripherally inserted central catheters (PICCs) are utilized in critically ill newborns for stable intravenous access. Ideal tip position for a PICC is the superior or inferior vena cava. In instances where central position cannot be achieved, peripherally inserted non-central catheters (PINCCs) may still be utilized. Little data exists, however, as to their rate of associated complications.

OBJECTIVE: To compare complication rates in PINCCs versus PICCs in a neonatal intensive care unit (NICU) and to evaluate the risk of a complication with duration of catheter use.

DESIGN/METHODS: Using an existing database, we identified all lines placed in the Yale NICU from July 1st 2000 through August 2010. Data included demographics and duration of use, and associated complications including associated bloodstream infections, phlebitis, infiltration, obstruction, and effusions. Unadjusted and adjusted complication rates were compared between PINCCs and PICCs. Risk factors for complications were assessed using Generalized Linear Equations (GEE) modeling, accounting for multiple catheter insertions per infant. Risk of complication by duration of catheter was further assessed using Kaplan-Meier survival estimates.

RESULTS: Data were available from 980 lines placed in 750 neonates. 91 were PINCCs and 889 PICCs. Neonates with a PICC were of significantly higher gestational age (34 weeks ± 30 weeks, p<0.0001) and birth weight (2252 grams ± 1495 grams; p<0.0001) 44% of PINCCs had a major complication as compared with 25% of PICCs (p<0.0001), with the most common PINCC-related complication being infiltration. The overall, unadjusted complication rate among PINCCs was 51.7 per 1,000 line days and 15.9 for PICCs (rate ratio: 3.25; 95% CI: 2.32, 4.55). After adjusting for multiple confounders such as birth weight, the adjusted odds ratio for complications from GEE was significantly higher for PINCCs (adj OR: 2.41; 95% CI: 1.34, 4.37). The median time to onset of a complication with the use of a PINCC was 11 days as compared with 45 days for PICCs (p<0.0001).

CONCLUSIONS: PINCCs are associated with a significantly higher rate of line-related complications as compared with PICCs. The median time to onset of a complication with the use of PINCC is about 11 days. Particular care should be taken with the use of a PINCC beyond 10 days and subsequent removal or replacement should be considered.

48 House Officer
Developmental Outcome in Late Preterm Infants at 24 to 30 Months of Age
Pediatrics, Flushing Hospital Medical Center, Flushing, NY; Pediatrics, Graduate School of Psychology and Health Sciences, New York, NY.

BACKGROUND: Late preterm births (LPBs), infants born from 34-36 weeks gestation, account for over 10% of all births and represent the highest percentage of all births that have increased from 7.3% in 1990 to 9.1% in 2005. Few studies have described the subsequent developmental profile of LPBs in early childhood: one study followed a cohort at 12-18 months of age and found no significant cognitive differences, but another observed some cognitive and behavioral problems at preschool age.

OBJECTIVE: To assess developmental outcomes of LPBs in comparison to term infants at 24-30 months of chronological age.

RESULTS: Of 40 infants were tested (20 cases, 20 controls). Of the total group, 57% were girls and 40% were from English-speaking families. The mean standard scores and percentile scores for both cases and controls were in the normal range. However, the mean standard score in basic assessment was lower among the LPBs than controls (98.45 vs. 102.25) and this difference was statistically significant (p<0.014). Percentile scores also showed statistically significant differences between cases and controls, 49.35 vs. 56.30 (p=0.01). The results in all 4 other domains were not significantly different.

CONCLUSIONS: Developmental outcomes of LPBs at 24-30 months were in the average range. The standard and percentile scores in basic assessment were lower in LPBs than for term infants.

49 House Officer
Breastmilk Science: Critical Review of Publications over the Last 30 Years
Angela Mukherjee, Celia Thomas, Sheila Mak, Nancy Mejias-Cepeda, Ben H. Lee. General Pediatrics, Goryeb Children’s Hospital at Atlantic Health, Morristown, NJ; Atlantic Neonatal Research Institute, Mult/Atlantic Neonatology Associates and Atlantic Health, Morristown, NJ.

BACKGROUND: Breastmilk is an essential component of neonatal nutrition and maternal-infant bond. Although breastmilk science has been promoted by healthcare professionals for over 30 years, there are concerns of a perceived imbalance of anecdotal versus scientific approach to breastmilk science among healthcare professionals, particularly with regards to high quality quantitative research publications.

OBJECTIVE: The objective of this study is to critically review research characteristics of published literature in breastmilk science in peer-reviewed journals over the last thirty years.

DESIGN/METHODS: Published manuscripts on breastmilk science from 1980-2009 were identified using PubMed (keywords “breastmilk” or “breast milk” and limits of the English language and human infants under 24 months). Articles related to drug pharmacokinetics, HIV, and toxic exposure were excluded.

Abstracts were reviewed by five study personnel. Articles were categorized by study type (biochemical, clinical, randomized controlled trial, or review-opinion) and topic (nutrition, immunology, and neurology). Pertinent articles were further separated into predatory and full-term and full-subgroup.

RESULTS: A total of 530 publications met inclusion criteria. The number of publications per five-year period fluctuated (86, 36, 82, 135, 70, and 121). There was a predominance of review-opinion articles, representing 45% of all publications. Clinical studies comprised 36% of the published studies, which had a median sample size of 70. Only 4.5% of the publications were randomized-controlled trials. The majority of publications focused on nutrition (42%), followed by the immunologic (36%) and neurologic (6.8%) properties of breastmilk. Preterm infants were included in 42% of the articles. Only 7% of publications included a statistically-significant p-value in their abstract.

CONCLUSIONS: Through the decades, research related to breastmilk science has maintained a steady presence in science citation index journals. However, there is a lack of randomized-controlled trials and studies with statistically-significant results. As breastmilk science continues to be advanced, it must maintain a high standard of scientific rigor in key peer-reviewed journals.
Increased Odds of Mechanical Ventilation at 36 Weeks
Gestation: Gestational Age Paradox
Romal K. Sekhon, Amy B. Mackley, David A. Paul. 
Neonatology, Christiana Hospital, Newark, DE; Pediatrics, Thomas Jefferson University, Philadelphia, PA.

BACKGROUND: Late preterm births comprise 8.1% of all live births. Most of the increase in preterm birth rates in the US is attributed to late preterm births. Limited data is available regarding the relationship between late preterm birth and long-term respiratory outcomes in late preterm infants.

OBJECTIVE: To assess respiratory support in late preterm infants stratified by gestational age.

DESIGN/METHODS: Retrospective cohort analysis of late preterm infants (34-36 wk) at a regional NICU, Christiana Hospital, from Jan’05 to Dec’09. ANOVA and chi-square were used to analyze continuous and dichotomous variables respectively. Linear and logistic regression analysis applied to control for confounding factors affecting respiratory outcomes.

RESULTS: The GA groups were similar in c-section rate, clinical chorioamnionitis, and Aggar scores. Infants 36 wk were less likely to receive steroids and more likely to be SGA compared to 34-35 wk (p<0.01). Despite advancing gestation, 36wk infants had similar rates of mechanical ventilation as those at 34-35 wk, and required longer mechanical ventilation. Infants born at 36 wk were less likely to receive CPAP than those born 34 and 35 wk.

After controlling for confounding variables including antenatal steroids, 36 week gestation infants had increased odds of requiring mechanical ventilation (OR 1.23, 95% CI, 1.06-1.5) and 36 week gestation was associated with increased ventilator days (p<0.05).

CONCLUSIONS: In our population of late preterm infants admitted to the NICU, infants born at 36 wk gestation had increased odds of requiring mechanical ventilation, and required a longer course of ventilation compared to infants 34-35 wk. Our data highlight that within the population of late preterm infants, those of relatively advanced gestation remain at increased risk of respiratory morbidity.

Red Blood Cell Storage Time and Morbidities of Prematurity
Jonathan R. Swanson, Etias Matta, Catherine Sawtelle, Charles Matarazzo, Ben Lee. 
Pediatrics, Morristown Memorial Hospital, Morristown, NJ.

BACKGROUND: Red blood cell (RBC) transfusions in the neonatal intensive care unit (NICU) are common, especially in the very low birth weight infant (VLBW, <1500 g). Studies have shown that RBC storage time is directly associated with increased morbidity and multiple systems organ dysfunction in both adult and pediatric transfusions (A & P populations). Prior studies have looked at RBC transfusions and morbidities such as necrotizing enterocolitis (NEC), chronic lung disease (CLD) and retinopathy of prematurity (ROP), but few have looked at RBC storage time.

OBJECTIVE: The primary objective of this study was to examine the relationship between RBC storage time and the development of common morbidities seen in VLBW infants, namely CLD, NEC, and retinopathy.

DESIGN/METHODS: VLBW infants admitted to a tertiary NICU between January 2007 and December 2009 were cross-referenced with the hospital blood bank’s transfusion database to acquire all VLBW infants who received a RBC transfusion. Infants were divided into 2 groups based on median age of RBC transfusion (A: ≤ 14 days and B: >14 days). Demographical and admission data were collected along with various outcomes seen in premature infants.

RESULTS: A total of 188 infants received at least one RBC transfusion over the study period. Group A (n=142) and group B (n=46) were not different in gestational age, birth weight, gender, race, and Aggar or CRIB-II scores. There was a significant difference in mean age of RBCs transfused (8 vs 19 days, p<0.001) between groups A and B. There were no differences in number of exposures to RBC units, platelets or FFP, or need for surgery. Group B had a significant increase in late-onset sepsis (43% vs 24%, p<0.02) and need for PDA ligation (35% vs 9%, p=0.01) compared to group A.

Group A was able to reach full feeds faster (21 days vs 27 days, p<0.01) and was discharged from the NICU and well newborn nursery. Bloodwork for total T4 and TSH was obtained in the first 24 hours of life and again with the routine newborn screening between day of life 2 and 5. Any patient with a total T4 ≤ 0.5 µg/dL or TSH > 10 mU/L were started on thyroid supplementation. Group A (n=126) and Group B (n=35) were not different in number of thyroid supplement exposures.

CONCLUSIONS: Our preliminary data indicate that using this simple clinical tool to assess OSF at the time of first oral feeding in otherwise healthy LP infants, we may be able to identify those infants who will be at risk for feeding problems that prolong hospital stay. By recognizing these infants early, clinicians may be able to develop a plan for oral feeding intervention(s) that is initiated soon after birth and thus, potentially shorten the LOS.

Enhancement of Accuracy of the Umbilical Vein Catheter Tip Localization: Using Echocardiography and X-Rays
Anoop Pulikal, Pradeepkumar Charlagorla, Sbestian Tume, Ali Nadroo, Manoj Chabara. 
Pediatrics, NICU, New York Methodist Hospital, Brooklyn, NY.

BACKGROUND: Several complications like myocardial perforation and cardiac tamponade have been reported with the use of Umbilical venous catheter (UCV) use even with optimal catheter tip position as revealed by antero-posterior (AP) chest x-ray. Echocardiography (ECHO) provides direct visualization of the catheter tip in relation to heart. However, for feasibility of routine performance in the NICU, this procedure needs to be performed by the care providers like neonatal attending or the resident physicians.

OBJECTIVE: To compare the location of the UVC tip position, using echocardiography vs. radiography.

To assess the feasibility and accuracy of UVC tip localization by echocardiography when performed by a Novice (Neonatologist or pediatric resident) and to determine the level of training needed in order to interpret the study accurately.

DESIGN/METHODS: All the infants who required placement of UVC were enrolled in the study. View of x-ray chest and abdominal x-ray was used to localize the UVC tip. The x-ray was initially interpreted by neonatologist and subsequently by a radiologist. 2D echo were performed by the pediatric cardiologist or a novice trained for this purpose. The novice underwent a two-step training protocol prior to performing ECHO in this study. It involved an observation session with the pediatric cardiologist followed by a satisfactory performance on at least 5 ECHOs by the novice under the direct observation of the pediatric cardiologist.

Both novices and cardiologist were blinded to each other’s interpretation of the echocardiogram as well as X-ray results. The novices’ report was compared to that of the cardiologist.

RESULTS: A total of 18 infants were enrolled in the study. Gestational age ranged from 24 to 40 weeks. Birth weight ranged from 270 to 4490 g. Comparing optimal UVC position as revealed by the chest x-ray to subsequent ECHO by the cardiologist, in 4 out of 18 (22%) patients it was sub-optimal. In comparison to the cardiologist, the novices had accurately reported 12 out of 18 (67%) ECHO studies.

CONCLUSIONS: In conclusion use of radiographs to localize UVC tip position is suboptimal. Echocardiography is feasible and it will identify malpositioned catheters that are missed on the x-rays and reduce the need for repeat radiographs. Comparing the accuracy of echo when performed by a novice with cardiologist is also reliable and can be improved with further training.

Thyroid Function in Late Preterm Infants in Relation to Respiratory Morbidity and Mode of Delivery
Renee M. Belcher, Amy B. Mackley, Louis Bartschovsky, David A. Paul. 
Neonatology, Christiana Care Health System, Newark, DE; Neonatology, Thomas Jefferson University, Philadelphia, PA.

BACKGROUND:Transient hypothyroxinemia has been associated with illness severity and adverse neurodevelopment in extremely preterm infants. Late preterm infants have increased morbidity and mortality compared to term infants, and are frequently delivered by cesarean section which potentially influences thyroid function and may increase risk for respiratory distress. The relationship between thyroid function, respiratory morbidity, and mode of delivery in late preterm infants has not been well studied.

OBJECTIVE: We hypothesized that late preterm infants who require respiratory support after delivery and those born by cesarean delivery will have lower total thyroxine (T4) levels in the first week of life.

DESIGN/METHODS: We enrolled babies with gestational ages 34 0-7/36 6/7 weeks admitted to the NICU and well newborn nursery. Bloodwork for total T4 and TSH was obtained in the first 24 hours of life and again with the routine newborn screening between day of life 2 and 5. Any infant who required respiratory support was defined as need for mechanical ventilation, nasal CPAP, or nasal cannula. Groups were analyzed using repeated measures ANOVA and Pearson correlation.

RESULTS: 103 patients were included in the study. Mean gestational age was 35.6±1.0 weeks and birth weight was 2559±459 grams. The first specimens were obtained at 9.1±1.7 hours and the...
Results were analyzed for 186 ART and 186 control infants. ART mothers were older but there were otherwise no differences in antenatal steroid use,chorioamnionitis, or other perinatal events between groups. ART infants required more respiratory support & oxygen, took longer to reach full oral feeding and full PO, had longer LOS and were discharged more often on home monitoring than controls. 

RESULTS: Data were analyzed for 186 ART and 186 control infants. ART mothers were older but there were otherwise no differences in antenatal steroid use, chorioamnionitis, or other perinatal events between groups. ART infants required more respiratory support & oxygen, took longer to reach full oral feeding and full PO, had longer LOS and were discharged more often on home monitoring than controls.

CONCLUSIONS: In our study sample of late preterm infants, infants who required respiratory support had lower total T4 levels than infants who did not require respiratory support. There was no association between total T4 or TSH levels and mode of delivery. From our data, we cannot determine if hypothyroxinemia is causal for, or associated with, the common respiratory morbidities observed in late preterm infants.

Association of Placental Inflammatory Changes with Maternal Fever and Elevated Neonatal CRP: A Guide To Initiate Antimicrobial Therapy

P Charlaorlala, C Abban, C Salafia, S Van Horn, D Hoang, B Dypulka, P Narula

PEDIATRICS, New York Methodist, Brooklyn, NY.

BACKGROUND: Chorioamnionitis(CA) complicates 1 to 10% of all pregnancies, and presents an infection risk to the neonate. Early diagnosis of infection continues to be diagnostic dilemma, as standard hematological tests(FT) like band count, immature to mature neutrophil ratio(T)and C reactive protein(CRP), have limited predictive values. Maternal fever(MF) is often used as a clinical predictor of infection, but may be affected by other factors such as epidural(EPI)/oral anesthesia(SE). Histologic CA, the inflammation(IF)of the chorio lacve and amnion, the most common pathologic finding during placental examination, can occur in absence of risk factors or clinical symptoms. Infection of fetal umbilical vessels by inflammatory cells (funisitis), has been reported to have a definitive association with positive signs and symptoms, cultures and other markers of IF.

OBJECTIVE: To determine whether antepartum MF correlates with histologic evidence of IF on maternal and/or fetal placentalsurfaces. To determine whether histologic umbilical vasculitis correlates with CRP and T/I in neonates. To determine whether SE/EPI can produce placental changes similar to CA.

RESULTS: There was significant association of cases vs controls with maternal IF (28/62 vs 5/62), choriatic plate IF (34/62 vs 7/62) and umbilical cord IF (fetal/19/62 vs 3/62,each P<.0001). There was no correlation between EPI/SE and placental IF. The presence of fetal IF was associated with significant rise in neonatal CRP (3.9 +/- 2.5 vs 0.9 +/- 0.25, P=0.001), IT:0.2 was uncorrelated with placental IF.

CONCLUSIONS: Acute inflammatory changes in the placenta strongly correlate with MF and rise in CRP in neonates. Maternal anesthesia(EPI/SE) do not correlate with MF and placental IF. Findings of histologic funisitis is a reliable marker of congenital infection, when found in conjunction with an elevated CRP, can be used as guide to initiate antimicrobial therapy in neonates born to febrile mothers.

Role of 4G/5G Single Nucleotide Polymorphism in the Spontaneous Closure of Patent Ductus Arteriosus?

Divya Chhabra, Johanna M. Calo, Edel Menddoza, Kristen Aaland, Lance A. Parton

Division of Newborn Medicine, Maria Fareri Children’s Hospital at Westchester Medical Center, Valhalla, NY; New York Medical College, Valhalla, NY.

BACKGROUND: We, and others have demonstrated an imbalance of fibrinolysis in those preterm infants with more severe RDS, as well as those who progress to BPD. In neonatal RDS, impaired fibrinolysis contributes to intra-alveolar accumulation of fibrinogen, fibrin and their degradation products impairing surfactant function, provoking an inflammatory response and remodeling the terminal capillary bed. Impaired fibrinolysis results in increased downstream cellular activation of endothelial cells to produce proinflammatory mediators and an increase in vascular permeability. The significance of PAI-1 in hyperoxia-induced fibrin deposition has been demonstrated in PAI-1 deficient mice, which failed to develop intra-alveolar fibrin deposits, showed a less severe phenotype, and were more resistant towards hyperoxia-induced mortality. 4G/5G/rs2227631 and rs2227672 single nucleotide polymorphisms (SNPs), which have been associated with PAI-1 expression were studied. 

OBJECTIVE: To evaluate the NICU needs of ART infants compared to naturally conceived infants of similar gestational age.

RESULTS: Data were analyzed for 186 ART and 186 control infants. ART mothers were older but there were otherwise no differences in antenatal steroid use, chorioamnionitis, or other perinatal events between groups. ART infants required more respiratory support & oxygen, took longer to reach full oral feeding and full PO, had longer LOS and were discharged more often on home monitoring than controls.

CONCLUSIONS: ART infants are physiologically more immature, have more intensive care needs and stay longer in the hospital than naturally conceived infants of the same GA. This potentially adds to the cost of care for these infants. The impact of this immaturity needs to be taken into account when decisions are made to deliver these infants early.

Role of 4G/5G Single Nucleotide Polymorphism in the Spontaneous Closure of Patent Ductus Arteriosus

Fellow in Training

Premature Infants Conceived Via Artificial Reproductive Technology (ART) Are More Immature Than Naturally Conceived (NC) Infants of Similar Gestational Age (GA)

Melissa Seala, Jennifer Berg, Martin Keszler, Kabir M. Abubakar

Neonatology, Georgetown University, Washington, DC; Neonatology, Brown University, Providence, RI.

BACKGROUND: Increasing numbers of infants are conceived via ART. Many of these infants are preterm. Anecdotal observations suggest that these infants are physiologically more immature than those conceived naturally even when born at the same gestational age.

OBJECTIVE: To evaluate the NICU needs of ART infants compared to naturally conceived infants of similar gestational age.

RESULTS: Data were analyzed for 186 ART and 186 control infants. ART mothers were older but there were otherwise no differences in antenatal steroid use, chorioamnionitis, or other perinatal events between groups. ART infants required more respiratory support & oxygen, took longer to reach full oral feeding and full PO, had longer LOS and were discharged more often on home monitoring than controls.

CONCLUSIONS: Art infants are physiologically more immature, have more intensive care needs and stay longer in the hospital than naturally conceived infants of the same GA. This potentially adds to the cost of care for these infants. The impact of this immaturity needs to be taken into account when decisions are made to deliver these infants early.
BACKGROUND: Prolonged exposure of newborn mice to O2 leads to lung changes similar to those of PH. Lung sections showed alveolar simplification, lower radial alveolar count (RAC) (15.1 ± 0.6 in RA vs 3.6±1.4 mm respectively, p<0.05; n=4).

OBJECTIVE: To assess the effects of neonatal hyperoxia on indices of structure and function of internal organs in adult mice.

DESIGN/METHODS: Newborn littermates were randomized at 3d to 85% O2 or room air (RA) for 12d. On d15, all mice were recovered in RA until sacrifice at 9 months of age & weighed. Lungs, heart, kidneys, spleen, liver were weighed & sectioned for histology. Lung sections were assessed for radial alveolar count (RAC).

RESULTS: Adult mice exposed to neonatal hyperoxia were significantly smaller (Table 1) & had a higher splenic to body weight (BW) ratio suggestive of splenic hypertrophy compared to RA mice. Mice in the hyperoxia group had a higher RV/BW and RV/LV+SV ratio, indices of RV hypertrophy resulting from PH. Lung sections showed alveolar simplification, lower RAC (15.1 ± 0.6 in RA Grop versus 7.9 ± 0.9 in Hyperoxia Grop) & features of PH (smooth muscle hypertrophy). Kidney weighed changes consistent with arteriosclerosis. Liver histology was consistent with cardiac failure.

59
8:15 AM Fellow in Training
Generation of Mice with Lung-Specific Expression of Nuclear Heme Oxygenase-1
Fumihiko Namba, Ping La, Amal P. Fernando, Guang Yang, Phyllis A. Denney,
Division of Neonatology, The Children’s Hospital of Philadelphia, Philadelphia, PA; Department of Pediatrics, University of Pennsylvania, Philadelphia, PA.
BACKGROUND: Although the stress protein heme oxygenase (HO)-1 is integral to the smooth endoplasmic reticulum, it can translocate to the nucleus under oxidative stress in several models. This nuclear form of HO-1 lacks the C-terminus and has no enzymatic activity. Nevertheless, HO-1 knockout MEF cells transplanted with nuclear HO-1 demonstrated increased viability, decreased apoptosis, and decreased production of reactive oxygen species in hyperoxia compared with cells transplanted with cytoplasmic HO-1.

OBJECTIVE: To understand the role of nuclear HO-1 in the neonatal lung in vivo.

DESIGN/METHODS: Newborn C57BL/6 mice less than 12 hours old were injected into the left lung with 20 µl adenovirus encoding mouse C-terminal truncated HO-1 cDNA (TR) tagged with c-myc and FLAG and containing 3 copies of a nuclear localization sequence (NLS). Controls were injected with empty vector (VEC) or with a full-length HO-1 cDNA (FL). In another model, constructs carrying FL or TR HO-1 tagged with hemagglutinin at the N-terminus and containing 3 copies of a nuclear localization sequence (NLS) driven by the human surfactant protein C promoter were microinjected into fertilized mouse embryos and cultured in a) 3% oxygen alone, b) 50% oxygen alone, c) 50% oxygen+ human recombinant VEGF-165 (100 ng/ml) daily, d) 50% oxygen+ human recombinant VEGF-121 (50 ng/ml) daily at 37°C in a sealed chamber for 2 days.

RESULTS: First, quantitation of the total number of lung bud branches and total branch length were significantly reduced in explants cultured in 50% oxygen+ anti-Nrp-1 antibody (10 µg/ml) for 2 days.

Second, 12 in vitro mouse explants were cultured in a)50% oxygen, b)50% oxygen+VEGF-165, c)50% oxygen+isotype control and then VEGF-165 and d)50% oxygen+anti-Nrp-1 antibody (10 µg/ml) for 30 minutes and then VEGF-165 daily at 37°C in a sealed chamber for 2 days.

CONCLUSIONS: Newborns at-risk for AKI have higher NGAL and FGF levels in the acute phase of illness. Persistence of low EGF at recovery may be associated with impaired renal function. The use of urinary biomarkers in the in the NICU population may be useful in stratifying patients at risk for AKI.

60
8:30 AM Fellow in Training
Neonatal Hyperoxia Restricts Somatic Growth, Induces Chronic Lung Disease (CLD) & Pulmonary Hypertension (PH) in Adult Mice
Vasuht H. Kumar, Huamei Wang, Daniel D. Swartz, Pediatrics, SUNY at Buffalo, Buffalo, NY.
BACKGROUND: Prolonged exposure of newborn mice to O2 leads to lung changes similar to those of CLD in infants. We have previously shown that neonatal hyperoxia alters airway responsiveness & alveolarization in adult mice at 3 months. The lasting effects of neonatal O2 exposure in adult mice are not known.

OBJECTIVE: To assess the effects of neonatal hyperoxia on indices of structure & function of internal organs in adult mice.

DESIGN/METHODS: Newborn littermates were randomized at 3d to 85% O2 or room air (RA) for 12d. On d15, all mice were recovered in RA until sacrifice at 9 months of age & weighed. Lungs, heart, kidneys, spleen, liver were weighed & sectioned for histology. Lung sections were assessed for radial alveolar count (RAC).

RESULTS: Adult mice exposed to neonatal hyperoxia were significantly smaller (Table 1) & had a higher splenic to body weight (BW) ratio suggestive of splenic hypertrophy compared to RA mice. Mice in the hyperoxia group had a higher RV/BW and RV/LV+SV ratio, indices of RV hypertrophy resulting from PH. Lung sections showed alveolar simplification, lower RAC (15.1 ± 0.6 in RA Grop versus 7.9 ± 0.9 in Hyperoxia Grop) & features of PH (smooth muscle hypertrophy). Kidney weighed changes consistent with arteriosclerosis. Liver histology was consistent with cardiac failure.

61
8:45 AM Fellow in Training
S-Nitrosylation of Surfactant Protein-D Upregulates C-C Chemokine Ligand 2 (CCL-2) Expression in Macrophages
Rania El-Khawam, Changjiang Guo, Andrew Gow, Neonatology/Critical Care, Robert Wood Johnson Medical School - UMDNJ, New Brunswick, NJ; Pharmacology/Toxicology, Rutgers University, Piscataway, NJ.
BACKGROUND: Surfactant protein-D, a pulmonary collectin, has both pro- and anti-inflammatory function in the lung. Previously, we have identified that the pro- and anti-inflammatory role of SP-D is regulated by NO through S-nitrosylation of the protein. S-nitrosylation of SP-D resulted in disruption of the protein multimeric structure and induced macrophage migration. However, the mechanism of SNO-SP-D mediated cell migration remains elusive.

OBJECTIVE: We hypothesized that SNO-SP-D might induce chemokine expression.

DESIGN/METHODS: Raw264.7 macrophages were incubated with SP-D over-expressing broncheal lavage (OE-BAL) or S-nitrosylated OE-BAL (SNO-OE-BAL) in the presence or absence of LPS (1ng/mL). Gene expression of beta-chemokine CC ligand 2 was analyzed by real-time qPCR assay.

RESULTS: SNO-OE-BAL indeed induced CCL-2 expression. OE-BAL inhibited LPS induced CCL-2 expression. This inhibitory effect was diminished when the BAL was S-nitrosylated. The SNO-OE-BAL mediated induction of CCL-2 expression was SP-D dependent since removal of SP-D from the BAL by maltose beads dramatically decreased the CCL-2 expression. Investigation of the mechanism of SNO-SP-D induced CCL-2 expression revealed that SNO-SP-D stimulated NF-kappa B activity. Pre-incubation with caffeic acid phenethyl ester (CAPE), a specific and potent NF-kappa B inhibitor, completely abrogated SNO-SP-D mediated CCL-2 expression.

CONCLUSIONS: These data provide new evidence that dichotomous nature of SP-D in the lung is regulated S-nitrosylation. Understanding the mechanism of NO modified molecules in the lung will lead to new strategies of designing the therapeutic approach for pulmonary inflammatory disorders.

62
9:00 AM Fellow in Training
Neonatal EGF Elevates Alveolarization in Adult Mice
BACKGROUND: Neonatal hyperoxia decreases physiological alveolarization resulting in reduced lung compliance, increased airway reactivity & chronic lung disease in adult life. We have previously shown that early exposure to hyperoxia results in reduced EGF production in the embryonic lung. The use of urinary biomarkers in the in the NICU population may be useful in stratifying patients at risk for AKI.

OBJECTIVE: To determine whether VEGF-121 and VEGF-165 bind heparin sulfate proteoglycans and signals through neuropilin-1 (Nrp-1). Our preliminary work determined that VEGF-165 was able to attenuate effects of hyperoxia in the embryonic lung.

DESIGN/METHODS: First, we harvested lung explants from embryonic day 12 (E12) mouse embryos and cultured in a) 3% oxygen alone, b) 50% oxygen alone, c) 50% oxygen+ human recombinant VEGF-165 (100 ng/ml) daily, d) 50% oxygen+ human recombinant VEGF-121 (50 ng/ml) daily at 37°C in a sealed chamber for 2 days.

Second, E12 mouse lung explants were cultured in a)50% oxygen, b)50% oxygen+VEGF-165, c)50% oxygen+isotype control and then VEGF-165 and d)50% oxygen+anti-Nrp-1 antibody (10 µg/ml) for 30 minutes and then VEGF-165 daily at 37°C in a sealed chamber for 2 days.

RESULTS: First, quantitation of the total number of lung bud branches and total branch length were significantly reduced in explants cultured in 50% oxygen+ anti-Nrp-1 antibody (10 µg/ml) for 2 days.

Second, we found that the total number of branches and total branch length were significantly reduced after 2 days in 50% oxygen alone and 50% oxygen+anti-Nrp-1 antibody + VEGF-165 as compared to 50% oxygen+VEGF-165 (16.2±4.7, 14.7±3.2 vs 27.5±9.8 and 2.5±0.8 mm, 2.5±0.8 mm vs 3.6±1.4 mm respectively, p<0.05; n=4).

CONCLUSIONS: VEGF-165 attenuates hyperoxic lung growth retardation in the absence but not in the presence of anti-Nrp-1. This finding suggests that manipulation of Flk1/neuropilin-dependent pathway might provide a therapeutic approach to attenuate effects of hyperoxic injury in the embryonic lung.
Table 1: Effects of Neonatal Hyperoxia on Various Indices in Adult Mice at 9 Months

<table>
<thead>
<tr>
<th>Variable</th>
<th>Age</th>
<th>RAP</th>
<th>Hyperoxia Gp</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BW (g)</td>
<td>2/2</td>
<td>24±6</td>
<td>22.5±15.3</td>
<td>0.0001</td>
</tr>
<tr>
<td>Spleen (g)</td>
<td>2/2</td>
<td>104±22</td>
<td>102±28</td>
<td>NS</td>
</tr>
<tr>
<td>Liver / BW (mg/g)</td>
<td>2/2</td>
<td>3.1±0.4</td>
<td>4.5±1.2</td>
<td>0.062</td>
</tr>
<tr>
<td>Lung / BW (mg/g)</td>
<td>2/2</td>
<td>7.2±1.2</td>
<td>6.5±1.5</td>
<td>NS</td>
</tr>
<tr>
<td>Heart / HW (g)</td>
<td>2/2</td>
<td>141±16</td>
<td>99±16</td>
<td>0.001</td>
</tr>
<tr>
<td>RV (mg)</td>
<td>33±5.2</td>
<td>31.8±3.1</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>LV + S (mg)</td>
<td>107±14</td>
<td>10±3.5</td>
<td>0.0001</td>
<td></td>
</tr>
<tr>
<td>RV / LV (mg/g)</td>
<td>0.9±0.1</td>
<td>1.0±0.2</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>RV / BW (mg/g)</td>
<td>0.1±0.05</td>
<td>0.1±0.05</td>
<td>NS</td>
<td></td>
</tr>
</tbody>
</table>

Values are means ± SDM; BW - body weight; RV - right ventricle; LV - left ventricle; S - septum

CONCLUSIONS: Prolonged neonatal O2 exposure is toxic to adult mice. Oxygen not only restricts somatic growth but also permanently alters the structure & function of many organs in adult mice. The fundamental mechanisms on how O2 alters postnatal lung development & somatic growth needs to be explored further.

9:15 AM 63

**NFkB Is Essential in Regulating Rev-er α Promoter Activity in Hyperoxia**


BACKGROUND: Neonatal mice lacking the transcription factor NFκB subunit p50 (KO) have increased hyperoxia-induced lung injury compared to wild-type (WT) controls. We have previously shown that lung mRNA of Rev-erα, a nuclear receptor that coordinates circadian rhythm and metabolism, decreases 10 fold in KO neonates compared to WT littersmates. The Rev-erα promoter region contains a putative NFκB binding site, which could regulate its transcription under hyperoxia.

OBJECTIVE: To evaluate whether the Rev-erα promoter can be regulated in hyperoxia via NFκB.

DESIGN/METHODS: A 0.9 kb genomic DNA fragment upstream of the transcriptional initiation site of Rev-erα was amplified from mouse tail DNA using PCR. The product was sub-cloned into a luciferase reporter vector to obtain pGL4.90cLuc (0.9kb). Two putative NFκB binding sites, named N1 and N2, were identified and detected to obtain pGL4.90cAN1 (AN1) and pGL4.90cAN2 (AN2). Also, two long deletions were generated to obtain pGL4.90cL601 (0.6kb, excluding N2) and pGL4.90cL202 (0.2kb, excluding both N1 and N2). The constructs were transfected to mouse primary fibroblasts and subjected to hyperoxia (95% O2 and 5% CO2) or normoxia (95% air and 5% CO2) for 4 to 48 hours. Luciferase activity was measured using an in vivo imaging system or a luminometer and normalized to cell number or protein content. Co-transfection with a renilla luciferase vector was performed to verify transfection efficiency between constructs.

RESULTS: Hyperoxia significantly increased 0.9kb luc activity by 2, 4 and 9 fold compared to normoxia after 4, 24 and 48 h of exposure. At 4 h, the AN1 and AN2 luc activity was decreased to 7% and 17% of the 0.9kb level in normoxia, and had no further increase in hyperoxia. However, both luc activities of both AN1 and AN2 were maintained at the level of 0.9kb in normoxia and only marginally reduced to the hyperoxia-induced level of 0.9kb.

CONCLUSIONS: We conclude that the 0.9kb Rev-erα promoter activity is upregulated in hyperoxia. Both N1 and N2 binding sites are essential to maintain the basal and hyperoxia-induced activities of the 0.9kb. We speculate that Rev-erα may be regulated in hyperoxia via NFκB in neonatal mouse lung.

9:30 AM 64

**Angiogenesis in Neonatal Hyperoxic Lung Injury**

Anne Chetty, Gong-jie Cao, Heber C. Nielsen. Pediatrics, Tufts Medical Center, Boston, MA.

BACKGROUND: Bronchopulmonary dysplasia (BPD) is a major long-term morbidity of prematurity. The lung pathology in BPD is primarily impaired development of the alveolar unit, composed of the alveolar epithelium and the underlying microvascular bed. Microvascular remodeling is an important component of alveogenesis and is disrupted in BPD. We have shown that pigment epithelium-derived factor (PEDF), an important angiostatin, is upregulated in developing lung during hyperoxic exposure associated with impaired capillary and alveolar development.

OBJECTIVE: Test the hypothesis that PEDF has a mechanistic role in O2-injured alveolar unit development.

DESIGN/METHODS: Mouse pups of postnatal day (P5) were exposed to 90% O2 or room air (RA) through P13. PEDF and Vascular Endothelial Growth Factor (VEGF) proteins were measured by Western blot. Cell-specific PEDF mRNA expression was determined in lungs from the pups by in situ hybridization. A fetal lung mouse endothelial cell line (FMEL-91U cells) was used for in vitro studies. Angiogenesis was assayed to examine the anti-angiogenic property of PEDF in room air and hyperoxia (40% and 90% oxygen). Cultures were treated with VEGF and/or PEDF. The effect of PEDF on endothelial cell apoptosis was tested by examining activated caspase 3.

Knockdown of PEDF by siRNA was performed in P5 mouse lung organ cultures cultured for 48 h in room air or 90% O2. The development of alveolar crests was examined.

RESULTS: PEDF protein increased 6-fold and VEGF protein fell by 50% in lungs exposed to hyperoxia compared to RA. PEDF mRNA was markedly increased in hyperoxia-exposed lungs in the tips of alveolar crests, in alveolar type II cells and in the endothelium. In vitro angiogenesis was significantly reduced in both 40% and 90% O2. PEDF blocked baseline and VEGF-stimulated in vitro angiogenesis. PEDF did not cause apoptosis of endothelial cells, even in hyperoxia. Organ cultures of P5 lungs showed reduced alveolar crests in 90% O2. The development of alveolar crests was restored by knockdown of PEDF with siRNA.

CONCLUSIONS: The antiangiogenic cytokine PEDF is upregulated in neonatal mouse lung with hyperoxic exposure. The sites of upregulation are consistent with abnormal development of the alveolar unit in neonatal lung hyperoxia. In vitro studies show PEDF impair capillary and alveolar development. Early postnatal intervention with angiostatin inhibitors may be an effective strategy in the treatment and prophylaxis of BPD. Support: NIH HL137930.
CONCLUSIONS: High concentrations of O₂ during the early phase of lung development leads to alveolar arrest & retard lung growth. These findings suggest that neonatal hypoxia may lead to functional & structural changes in the lungs that are more likely to be permanent & persist throughout adulthood (fig 2).

Figure 2: Possible Pathologies of Neonatal Hypoxia Induced Lung Injury in Adult Mice from the Longitudinal Assessment of RAC

Retained Lung Growth

Probable Emphysema Change

Reason Air

Retained Lung Count

Neonatal Hypoxia

Postnatal Age

3d
7d
14d
21d
28d
9M

Radial Airway Count

< means vs. Control

≥ 0.05 by ANOVA/repeated measures versus Hypoxia group

10:15 AM - 10:30 AM
Hox Control of Vasculogenesis in Developing Mouse Lung
Thanhvyong Yuan, Sana M. Majidah, Heber C. Nielsen, MaryAnn V. Volpe
Pediatrics, Floating Hospital for Children at Tufts Medical Center, Boston, MA; Sackler School of Biogradaue Medicine, Tufts University, Boston, MA.
BACKGROUND: The Hox proteins Hoxb5 and Hoxa5 uniquely control lung morphogenesis. In other tissues, Hoxb5 promotes and Hoxa5 inhibits vasculogenesis, but their role in lung vasculogenesis is unknown. We previously reported that modest O₂ exposure (0.4 FiO₂) to e vivo developing mouse lungs alters the balance of Hoxb5 and Hoxa5 expression while inhibiting airway branch development and peri-airway vasculogenesis.
OBJECTIVE: To determine the direct contribution of Hoxb5 and Hoxa5 to lung vasculogenesis. We hypothesized that the individual effects of Hoxb5 and Hoxa5 on lung morphogenesis are mediated in part by control of lung vascular development.
DESIGN/METHODS: Human fetal lung fibroblasts (HLF cells) and E14 fetal mouse whole lung were cultured in the presence of DNA expression plasmids to specifically over express Hoxb5 or Hoxa5 in lung mesenchyme or siRNAs to specifically inhibit Hoxb5 or Hoxa5. Controls included no treatment, vehicle control, scramble and GPDH siRNA in siRNA-treated cultures and plasmid lacking the Hoxb5 or Hoxa5 constructs for over expression cultures. Cultures were visualized daily to monitor fetal lung growth, airway development and HLF cell confluence. At 48 hours, cultures were prepared for Western blots and immunohistochemistry (IHC) of Hox proteins and VEGFR2 and morphologic analysis via microscopy.
RESULTS: SiRNA targeting Hoxb5 in HLF cells decreased Hoxb5 protein levels by 44% and VEGFR2 by 22% compared to controls. Conversely, over expression of Hoxb5 in E14 fetal mouse lung showed strongly increased mesenchymal Hoxb5 expression. VEGFR2 expression increased by 23%. IHC showed profoundly increased intensity of VEGFR2 in peri-airway regions. Airway development was more complex with increased 3-D structure and multi-podal branch generations. Hoxa5 over expression had strong Hoxa5 expression in lung mesenchyme of E14 fetal mouse lungs. However, VEGFR2 expression was decreased and the lungs had a more finely arborized airway branching pattern that was more organized than that seen with Hoxb5 over expression.
CONCLUSIONS: Hoxb5 and Hoxa5 play important regulatory roles in balancing lung vascular development. We speculate that specific modulation of these Hox proteins contributes to dys-coordinated lung vasculogenesis in lung injury after preterm birth. Mesenchymal-epithelial cell communication regulating airway development may be influenced by the coordination of lung vasculogenesis by these Hox proteins. Support: HD04478, HL037930, Peabody Foundation.

8:15 AM - 8:30 AM
Lipases as Virulence Factors in Candida Albicans and Parapsilosis Infection in a Neonatal Rat Model of Invasive Candidiasis
David Tofra, Lamia M. Souhier, Christina Long, Joshua D. Nosanchuk, Atilla Gencer, David L. Goldman
Medicine, Albert Einstein College of Medicine of Yeshiva University, Bronx, NY; Microbiology and Immunology, Albert Einstein College of Medicine of Yeshiva University, Bronx, NY; Pediatrics, Children's Hospital at Montefiore, Bronx, NY; Microbiology, University of Szeged, Szeged, Hungary.
BACKGROUND: Candidal infections are a leading cause of neonatal sepsis, particularly in those receiving parenteral lipids. Candida spp secrete extracellular lipases that aid in lipid digestion, adhesion to host cells, and defense against competing microflora. Nonetheless, the role of lipases in the pathogenesis of neonatal candidiasis has not been defined.
OBJECTIVE: To determine the contribution of secreted lipases to the pathogenesis of C. parapsilosis and C. albicans neonatal disease using a rat pup model.
DESIGN/METHODS: Using site-specific recombination, a C. parapsilosis mutant deficient in both lipases, LIP1 and LIP2 and was generated (CpKO). A C. albicans mutant deficient in LIP1 was similarly generated (CaKO). 2-3 day old Sprague Dawley pups were used (approximately 6-8 pups/condition). The 3 models of infection were: intravenous (IV), intragastric (IG) and intraperitoneal (IP). Primary outcomes were organ fungal burden (FB) in pups infected with Wild type (WT) compared with lipase deficient Candida strains at day 3 of infection. Histologic evaluation of tissues was performed.
RESULTS: Pups infected IV with CpKO exhibited significantly less FB (range from 65-84% lower) in the blood, kidney, spleen and liver compared with pups infected with CpWT. Likewise, pups infected IV with CaKO showed less FB in all organs, though reaching statistical significance only for the liver. Pups infected IG with CpKO exhibited significantly less kidney, stomach and liver FB (28.1%, 30.0%, and 39.4%, respectively) compared with pups infected with CpWT. FB in the kidneys and livers of pups infected IG with CaKO were also significantly less (20.7% and 38.9%, respectively) compared with those infected with CaWT. Following IP infection, there was significantly less FB in the kidneys, spleens and livers of pups infected with CpKO compared with CpWT. No differences in FB were detected for pups infected IP with Ca variants. Histologic examination IV infected pups revealed more fungal disease and inflammation for CaWT strain compared with CaKO strain, including hyphae in the renal cortex and medulla, hepatocellular necrosis and granulomatous inflammation in the spleen.
CONCLUSIONS: These studies highlight the importance of lipases in the pathogenesis of neonatal invasive candidiasis. Additional studies are needed to characterize the role of specific lipases secreted at various stages of infection.

Neonatology - Infectious Diseases Platform Session
Saturday, March 26, 2011
8:15 AM-10:30 AM
8:15 AM
8:30 AM
Fellow in Training
Prolonged Antibiotics in the First Week of Life Increase the Odds of Chronic Lung Disease (CLD) in Very Low Birth Weight Infants
Alexandra Novitsky, Deborah Tuttle, Robert G. Locke, Lisa Saiman, Amy Mackley, David A. Paul
Neonatology, Christiana Care Health System, Newark, DE; Neonatology, Thomas Jefferson University Hospital, Philadelphia, PA; Infectious Diseases, Columbia University, New York, NY.
BACKGROUND: Very low birth weight (VLBW) infants are at increased risk for bacterial infection. Infants often receive extended antibiotic courses for culture negative sepsis following birth which may have risks including later changes in respiratory tract colonization.
OBJECTIVE: To determine if prolonged antibiotic coverage in the 1st week of life alters tracheal colonization and increases the odds of chronic lung disease (CLD) in VLBW infants.
DESIGN/METHODS: Retrospective cohort study of VLBW infants from a single Level 3 NICU, between 7/04 to 6/09. A short course of antibiotics was defined as a continuous course > 48 hours duration following birth. CLD was defined as the need for supplemental O₂ at 36 weeks post-menstrual age. Weekly ETU cultures were obtained to monitor colonization. Statistical analysis included ANOVA, x² or logistic regression. Data are expressed as mean SD.
RESULTS: Study sample included 906 infants,747 (82%) received a short course, and 159 (18%) received a long course of antibiotics following birth. Infants receiving a long course were of lower gestation (27±3 vs 28±3:2 g, p<.01) and birthweight (944±274 vs 1053±296 g, p<.01) and more likely to require mechanical ventilation (93% vs 72%, p<.01) compared to infants receiving a short course. There was no difference in culture proven early onset sepsis between groups. Infants who received a long course were more likely to develop ETU colonization (39% vs 17%, p<.01), and more likely to be colonized with resistant gram negative organisms (6% vs 2%, p=.017) compared to the short course group. Infants who received a long course had an increased occurrence of CLD compared to those receiving as short course (17% vs 38%, p<.01).
After controlling for confounding variables including gestation, birthweight and mechanical ventilation, infants receiving a long course had an increased odds of CLD: adjusted odds ratio 2.3 (95% CI: 1.5-3.6).
8:45 AM  
**Fellow in Training**  
The Role of Nitrated Fatty Acids in Modulating Inflammation in Neonates  
Sharada H. Gowda, Faith E. Archer, Debra L. Laskin, Andrew Gow, Anna M. Vetrano, Barry J. Weinberger  

**Pediatrics, UMDNJ-Robert Wood Johnson Medical School, New Brunswick, NJ; Pharmacology and Toxicology, Rutgers University, Piscataway, NJ.**  

**Background:** Neonates are susceptible to inflammatory disorders due to intrinsic defects in clearing activated immune cells, so it is important to identify signals that trigger the resolution of inflammation. Nitroalkene derivatives of fatty acids (FA), such as linoleic acid (LA, LNO) and oleic acid (OA, OA-NO), are formed by nitric oxide-dependent oxidative reactions. These compounds are increased in the presence of leukocyte-derived NO, and very high levels are seen in inflammatory diseases. While α6 FA generally exert inflammatory effects, nitrated FA bind PPAR-γ, a nuclear transcription factor that down regulates inflammation. Consistent with this, recent studies suggest that LNO and OA-NO inhibit the production of adhesion molecules, cytokines, and cytokine receptors.  

**Objective:** We hypothesize that nitrated FA suppress respiratory burst activity and production of inflammatory cytokines in response to LPS and mono(2-ethylhexyl) phthalate (MEHP), a potent PPAR-γ antagonist.  

**Design/Methods:** Neutrophils from cord and adult peripheral blood were isolated by density centrifugation and treated with LA, OA, LNO-NO, OA-NO (1-2 µM) or medium control, in the presence or absence of inflammatory stimuli (MEHP 500 µM, LPS 100 ng/ml). H2O2 production was measured by Amplex Red fluorescence. Inflammatory cytokines were measured by cytometric bead array analysis.  

**Results:** LNO and OA-NO inhibited both basal and MEHP-stimulated IL-1β production and LPS-induced IL-6 and IL-8 production in adult and neonatal neutrophils. They decreased MEHP produced induction of IL-8 and LPS-induced production of IL-1β and MIP-1β in adult, but not neonatal cells. Nitrated FA also inhibited MEHP-induced H2O2 production in neonatal cells.  

**Conclusions:** LNO and OA-NO down regulate generation of inflammatory cytokines and inhibit respiratory burst activity, with distinct patterns of response in adults and neonates. Neutrophil neutrophils may be less responsive to the transcriptional effects of nitrated FA because of decreased expression or activity of PPAR-γ. Endogenous NO and FA are present in excess in tissues during inflammation, suggesting that nitrated FA may be key regulators of inflammation with physiologic and therapeutic relevance in ameliorating inflammatory diseases in newborns.  

Nitrated lipids may also constitute a cGMP-independent mechanism for the protective effects of inhaled NO in BPD.  

Supported by NIH HD058901, ES005022

9:00 AM  
**Fellow in Training**  
Usefulness of Urinary Immune Biomarkers in Evaluation of Neonatal Sepsis: A Pilot Project  

Division of Neonatology, New York University School of Medicine, New York, NY.  

**Background:** Early diagnosis of neonatal sepsis is a major diagnostic challenge in neonatology. Currently no non-invasive methods are available for diagnosis and there is no data assessing the value of urinary pro and anti-inflammatory cytokines in predicting early onset neonatal sepsis.  

**Objective:** To conduct a pilot prospective hospital based longitudinal observational study to test urine of term neonates with a 13 biomarker panel of pro and anti-inflammatory cytokines and chemokines.  

**Design/Methods:** Bagged urine samples were collected from 30 term neonates, born at Tisch hospital between May 2006 and May 2007. This is the pilot phase of the Neonatal Sepsis: A Pilot Project study. Urine is bagged within 2 hours after delivery and processed within 4-6 hrs and stored -80°C. Biomarkers were determined using Luminox human cytokine bead-based ELISA, Millipore. Infants were divided into control, N=15 and NICU admissions for presumed sepsis (test), N=15. Statistical analysis was performed with MSFT EXCEL & SPSS 18. t-test: significance level p≤0.05.  

**Results:** Urinary IL8, IP-10 and MCP -1 were significantly increased in the test group compared to control group, as seen in Table 1  

<table>
<thead>
<tr>
<th></th>
<th>Control (Mean ± SD)</th>
<th>Test (Mean ± SD)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL8</td>
<td>133±11</td>
<td>249±12.1</td>
<td>0.004*</td>
</tr>
<tr>
<td>IP-10</td>
<td>74±7</td>
<td>134±216</td>
<td>0.007*</td>
</tr>
<tr>
<td>MCP-1</td>
<td>632.6±4.99</td>
<td>1662±1823.8</td>
<td>0.02*</td>
</tr>
</tbody>
</table>

*P<0.05 significant;  

IP-10, MCP-1 and IL-8 levels correlated with increasing I/T ratio. This trend is demonstrated for IL-8 below.

9:15 AM  
**House Officer**  
Michele A. Levin, Janet Avello, Jessica Hochberg, Carmella Vandeveen, Frances Zhao, Mitchell S. Cairo.  

**PEDIATRICS, Medicine, Pathology and Cell Biology, Columbia University, Morgan Stanley Children’s Hospital, New York, NY; Pediatrics, Maria Farei Childrens Hospital, New York Medical College, Valhalla, NY.**  

**Background:** Neonates are at great risk for serious infection and develop malignancies like neorublastoma and acute leukemia in part due to deficiencies in adaptive cellular immunity (Satwani/Cairo et al. Biol Neonate 2005). CBNK immaturity is characterized by reduced expression/production of NK regulatory cytokines IL-15, IL-12 and IL-18 (Qian/Cairo et al. Blood 1997; Lee/Cairo et al. Blood 1996; Satwani/Cairo et al Br J Haem 2005).  

**Objective:** To determine invitro and invivo antitumor effects, mechanism and activity following stimulation with genetically reengineered K562 expressing IL-15 and 4-1BBL (K562mIL15-41BBL; MODK562).  

**Design/Methods:** MODK562 (generously supplied by D.Campana MD, PhD) were cultured with CBMC for 7d. NK CD107a, perforin and granzyme B were determined by FACS and cytotoxicity by europen release assay at 20:1 E:T ratio with Ramos (BL) and K562 (NK sensitive) tumor targets (TT). The mammalian expression construct IL12-zeocin-pDNA (supplied by L.Cooper, MD, PhD) was transfected into BL cells.  

**Results:** After 7d, MODK562 ECBMNC showed significantly increased perforin and granzyme B expression vs WTK562 (42±1.5 vs 15±0.5%, p<0.001; 22±0.5 vs 11±0.3%, p<0.001, respectively) and CD107a expression (p<0.05). MODK562 ECBMNC cytotoxicity against K562 and BL was increased vs WTK562 (80±10 vs 34±4%, p<0.001; 42±1.5 vs 18±2%, p<0.01, respectively). At 5wks, tumor vol in mice receiving either dose of MODK562 ECBMNC was significantly decreased vs WTK562 (19±1.2 vs 3±0.1%, p<0.001; 15±0.1 vs 7±0.1%, p<0.001, respectively).  

**Conclusions:** CBMCs stimulated with MODK562 exhibited increased NK activation marker CD107a, perforin and granzyme B granule exocytosis and enhanced invitro and invivo survival. Future translational applications using this expansion approach could involve neonatal ACI.

9:30 AM  
**Inflammation in Neonatal Bacterial Meningitis: The Role of Novel Biomarkers**  
Lakshmi Srinivasan, Laurie Kilpatrick, Soraya Abbasi, Mary C. Harris.  

The Children’s Hospital of Philadelphia, Philadelphia, PA; Temple University, Philadelphia, PA; Pennsylvania Hospital, Philadelphia, PA; University of Pennsylvania School of Medicine, Philadelphia, PA.  

**Background:** Neonatal meningitis is associated with significant morbidity and mortality. Lumbar puncture (LP) is often deferred in critically ill infants, and antibiotics administered presumptively, thereby reducing the yield of cultures. One of the hallmarks of bacterial meningitis is the influx of immune cells into cerebrospinal fluid (CSF). Interleukin 18 (IL-18), (IL-23) and RAGE receptor for advanced glycation end-products are mediators of neutrophil influx in severe inflammation. However, the pattern of mediator release in meningitis is not well defined.

**Results:** This study demonstrates that urinary biomarkers IL 8, IP-10 and MCP -1 are pro-inflammatory cytokines that are increased in the neonate during an infectious inflammatory response. These biomarker may be useful predictors and an adjunct to the current evaluation protocol to recognize neonatal sepsis. Future research is needed to identify a panel of inflammatory and anti-inflammatory biomarkers that may be useful to prognosticate, monitor and direct therapy in neonatal sepsis.

**Conclusions:** This study demonstrates that urinary biomarkers IL 8, IP-10 and MCP -1 are pro-inflammatory cytokines that are increased in the neonate during an infectious inflammatory response. These biomarker may be useful predictors and an adjunct to the current evaluation protocol to recognize neonatal sepsis.
**9:45 AM**

**Fellow in Training**

**Docosahexaenoic Acid (DHA) Upregulates the Innate Immune Response in Neonatal Cord Blood**

Michael M. Espiritu, Jeffrey M. Perlman, Susanna Cunningham-Rundles

Department of Pediatrics, Weill Cornell Medical College, New York, NY.

**BACKGROUND:** Recent attention has focused on the potential role in neonates of DHA, an n-3 polyunsaturated fatty acid, as a modulator of immunity and inflammation. Neonates, whose host defenses are immature, are a population especially vulnerable to infection. We hypothesized that DHA has an upregulatory effect on the neonatal immune response as measured by cytokine response to lipopolysaccharide (LPS).

**OBJECTIVE:** To determine whether pretreatment of neonatal cord blood with DHA potentiates the immune cytokine response to LPS.

**DESIGN/METHODS:** Neonatal cord blood samples were freshly obtained from healthy full term infants (n=9) and incubated with or without DHA at concentrations of 25 or 100 µM for 24h, then stimulated with LPS for 18h. Supernatants were collected and assayed by multiplex analysis (MDL 7-plex Human Pro-inflammatory Cytokine Assay) for cytokines IL-1α, IL-6, IL-8, IL-10, IL-12p70, TNF-α, and IFN-γ (pg/mL).

**RESULTS:** The effect of pretreatment with DHA on response to LPS varied among cytokines. Compared to untreated cord blood, pretreatment with 100 µM DHA resulted in significant enhancement of IFN-γ (Fig. 1) response to LPS (p<0.05). IL-12p70 and IL-6 responses were also enhanced (p<0.05). No effects were observed for IL-1α, IL-6, IL-10, or TNF-α. Pretreatment with 25 µM DHA had neither a significant inhibitory nor potentiating effect on response to LPS for all cytokines tested.

**CONCLUSIONS:** Contrary to popular teaching, CSF WBCs are not significantly different between non-infected preterm and term infants. While the use of antibiotics may affect CSF parameters, our data reflect common NICU practices with regard to performance of LPs in hospitalized infants. We also quantify age related changes in CSF protein and glucose levels. These values can be used to accurately interpret the results of CSF studies in young infants.

**10:00 AM**

**Reference Ranges for Cerebrospinal Fluid (CSF) Parameters in Non-Infected Preterm and Term Infants in the NICU – A Multicenter Prospective Study**


The Children’s Hospital of Philadelphia, Philadelphia, PA; Pennsylvania Hospital, Philadelphia, PA; University of Pennsylvania School of Medicine, Philadelphia, PA. 

**BACKGROUND:** Neonatal meningitis is a significant cause of morbidity and mortality in infants. Studies examining normal ranges of CSF parameters are often retrospective, and provide limited information in preterm infants. 

**OBJECTIVE:** To determine reference ranges of CSF parameters in term and preterm infants hospitalized in NICUs.

**DESIGN/METHODS:** Data were collected prospectively as part of a multi-site study of infants < 6 mos in 3 NICUs receiving a lumbar puncture (LP) for diagnosis of suspected meningitis. Infants with proven bacterial or viral meningitis and traumatic taps were excluded. The relationships of CSF white cell count (WBC), protein and glucose with postnatal age (PNA) were examined in the entire cohort and in gestational age (GA) subsets. 

**RESULTS:** 333 infants had median GA of 36wks (range 23-42wks) and median PNA of 6d (range 0-158d). 74% received antibiotics prior to LP.

<table>
<thead>
<tr>
<th>CSF parameters</th>
<th>Infants&lt;37wks</th>
<th>Infants≥37wks</th>
<th>All infants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median (95%)</td>
<td>Median (GA 37wks)</td>
<td>Median (GA 39wks)</td>
<td>Median (GA 36wks)</td>
</tr>
<tr>
<td>WBC (mm³)</td>
<td>1 (29)</td>
<td>3 (23)</td>
<td>3 (29)</td>
</tr>
<tr>
<td>Glucose (mg/dl)</td>
<td>49 (81)</td>
<td>49 (81)</td>
<td>49 (81)</td>
</tr>
<tr>
<td>Protein (mg/dl)</td>
<td>103 (206)*</td>
<td>68.5 (133)*</td>
<td>86 (173)</td>
</tr>
</tbody>
</table>

There was an age related decline in CSF protein levels in term infants by 5 mg/dl/wk (p<0.001). In contrast, CSF glucose levels increased by 1.5 mg/dl/wk in term infants (p=0.003). There was no correlation between CSF WBCs and PNA in either GA category. Glucose and protein values were unaffected by PNA in preterm infants.

**10:15 AM**

**Fellow in Training**

**Efficacy of Als3p-Specific Monoclonal Antibody in a Mouse Model of Neonatal Candidiasis**

Nancy Y. Tsa, Sonia S. Lafore-Nesbitt, Lois L. Hoyer, Joseph M. Bliss.

Department of Pediatrics, Women & Infants Hospital of RI, Alpert Medical School of Brown University, Providence, RI; College of Veterinary Medicine, University of Illinois Urbana-Champaign, Urbana, IL.

**BACKGROUND:** Candida albicans is the leading fungal pathogen causing invasive disease in premature infants. Despite treatment with antifungal agents, these infections lead to high mortality and neurodevelopmental impairment among survivors. Novel therapeutic strategies are needed to treat these infections.

**OBJECTIVE:** To evaluate the therapeutic potential of a monoclonal antibody (MAb) against the C. albicans adhesin, Als3p, in a neonatal mouse model for disseminated candidiasis.

**DESIGN/METHODS:** Two-day-old BALB/c mouse pups were given a lethal dose of C. albicans by intraperitoneal injection, and randomized to receive Als3p-specific MAb or sterile saline. Control animals received anti-Als3p antibody only. Pups were examined every 3-8 hours for death and moribund. Surviving pups were euthanized at 72 hours after injection and organs were harvested. Kidney, lung and brain were homogenized at time of death and plated to assess fungal burden.

**RESULTS:** Infection with C. albicans in animals receiving saline (n=8) led to a median survival of 34 hours. A single dose of anti-Als3 MAb given 1.5 hrs after infection (n=12) led to increased survival to a median of 55 hours (p<0.007). Median colony counts (in colony forming units (CFU)/organ) in the kidney were 1110 [600-4100]* in the treatment group vs. 2520 [3325-3600]* for C. albicans alone. Colony counts for lung tissue were comparable in both groups, 1340 [535-3055]* in the treatment group vs. 1450 [306-3075]* in C. albicans only group. Uninfected pups injected with anti-Als3 MAb alone remained healthy until study endpoint. Death due to candidiasis in...
infected animals was confirmed by colony counts of homogenized kidney, lung, and brain tissue.

*inter-quartile range

CONCLUSIONS: Although limited by small sample size, a single dose of anti-Als3 MAb given to neonatal mice infected with C. albicans shows a trend toward reduced mortality. Targeted immunotherapy may be a useful approach for translation to human neonates.

GI / Hematology - Oncology / Nephrology / Nutrition

Platform Session

Saturday, March 26, 2011
8:15 AM-10:30 AM

8:15 AM

House Officer

Changes in Vitamin D Status in Incident Pediatric Crohn Disease

Aaron R. Prosnitz, Mary B. Leonard, Justine Shulits, Babette S. Zemel, Bruce W. Hollis, Robert N. Baldassano, Meena Thayu.

Yale-New Haven Children’s Hospital, New Haven, CT; Children’s Hospital of Philadelphia, Philadelphia, PA; Department of Biostatistics and Epidemiology, University of Pennsylvania, Philadelphia, PA; Department of Biochemistry and Molecular Biology, Medical University of South Carolina, Charleston, SC.

BACKGROUND: Vitamin D is essential for musculoskeletal health and immune function. Prior studies have reported a high prevalence of vitamin D deficiency in pediatric Crohn disease (CD); however, no studies have examined changes in vitamin D status in an incident cohort or included healthy controls.

OBJECTIVE: This prospective cohort study characterized 25(OH)D, 1,25(OH)2D, and parathyroid hormone (PTH) levels in pediatric CD at diagnosis, compared with controls, and identified correlates of changes in these parameters following diagnosis.

DESIGN/METHODS: Serum vitamin D and PTH levels were measured at diagnosis, 6, 12, and a median of 45 months later in 78 CD participants, and once in 221 controls. Multivariate linear and logistic regression models identified correlates of baseline levels, and quasi-strict parentheses regression models identified factors associated with changes over time.

RESULTS: At diagnosis, 25% of CD participants were vitamin D deficient [25(OH)D < 15 ng/mL], and the odds ratio for deficiency was 4.9 [95% CI 2.0, 11.8; p<0.001], compared with controls, adjusted for age, race, and sex. Serum 1,25(OH)2D levels were lower compared with controls, independent of 25(OH)D levels [p<0.001], and were lower relative to PTH in CD (interaction p<0.02). Among CD subjects and controls with 25(OH)D < 30 ng/mL, CD was associated with lower PTH levels [p<0.05]. Both 25(OH)D and 1,25(OH)2D (both, p<0.001) levels improved over time. At follow-up, 4% were vitamin D deficient, and PTH was no longer lower relative to 25(OH)D levels in CD, compared with controls. Greater increases in 25(OH)D were correlated with lower baseline 25(OH)D; a summer study visit, lower baseline CD activity, and vitamin D supplementation [all, p<0.05]. Greater increases in 1,25(OH)2D were correlated with greater increases in PTH [p<0.02].

CONCLUSIONS: This study demonstrates significant 25(OH)D deficiency in incident pediatric CD, which resolves following diagnosis. Further, 1,25(OH)2D improved following diagnosis, and the relative hypophosphatemia at baseline resolved at follow-up. Immunologically cytokine suppression of PTH and downregulation of renal 1-α-hydroxylase may contribute to an altered vitamin D-PTH axis. Future studies should address the impact of vitamin D supplementation on clinical outcomes in pediatric CD.

8:30 AM

Medical Student

Preliminary Results of Phase I/II Study of Clofarabine (CLO) in Combination with Cytarabine (ARA-C) and Total Body Irradiation (TBI) Followed by Allogeneic Stem Cell Transplantation (AlloSCT) in Children, Adolescents and Young Adults (CYA) with Poor-Risk Acute Leukemia


Pediatrics, Columbia University, New York, NY; Pediatrics, University of Louisville, Louisville, KY; Pediatrics, Medical College of Wisconsin, Milwaukee, WI; Pediatrics, New York Medical College, Valhalla, NY; Pediatrics, University of California Los Angeles, Los Angeles, CA; Pathology and Cell Biology, Columbia University, New York, NY; Surgery, University of California San Francisco, San Francisco, CA; Medicine, Columbia University, New York, NY.

BACKGROUND: CAYA with ALL/AML in 3rd complete remission (CR3), refractory relapse (RR) or induction failure (IF) continue to have very poor prognosis, ~20% EFS (Gaynor, BJH, 2005, Wells et al, JCO, 2003). CLO, an inhibitor of DNA polymerase and ribonucleotide reductase, has activity in CAYA with relapsed ALL/AML (Jeha et al., JCO, 2006, 2009). CLO with CYT demonstrates synergy and greater rates of CR than CLO alone (Faderl et al, Blood, 2005, 2008).

OBJECTIVE: We sought to determine maximum tolerated dose of CLO and assess safety, progression-free survival (PFS) and overall survival (OS) of CLO, ARA-C and TBI followed by AlloSCT in CAYA with poor-risk ALL/AML.

DESIGN/METHODS: This is a multi-center phase I/II trial of a novel conditioning regimen of CLO (dose escalation: 40mg/m2 [n=3], 60mg/m2 [n=2], 52mg/m2 [n=9]) x5d with ARA-C 1000mg/m2 4 hrs later x6d and TBI (1200cGy) followed by AlloSCT from matched related or unrelated donors, 9 unrelated donors (5 BM/PBSC, 4 UCB). Median TNC/CD34 dose was 5.0x10^6/kg/5.0x10^6/kg for BM/PBSC and 3.8x10^7/kg/4.0x10^5/kg for UC. Probabilities of neutrophil and platelet engraftment and grade II-IV aGVHD were 100%, 90.9% and 48.1%. All achieved 100% whole blood chimerism by day 30. Day 100 TRM is 0%. CLO dose tolerated at 52mg/m2, which is being used in phase II. No SAEs related to CLO were observed. 2 pts had disease progression at days 90 and 126. 1 pt is alive in continuous CR at median 182 days (42-476). Probabilities of 1-yr PFS and OS are 64.7% and 60.2%.

CONCLUSIONS: Preliminary results suggest this regimen followed by AlloSCT is safe and well tolerated in CAYA with poor-risk ALL/AML with CLO dose of 52mg/m2. Early results are encouraging with respect to low risk of early leukemic relapse with this conditioning regimen.

8:45 AM

House Officer

Are Children with Elevated Body Mass Index at Increased Risk for Gastroesophageal Reflux? A Community-Based Study

Sowrya Ansugamay, Babu Bangaru, Louis Primavera, Rapaport Susan, Fernando Kunferman.

Pediatrics, Flushing Hospital Medical Center, Flushing, NY; School of Health Sciences, Touro College, New York, NY.

BACKGROUND: Childhood obesity has reached epidemic proportions worldwide and is a leading public health concern in the US. Emerging data suggest that elevated body mass index (BMI) in children is associated with many adverse health consequences. Elevated BMI has been associated with gastroesophageal reflux (GER) in adults, but the presence of this association in children remains uncertain.

OBJECTIVE: To identify whether elevated BMI is associated with GER in children.

DESIGN/METHODS: We conducted a cross-sectional study at Flushing Hospital Medical Center from May to October 2010. Children 2-19 years of age who attended the outpatient department were recruited. Consent was obtained from their parents and assent for children over 7. Children with illness in the past 2 weeks were excluded. Height and weight of enrolled subjects was recorded, and they or their parents were asked to complete a validated questionnaire used to diagnose GER in children. The questionnaire obtained demographic data on the patients and their exposure to smoking, caffeine, antireflux medications and any illness in the past 2 weeks. In addition, there were questions related to GER symptoms experienced over the previous week including vomiting, nausea, heartburn, epigastric pain, abdominal pain, regurgitation and difficulty swallowing. Each symptom was given a weighted score. A total score of ≥ 2 was considered positive for GER. BMI was calculated according to published standards for each patient, and subdivided into percentile groups of overweight (<5%), normal (5%-84%), overweight (85%-95%) and obese (> 95%). Descriptive data were reported using frequencies, means and standard deviations (SD).

Associations between BMI and GER were analyzed using Chi-squares. A p-value of <0.05 was considered significant.

RESULTS: A total of 390 subjects were recruited; 48 were excluded due to recent illness. The 342 subjects studied had a mean age of 7.2 ± 4.3 years, were 47% male and 70% Hispanic. The subjects’ BMIs classified them as overweight 2%, normal 46%, overweight 22% and obese 31%.

CONCLUSIONS: Elevated BMI was not significantly associated with GER symptoms in children in our community-based study.
9:45 AM
Medical Student

Pedicure Pharmacokinetics (PK) of IV Busulfan (Bu) in Allogeneic Stem Cell Transplantation (AlloSCT) Recipients: Dosing q12 Hours Schedules Are Safe and Comparable to q6 Hours Schedules

John LeGall, Michael Milone, Ian Waxman, Les Shaw, Lauren Harrison, Deirdre Duffy, Olaa Milianu, Monica Bhata, Prakash Sovani, Diane George, James H. Garvin, M. Bregid Bradley, Carmella van de Ven, Mitchell S. Cairo.

Pediatrics, Columbia University, New York, NY; University of Pennsylvania, Philadelphia, PA; Medicine, Columbia University, New York, NY; Pathology and Cell Biology, Columbia University, New York, NY.

BACKGROUND: IV Bu divided q6h in pediatric AlloSCT conditioning has been demonstrated to be safe and effective at doses of 4 mg/kg/day in pts <4 years and 3.2 mg/kg/day in pts >4 years (Walt et al, PBC, 2010). Less frequent dosing of IV Bu would be attractive for ease of administration and increased efficiency.

OBJECTIVE: To compare the PK of IV Bu q12h to those of IV Bu q6h.

DESIGN/METHODS: For comparison of PK data two cohorts of pediatric AlloSCT pts receiving IV Bu during conditioning were established. Cohort A received IV Bu q6h x 16 doses and cohort B received IV Bu q12h x 8 doses (age ≤4 yrs: 4 mg/kg/day; age >4 yrs: 3.2 mg/kg/day). Heparinized plasma was obtained at 1,2,3,5,6, and 8 hrs after the first dose of IV Bu to determine drug levels as measured by gas chromatography–mass spectroscopy (GC-MS). Bu levels were used to determine volume of distribution (Vd), half-life (t1/2), and clearance (Cl) of Bu. Area under the curve (AUC) was calculated using a 1-compartment first order kinetic model. An estimated AUC/day was calculated.

RESULTS: In comparing PK of cohort A (n=89; mean age 7.9 yrs) vs cohort B (n=38; mean age 8.2 yrs) there was no statistically significant difference in the Vd, t1/2, or Cl.

Table 1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>89</td>
</tr>
<tr>
<td>N/A</td>
<td>36</td>
</tr>
<tr>
<td>T½ (h)</td>
<td>20.61 ± 16.60</td>
</tr>
<tr>
<td>Vd(L)</td>
<td>132.0 ± 31.10</td>
</tr>
<tr>
<td>Cl(mL/min)</td>
<td>3.39 ± 0.94</td>
</tr>
<tr>
<td>AUC(mmol·min/L)</td>
<td>1077 ± 352</td>
</tr>
<tr>
<td>AUC/day</td>
<td>4310 ± 1406</td>
</tr>
</tbody>
</table>

As expected there was a significant increase in the AUC in cohort B vs cohort A (1886 vs 1077 mmol·min·L⁻¹·h⁻¹; p <0.0001). The AUC/day of cohort B was less than that of cohort A (3773 ± 841 vs 4310 ± 1406 mmol·min·L⁻¹·h⁻¹; p=0.031).

CONCLUSIONS: In summary, besides an expected increase in AUC, IV Bu q12h administration in conditioning of pediatric AlloSCT pts results in a PK profile (Vd, t1/2, Cl, AUC/day) clinically comparable to IV Bu q6h. Improved efficiency of administration may make the IV Bu q12h dosing an attractive alternative to the conventional q6h dosing.

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10:00 AM
Medical Student

GA101, a Type II Glycoengineered Antibody Against CD20
Induces Significant InVitro Cell Death of PreB-ALL (PBALL) and PreB Lymphoblastic Lymphoma (PBLL)

Christina Cho, Janet Ayello, Andrew Stier, William Quish, Mitchell S. Cairo.

Pediatrics, Medicine, Pathology and Cell Biology, Columbia University, New York, NY.

BACKGROUND: CD20 is an excellent tumor target and rituximab, a chimeric type 1 antibody (ab) directed at CD20, has shown enhanced activity in adult and pediatric B-cell nonlymphoblastic NHL but eventually relapse and refractoriness occur (Coiffier et al NEM 2002; Cairo et al ASCO 2010). GA101 is a type-II glycoengineered and humanized anti-CD20 ab exhibiting superior activity in vitro and in vivo. Therefore, we investigated its activity against CD20+ nonlymphoblastic NHL invitro and in human NHL xenograft models (Mössner et al Blood 2010). CD20 is also expressed in childhood PBLL and PALL (Jeha et al Blood 2006).

OBJECTIVE: To determine optimal GA101 dose and incubation time for invitro cell death of preB-ALL and PBLL.

DESIGN/METHODS: PBALL (Tanoue) and PBLL (U698M; DMSZ) tumor targets (TT) were cultured in RPMI10% FBS. The T-ALL cell line Loucy, 2D20, (ATCC), served as a negative control; Tcell leukemia line Jurkat (ATCC) with camptothecin, acted as positive cell death control.

TT stained with fluorescein-conjugated anti-CD20 mAb to assess CD20 expression by flow cytometry. TT (3x10⁶/well) were incubated with 1.0, 10 and 100µg/ml of GA101 (generously supplied by Roche) or IgG isotype control at 37°±5% C02 for 24, 48, 72 hrs. Cells stained with succinylacetone (SA), an inhibitor of delta-aminolevulinate dehydrogenase (ALAD), the second enzyme in heme synthesis, for 16 hours. Aconitase activity was also measured as an index of Fe-S assembly. Mitotacker green labeling was determined as a measure of mitochondrial biogenesis.

RESULTS: shRNA infection decreased ALAS1 and HO-1 expression to at least 20%. The inhibition of ALAS1 reduced heme cellular amount and cytosol Fe-S assembly without affecting HO-1 protein level. However, when HO-1 was inhibited, cytosol Fe-S synthesis was decreased despite increased heme levels, suggesting that heme is not the only factor affecting Fe-S assembly. Nevertheless, ALAS1 protein levels were decreased in cells where HO-1 was inhibited. Moreover, incubation with SA decreased heme levels in Hela and HepG2 cells but enhanced ALAS1 expression. Furthermore, the imbalance of heme metabolism, due to disrupted HO-1 or ALAS1 expression, significantly inhibited cell proliferation while accelerating cellular iron accumulation and mitochondrial biogenesis.

CONCLUSIONS: These data suggest that heme metabolism modulates Fe-S synthesis in mammalian cells, likely through ALAS1. We speculate that this regulatory pathway modulates iron homeostasis, cell proliferation and mitochondria biogenesis.
RESULTS: CD20 expression on PBALL and PBLL cell line was 8.2±2 and 53±2.5%, respectively. At 36h the PBALL line demonstrated no significant change in cell death; while cell death in PBLL was significantly increased at 10µg/ml GA101 compared to 1 and 10(166.3 ± 7.3, 0.04±vs 5±, respectively, p<0.01) and compared to isotype and Locye (163.5 ± 1.1, 16.26 vs 8±, respectively, p<0.01). Despite low CD20 expression in PBLL, cell death induction was demonstrated when PBALL was cultured for 72h at 100 µg/ml vs 36 hrs (p<0.01). Following 72h incubation, GA101 induced a significant increase in cell death in BLL (5% CD20 ± vs PBALL (8% CD20) vs isotype vs neg control (Locye CD20) [59±0.3 vs 39±2.3 vs 0.02% 2.86±0.13%, p<0.01).

CONCLUSIONS: GA101 induced significant cell death in PBALL and PBLL and appears to be dependent in part on degree of CD20 expression and is active in CD20- lymphoblastic disease. Future xenograft studies are underway as well as comparative studies with rituximab.
9:00 AM   Fellow in Training

Pretesting Health Reform: Impact of State Laws Extending Parents’ Health Insurance Coverage to Young Adults
Alexander B. Blum, Joseph S. Ross, Lawrence C. Kleinman

Health and Education Policy, Mount Sinai School of Medicine, New York, NY; General Internal Medicine, Yale University School of Medicine, New Haven, CT.

BACKGROUND: As part of recently enacted national health care legislation, insurance companies must allow young adults to remain eligible for their parents’ health plan until age 26. Nearly half of all states had previously enacted similar laws.

OBJECTIVE: To examine the impact of state laws extending coverage to young adults and their access to care.

DESIGN/METHODS: We examined changes in access to care in five states enacting laws extending coverage to young adults in 2005 or 2006 and compared to 26 states without any such law. We used data from the CDC’s Behavioral Risk Factor Surveillance System, a representative survey of community-dwelling adults, selecting 19-23 year olds from each state in years before (2002-2004) and after (2008-2009) state law enactments. We studied 4 measures of access to care: health insurance coverage, identification of a personal physician (PMD), physical exam from a physician within the past 2 years, and report of having foregone care in the past year due to cost.

RESULTS: All measures of access to care improved significantly (p<0.001; Table) in states that enacted laws compared to states that had not. As documented in the right hand column of the table, we found differential improvement in health insurance coverage rates (3.8%), identification of a personal physician (1.6%), physical exam rates (3.0%), and decreased need to forego care due to cost (3.9%).

Results Summary

<table>
<thead>
<tr>
<th>Health Insurance Coverage</th>
<th>% Change</th>
<th>% Change</th>
<th>% Change</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>States</td>
<td>% Before</td>
<td>% After</td>
<td>% Difference</td>
<td>95% CI</td>
</tr>
<tr>
<td>With laws</td>
<td>7.561</td>
<td>7.91</td>
<td>0.35</td>
<td>3.8%</td>
</tr>
<tr>
<td>Without laws</td>
<td>11.252</td>
<td>11.68</td>
<td>0.46</td>
<td>3.8%</td>
</tr>
<tr>
<td>Personal doctor (PMD)</td>
<td>6.115</td>
<td>6.45</td>
<td>0.34</td>
<td>3.4%</td>
</tr>
<tr>
<td>Physical exam within 2 years</td>
<td>8.38</td>
<td>8.74</td>
<td>0.36</td>
<td>3.6%</td>
</tr>
<tr>
<td>Without laws</td>
<td>16.552</td>
<td>17.10</td>
<td>0.58</td>
<td>3.6%</td>
</tr>
<tr>
<td>Forgone care due to cost</td>
<td>91.674</td>
<td>91.18</td>
<td>0.49</td>
<td>3.6%</td>
</tr>
<tr>
<td>Without laws</td>
<td>21.865</td>
<td>22.02</td>
<td>0.16</td>
<td>3.6%</td>
</tr>
</tbody>
</table>

CONCLUSIONS: Compared to states which did not enact such legislation, states which required insurance plans to extend parent health insurance benefits beyond age 19 showed increases in the percent who were insured, identified a personal physician, received a physical exam, and a decrease in those who went without needed care due to cost. These findings suggest that this requirement within national health care reform is likely to improve access to care for young adults.

9:15 AM   Do Questions about Parent Concerns Provide Adequate Surveillance?
Emily N. Neger, Shela Merchant, Brandi S. Henson, R. Christopher Sheldrick, Ellen C. Perrin

Pediatrics, Floating Hospital, Tufts Medical Center, Boston, MA.

BACKGROUND: The American Academy of Pediatrics recommends surveillance of children’s behavior and development by asking parents “Do you have concerns about your child’s behavior? Did you discuss these concerns with your child’s primary care pediatrician?” and, if not published data confirm the usefulness of these questions.

OBJECTIVE: As part of a larger questionnaire, parents were asked these 3 questions. Data were analyzed to determine how well parents’ concerns reflected problems identified by validated screening measures.

DESIGN/METHODS: 432 parents of children ages 2 months to 5 years were recruited from primary care pediatric waiting rooms. In addition to specific questions about development, behaviors, and concerns, parents completed the Ages and Stages Questionnaire-Social/Emotional (ASQ-SE), a behavioral screener, and the Ages and Stages Questionnaire (ASQ-3), a developmental screener. Using clinical scores on the ASQ-3 and ASQ-SE as criteria, children were classified as having a) coexisting developmental and behavioral problems, b) developmental problems alone, c) behavioral problems alone, or d) no identified problems.

RESULTS: 106 parents (23%) reporting having a concern about their child on one or more questions. Multinomial logistic regressions showed that concerns about behavior and development were each independently associated with coexisting positive screens in both domains. Only concerns about behavior predicted the no type of concerns predicted at risk scores on the ASQ-3 alone. Concerns about learning were not predictive of any category.

Table. Frequency, specificity & sensitivity of parent concerns

<table>
<thead>
<tr>
<th>Concerns about development</th>
<th>% Match</th>
<th>% Match</th>
<th>% Match</th>
<th>% Match</th>
</tr>
</thead>
<tbody>
<tr>
<td>No concerns</td>
<td>11</td>
<td>33</td>
<td>28</td>
<td>66%</td>
</tr>
<tr>
<td>Concerns about behavior</td>
<td>25</td>
<td>42</td>
<td>24</td>
<td>66%</td>
</tr>
</tbody>
</table>

CONCLUSIONS: While only a small number of children recognized to be at risk by formal screening were identified by their parent’s stated concerns (modest sensitivities), very few of the children in the normal range on screening tests aroused a concern in their parents (high specificities).

9:30 AM   House Officer

Comparison of Anthropometric Measures in the Longitudinal Assessment of Fat Mass
Thao-Ly T. Phan, Michelle M. Maresca, Hossain Jobayer, George A. Datto, Nemours, A.I. duPont Hospital for Children, Wilmington, DE.

BACKGROUND: The American Academy of Pediatrics recommends surveillance of children’s weight and body fat mass (FM) at a single time point with variable results. However, no study to date has examined the longitudinal relationship between FM and anthropometric measures. Understanding which anthropometric measures are most clinically useful over time would help inform providers who manage obese patients over time.

OBJECTIVE: To determine which anthropometric measure best correlates with change in FM over time.

DESIGN/METHODS: We performed a retrospective cohort study of 76 obese patients (mean BMI of 38.04, S.D. 8.15) between 9 and 18 years of age who presented to a single provider at a weight management clinic between 2005 and 2010. For each patient, during both an initial and subsequent visit to the clinic, FM was measured by bioelectrical impedance analysis using the RJL Quantum X. Each visit, the following measures were also obtained: BMI, waist circumference (WC), hip circumference (HC), waist to height ratio (WHR), waist to hip ratio (WHR), and neck circumference (NC). We calculated partial correlation coefficients (adjusting for age, gender, and race) to test the relationship between the percent change in each anthropometric measure per month and the percent change in FM per month.

RESULTS: Change in BMI over time correlated better with change in FM over time than any other anthropometric measure (see table below). This was statistically significant (p<0.01) and held true even when racial and gender groups were assessed separately (p<0.001).

CONCLUSIONS: In this study, change in BMI was strongly correlated with change in FM over time. Other anthropometric measures do not appear to add to the assessment of change in FM for any subgroup. We suggest that in the clinical management of obese children, BMI is an adequate measure of change in FM.

9:45 AM   Improving Response Rate for Mailed Pediatric Questionnaires:
Effect of Cover Letter Tone and Literacy Level
Andrew Adesman, Alison Cohn, Nina Kohn, Helen Papaioannou, Ruth Milnaik, North Shore-LIJ Health System, New Hyde Park, NY; Washington University, St. Louis, MO.

BACKGROUND: Questionnaires are an important research tool to assess pediatrician practices and knowledge; however, response rate (RR) by physicians is notoriously low, which can skew the results.

OBJECTIVE: The aim was to determine if RR by pediatricians for a mailed questionnaire could be increased by adding humor or a personal plea in the cover letter (CL). A secondary aim was to assess the impact of the cover letter’s readability.

DESIGN/METHODS: A 6-minute questionnaire on parenting myths was mailed to 5,000 primary care pediatrics in the U.S. Four different CLs were created to go to 4 randomly selected groups of 1,250 pediatricians. One CL had a humorous tone, and one had an imploring/desperate tone (written by a 3rd year fellow required to complete the research project for her training). The 2 control CLs were written in a dry tone: one at a 5th grade reading level (RL) and one at a college RL.

Cover Letter Characteristics

<table>
<thead>
<tr>
<th>Correlation with % ChangeFM per Month</th>
<th>% Change</th>
<th>% Change</th>
<th>% Change</th>
<th>% Change</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>0.93</td>
<td>0.70</td>
<td>0.69</td>
<td>0.49</td>
<td>0.49</td>
</tr>
<tr>
<td>Male</td>
<td>0.96</td>
<td>0.81</td>
<td>0.81</td>
<td>0.45</td>
<td>0.56</td>
</tr>
<tr>
<td>Female</td>
<td>0.92</td>
<td>0.76</td>
<td>0.73</td>
<td>0.57</td>
<td>0.51</td>
</tr>
<tr>
<td>White</td>
<td>0.93</td>
<td>0.74</td>
<td>0.73</td>
<td>0.34</td>
<td>0.48</td>
</tr>
<tr>
<td>Nonwhite</td>
<td>0.94</td>
<td>0.68</td>
<td>0.67</td>
<td>0.74</td>
<td>0.49</td>
</tr>
</tbody>
</table>

All correlations with p < 0.05

CONCLUSIONS: In this study, change in BMI was strongly correlated with change in FM over time. Other anthropometric measures do not appear to add to the assessment of change in FM for any subgroup. We suggest that in the clinical management of obese children, BMI is an adequate measure of change in FM.
prescribed to a child less than 18 years of age in the Journal of the American Medical Association, The New England Journal of Medicine, Pediatrics, Journal of Pediatrics, and Archives of Pediatrics and Adolescent Medicine from November 2009 to October 2010 were evaluated. RESULTS: A total of 898 articles were reviewed; 98 (11%) article titles contained a total of 146 medications. When examined by country of the lead author, almost one half, 46% (45/98), of the articles originated outside of the USA, with Canada, 9%, and Australia, 9%, the most frequent non-US contributors. Comparing US authors to non-US authors, non-US authors were more likely than US authors to submit and have published an off-label drug study, 63% vs 37% (p = 0.026). When funding by pharmaceutical companies was explored, US authors and non-US authors, 22% vs 18%, were equally likely to accept drug company dollars (p = 0.80). CONCLUSIONS: Pediatric research involving off-label drugs is responsible for one half of the drug study articles currently published in high impact journals in the US. One-half of all drug studies published in US journals are performed outside the US. Most (80%) of all pediatric drug studies are not funded by industry.

General Pediatrics - Vulnerabilities Platform Session

Saturday, March 26, 2011 8:15 AM-10:30 AM

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House Officer

Urine STD Screening of Pediatric Patients Presenting to the Emergency Department with Behavioral/Psychiatric Complaints. Are They at High Risk of Infection? David A. Listman, Ashmita Monga, Jennifer Goodrich, Pediatrics, St. Barnabas Hospital, Bronx, NY; Pediatrics, Albert Einstein College of Medicine, Bronx, NY; Emergency Medicine, St. Barnabas Hospital, Bronx, NY. BACKGROUND: A 2008 CDC report on sexually transmitted disease (STD) activity found a continued unacceptably high level of disease and recommended screening specific populations to reduce the rate of STD. Studies have established the connection between patients with known psychiatric disorders and high incidence of risk taking behaviors. High risk taking behavior in teens can increase exposure to STD’s.

OBJECTIVE: To determine if adolescent patients seen in the the Pediatric ED for psychiatric evaluation represent a high risk group that should be specifically targeted for routine urine STD screening.

DESIGN/METHODS: Subjects were recruited from patients who presented to the St. Barnabas Hospital Pediatric Emergency Department (PED) a mid sized urban community hospital with an annual census of 25,000 patients < 18 years of age. The study group included patients 12-17 years of age presenting for psychiatric or behavioral evaluations to the PED. Patients were excluded if they had autism, significant mental retardation or were unable to give their verbal understanding and consent due to sedation. A matched cohort of patients presenting with non-psychiatric complaints were recruited as a control group. Urine was collected in GEN-PROBE® specimen collection tubes for laboratory analysis.

RESULTS: 160 behavioral health patients invited to participate, 36 refused, 6 were excluded if they had autism, significant mental retardation or were unable to give their verbal understanding and consent due to sedation. A matched cohort of patients presenting with non-psychiatric complaints were recruited as a control group. Urine was collected in GEN-PROBE® specimen collection tubes for laboratory analysis.

CONCLUSIONS: The PPSC assesses four domains that are highly relevant to mental health for young children and can be reliably reported by parents using a brief instrument. The PPSC shows promise as a brief screening instrument for use in pediatric care. Further research using independent samples is needed and in process.

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10:15 AM

House Officer

Impact of Shared Decision Making on Behavioral Impairment among US Children with Special Health Care Needs

Alexander Fiks, Russell Localio, Stephanie Mayne, Evaline Alessandrini, James Guveyar.

The Children’s Hospital of Philadelphia, Philadelphia, PA; University of Pennsylvania, Philadelphia, PA; Cincinnati Children’s, Cincinnati.

BACKGROUND: The Institute of Medicine has prioritized shared decision making (SDM), yet little is known regarding the impact of SDM on behavioral outcomes for children.

OBJECTIVE: To assess the impact of SDM on behavioral impairment for US children with special health care needs (CSHCN).

DESIGN/METHODS: CSHCN 5-17 years in the 2002-2006 Medical Expenditure Panel Survey (MEPS) were followed longitudinally for 2 years. Our primary outcome was behavioral impairment, assessed through the validated 13 item Columbus Impairment Scale (CIS, Score0-15 indicates impairment). SDM (high, medium, low) was defined by a latent class analysis based on 7 items in MEPS addressing clinicians’ involving families in decisions, explaining all options, communicating clearly, respecting families’ preferences and concerns, listening carefully, and taking enough time. We used generalized linear models to assess the impact of change in SDM from year 1 to 2 (increase, decrease, same) on the CIS score, multinomial regression to assess the impact of SDM on change in impairment (becoming unimpaired, improved, or no change), and logistic regression to assess the impact of SDM in year one on impairment in year 2, controlling for baseline impairment. We considered children with asthma and ADHD in secondary analyses.
RESULTS: Table 1 details outcomes in each SDM group. Among 2282 subjects representing 9.6 million CSHCN, increasing versus unchanged and decreasing SDM was associated with a 1.2 (P=0.02) and 1.7 (P=0.01) point decrease on the CIS score, respectively. Impaired CSHCN were less likely to remain impaired if SDM remained versus increased (p=0.04). Higher levels of year 1 SDM predicted less impairment in year 2 in the overall population (OR=0.27, p<0.001), among those with asthma (OR=0.23, p<0.001) and ADD/H (OR=0.14, p=0.055).

Change in Outcomes by SDM Pattern

<table>
<thead>
<tr>
<th>SDM Increase, n=481</th>
<th>SDM Same, n=943</th>
<th>SDM Decrease, n=348</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIS Score Year 1</td>
<td>11.7</td>
<td>10.1</td>
</tr>
<tr>
<td>Year 2</td>
<td>10.8</td>
<td>10.0</td>
</tr>
<tr>
<td>% SDM Impaired</td>
<td>40.8</td>
<td>34.6</td>
</tr>
<tr>
<td>Year 1</td>
<td>13.2</td>
<td>13.1</td>
</tr>
<tr>
<td>% Change</td>
<td>-3.2 (10.6, 3.4)</td>
<td>-1.3 (1.3, 4.4)</td>
</tr>
</tbody>
</table>

CONCLUSIONS: Increasing SDM is associated with decreased behavioral impairment and higher baseline SDM predicted a greater decline in impairment in year 2. Results support research to develop and evaluate interventions to foster SDM for CSHCN.

9:00 AM

Association of Shared Decision Making with Health Care Expenditures and Utilization among US Children with Special Health Care Needs

Alexander G. Fiks, Stephanie Maye, James P. Guevara, Evaine Alessandrini, Russell Localio.

The Children’s Hospital of Philadelphia, Philadelphia, PA; University of Pennsylvania, Philadelphia, PA; Cincinnati Children’s, Cincinnati.

BACKGROUND: The Institute of Medicine has prioritized shared decision making (SDM), yet little is known regarding the impact of SDM on child health care expenses and utilization.

OBJECTIVE: To understand the association between SDM and health care expenses, emergency department (ED) visits, and inpatient (IP) stays among US children with special health care needs (CSHCN).

METHODS: CSHCN in the 2002-2006 Medical Expenditure Panel Survey (MEPS) were followed longitudinally for 2 years. Primary outcomes were health care expenditures, ED visits, and IP stays. The primary exposure was change in SDM from year 1 to 2 (increase, decrease, same), defined by a latent class analysis of 7 items in MEPS addressing clinicians’ involving families in decisions, explaining all options, communicating clearly, respecting families’ preferences and concerns, listening carefully, and taking enough time. We used generalized linear models with variances adjusted for the survey design to assess the association of change in SDM from year 1 to 2 on change in health care expenses, ED visits, and IP stays. To avoid bias from outliers, the top and bottom 2.5% of values for expenses were truncated to the 2.5 and 97.5 percentile.

RESULTS: Table 1 details the change in outcomes in each SDM group. In our sample of 2858 subjects representing 12 million CSHCN, increasing SDM was associated with a $164 (p=0.05) and $563 (p=0.02) relative drop in health care expenses compared to SDM unchanged and decreased. As SDM increased, IP stays decreased by 4.6 (p=0.03) and ED visits decreased by 8.5 (p=0.04) per hundred patient years relative to those with SDM unchanged.

9:15 AM

Cervical Dysplasia in Immunocompromised vs. Immunocompetent Adolescents

Amanda M. Jacobs, Melissa J. Fazzari, Susan M. Coupey.

Pediatrics, Children’s Hospital at Montefiore/Albert Einstein College of Medicine, Bronx, NY; Department of Epidemiology & Population Health, Albert Einstein College of Medicine, Bronx, NY.

BACKGROUND: Pap smear screening is recommended to begin at age 21. Adolescents with immune compromise may be at increased risk of cervical dysplasia [low grade (LGSIL) or high grade (HGSIL) squamous intraepithelial lesion]. There are no guidelines for Pap smear screening of immunocompromised women under age 21 and little data on prevalence of dysplasia in this group.

OBJECTIVE: To compare the prevalence of LGSIL & HGSIL in women <21 yrs with and without an immunocompromising diagnosis.

METHODS: Clinical Looking Glass (CLG), a searchable database for a large health care system, was used to query for females aged 12–20 years from 1997-2010 who had both a Pap smear & one of the following diagnoses as defined by ICD-9 codes: HIV; transplant; inflammatory bowel (IBD); Hodgkin’s; lupus (SLE); and other immune deficiencies (e.g. common variable, Wiskott-Aldrich). We randomly selected age & time matched controls from CLG who had Pap smears & none of the diagnoses listed above as well as no neoplastic, rheumatologic, fetal, or autoimmune condition.

RESULTS: We identified 1,095 immunocompromised (IC) adolescents with 2,532 Pap smears and 1,202 controls with 2,499 Pap smears (2.3 & 2.1 Pap smears/patient; mean age at first Pap smear 18.6 ± 1.8 years). Patients were white (45%), African American (27%), and Hispanic (20%). There were no significant differences in age or race/ethnicity when comparing IC & healthy adolescents.

CONCLUSIONS: Increasing SDM is associated with decreased behavioral impairment and higher baseline SDM predicted a greater decline in impairment in year 2. Results support research to develop and evaluate interventions to foster SDM for CSHCN.

9:30 AM

Suicidal Ideation and Intent in a Community Sample of Preadolescent Youth: A Case-Control Study

Mariel C. Giannetta, Nancy Brodsky, Laura Betancourt, Matthew B. Wintersteen, Hallam Hurt.


BACKGROUND: Suicide is the third leading cause of death in adolescents in the US. While research has focused on better understanding of risk factors in older youth, less is known regarding preadolescents who endorse suicidal ideation and intent.

OBJECTIVE: To examine characteristics associated with endorsement of suicidal ideation and intent in youth ages 10-13.

METHODS: A community sample of 387 youth of mixed SES, enrolled in a prospective study assessing precursors of risk behaviors, was administered two questions related to suicide as part of Achenbach’s Youth Self-Report (YSR): “I think about killing myself” and “I deliberately try to hurt or kill myself”. Adolescents with HIV [97/185 (61%)], transplant [7/13 (54%) & other immune deficiencies [20/65 (31%)] were more likely to have dysplasia than those with IBD [12/799 (14%)], Hodgkin’s [4/29 (14%), or SLE [2/216 (1%)].

CONCLUSIONS: Immunocompromised adolescents have a higher prevalence of cervical dysplasia than immunocompetent adolescents. Adolescents with HIV & transplants have the highest prevalence of cervical dysplasia.
CONCLUSIONS: In this study, preadolescent SIE report significantly more problem behaviors than non-SIE. However, parental monitoring and parent report of problems do not differ between groups. Given these findings, we suggest that at-risk youth may be under-recognized at young ages, a time at which initiation of interventions may reduce adolescent risk behaviors and suicidal ideation.

9:45 AM

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Maternal Factors Associated with Medicaid/SCHIP Renewal for Low-Income, Minority Children

Omolar A. Thomas, Melissa S. Stockwell, Dodi Meyer.


BACKGROUND: One-third of children living in the US are publicly insured, and many lose coverage despite remaining eligible. Gaps in coverage decrease access to a medical home, reduce preventive care visits and increase unmet medical needs. Lack of caregiver’s knowledge about the renewal process has been a major barrier to retention of children in public insurance programs, especially among minorities. However, little is known about which caregivers may be at highest risk for suboptimal knowledge of renewal procedures.

OBJECTIVE: To examine the role of caregiver demographic factors on knowledge of Medicaid/SCHIP renewal for children from a low-income, minority population.

DESIGN/METHODS: A survey was developed to assess families’ experience with discontinuous coverage and renewal procedures, including knowledge, attitudes and behaviors. A convenience sample of 64 mothers, of children aged 2-18 years attending a community health center, were interviewed. Associations between renewal process knowledge, attitudes and behaviors and sociodemographics were assessed using bivariable analyses and multivariable logistic regression.

RESULTS: Overall, 85% of children were Latino, 13% Black. 94% enrolled in a Medicaid health plan, 2% in SCHIP and 4% in Medicaid. Most (75%) mothers were foreign-born. 23% of children experienced loss of coverage since birth and 14% in the past year. Only 6% of mothers less than a high school education knew when their child was due for renewal, compared to those who completed high school (33%) or were college educated (48%; p=0.02). The renewal process was reported as more difficult among mothers who lived in the US for <10 years compared to those with longer residence (46% vs. 12%; p=0.018). Younger mothers had less knowledge of mandatory renewal than older mothers (42% vs. 5%; p=0.001). After controlling for education level, length of time in US and prior experience with coverage loss, younger mothers were far less likely to know about mandatory renewal than older mothers (AOR 0.07, 95%CI: 0.02: 0.34).

CONCLUSIONS: In this study sample, children with mothers who are younger, recently immigrated or have lower education level may be at heightened risk of losing coverage due to mothers’ lack of knowledge about Medicaid/SCHIP renewal.

10:00 AM

102

Improving Teacher Knowledge of Safety in Preschoolers

Michael A. Ferguson, Nancy Miller, Jennifer Friderici, Margaux Frank.

Pediatrics, Baystate Medical Center, Springfield, MA.

BACKGROUND: Accidental injuries are the most common causes of morbidity and mortality in young children. A previous survey found that parents ranked daycare teachers as the second most trusted source for safety information after pediatricians.

CONCLUSIONS: Parents rank daycare teachers just behind pediatricians as most trusted sources for safety information, yet daycare teachers exhibit considerable knowledge gaps of child safety. Pedagogical interventions providing regular safety education to daycare teachers may lead to an increase in teacher knowledge, appropriate confidence in daycare teachers providing accurate safety information to parents and ultimately fewer accidental injuries.

43
Cryptococcus Neoformans-Specific IgA in Bronchoalveolar Lavage Fluid from Children with Poorly-Controlled Asthma

Aflin G. Vicencio, Kaliope Tsirilakis, Xiaoxiao Lee, Arturo Casadevall, David L. Goldman.

PEDIATRICS, Cohen Children’s Medical Center of New York, New Hyde Park, NY; PEDIATRICS, Albert Einstein College of Medicine, Bronx, NY; MICROBIOLOGY, Albert Einstein College of Medicine, Bronx, NY.

BACKGROUND: Increasing evidence highlights the potential role of unrecognized fungal infection in asthma, including recent reports that anti-fungal therapy can improve symptoms in a select cohort of patients with fungal sensitization. Previously, we demonstrated in a rat model that a single intra-tracheal inoculation of C. neoformans results in chronic infection, sustained allergic inflammation in the lung, and airway hyper-reactivity. In addition, we demonstrated that infection with C. neoformans is exceedingly common in the Bronx, an urban area known for its high prevalence of severe asthma, compared to rural areas where asthma is much less prevalent. Collectively, these findings suggest that C. neoformans may directly contribute to poorly-controlled asthma in Bronx residents. However, our previous diagnostic studies in children were based on IgG serology, which may simply reflect prior exposure. Thus, we utilized an ELISA-based assay to analyze bronchoalveolar lavage fluid (BALF), a more direct reflection of pulmonary exposure.

OBJECTIVE: We sought to determine whether C. neoformans-specific IgA in BALF is more common in patients with poorly-controlled asthma compared to controls.

DESIGN/METHODS: Bronchoalveolar lavage fluid was collected from children undergoing clinically-indicated flexible bronchoscopy with lavage and analyzed for the presence of fungal-specific IgG and IgA.

RESULTS: Among 38 patients analyzed, 29 were asthmatic and 9 were non-asthmatic. The median serum IgA level for asthmatics and controls was 748 IU/ml (range 219-1765 IU/ml) and 8 IU/ml (range 1-293 IU/ml), respectively. While BALF from asthmatics appeared to contain more IgA to fungi than non-asthmatics, these differences were not statistically significant. Interestingly, IgA reactivity to C. neoformans was found in 16 of 18 (88%) asthmatics compared to 2 of 9 (22%) controls (Fisher’s exact test, p = 0.038).

CONCLUSIONS: Increased IgA reactivity to C. neoformans is present in the BALF of Bronx asthmatics compared to controls and may reflect a local response to pulmonary cryptococcosis. Our previous and current findings support a potential connection between pulmonary fungal infection and the development of asthma among Bronx children. Additional studies are needed to understand this potential relationship and may lead to the development of new therapies for a subset of asthmatics with severe disease.

Corticosteroid Timing and Length of Stay for Children with Asthma in the ED

Stephanie Davis, Georgia Burke, Emily Hogan, Sharon R. Smith.

University of Connecticut, Storrs, CT; Department of Pediatrics, Connecticut Children’s Medical Center, Hartford, CT; Department of Pediatrics, University of Pittsburgh, PA.

BACKGROUND: The current standard of care for children presenting to the ED with an acute asthma exacerbation is treatment with oral corticosteroids in conjunction with inhaled bronchodilators. With overcrowding and a trend of rising lengths of stay a problem for many EDs, early treatment with corticosteroids may offer an avenue to decrease the length of stay of pediatric asthmatics.

OBJECTIVE: To determine if administering corticosteroids to children with acute asthma exacerbations within one hour of arrival to the ED will decrease the mean length of stay when compared to those children receiving corticosteroids an hour or later.

DESIGN/METHODS: A retrospective chart review of ED patients was conducted. All children presenting to our urban community hospital for 2 consecutive RSV seasons (Oct’08 to Apr’10) with SOB > 60 minutes from initial ED triage were included. Children were classified into one of two groups based on the time from initial ED triage to receiving corticosteroids: Group 1 (≤ 60 min), Group 2 (> 60 min).

RESULTS: Of the 101 children (52.5% female, modal age 4 years, median age 2.5 years), 42 children received corticosteroids less than an hour from initial ED triage: 83% (35/42) of Group 1 vs. 77% (58/75) of Group 2 (p = 0.02). Recall that this was based on elimination of any potential bias and that the sample size still did not prove a significance level of p<0.05. Group 1 had a mean length of stay of 158 minutes (SD 71.6 minutes) while Group 2 had a mean length of stay of 185 minutes (SD 71.6 minutes), p=0.0001. Shorter stays in Group 1 were not affected by gender, ethnicity, or disposition.

CONCLUSIONS: Although clinical judgment remains the gold standard for admission of children with RSV bronchiolitis, we identified 2 CST that strongly predicted the need for hospitalization. When in doubt negative CST might reassure an outpatient care.
9:30 AM

**109**

**Relationship between Parental Health Literacy and Self-Efficacy with Managing Child Asthma**

Iman Sharif, Debra Roter, Laurie Bauman, Roopa Chari, Tara Ketterer, Mary Ann Abrams, Katherine Freeman, Arthur E. Blank, Benard P. Dreyer, Ruth E. Stein.

**Objectives:** To test the relationship between parental health literacy and self-efficacy with managing their child’s asthma. As the most common chronic condition affecting children, self-efficacy with managing asthma is of particular interest.

**Design/Methods:** We analyzed baseline data from an ongoing cohort study that enrolled parents of children with asthma at a primary care visit. Seventy-six percent of the children in this study had uncontrolled asthma, as measured by the Asthma Control Test. We used the Neale Vital Sign (NVS) a 6-item administered test to measure reading comprehension and numeracy. A trained research assistant administered a 22-item Caretaker Asthma Self-efficacy survey (CASE) previously validated in the National Cooperative Inner-City Asthma Study. CASE scores range from 20 (best self-efficacy) to 100 (worst). We used the NVS and CASE scores as ordinal variables, and used spearman correlation to test the relationship between them.

We used education as an ordinal variable based on years of school completed. We used the Kucal-Wallis rank sum test to compare median CASE scores across the NVS categories of “limited literacy” (0-1), “possible limited literacy” (2-3), and “adequate literacy” (4-6).

**Results:** Complete data was available for 37 subjects; mean age (SD) was 36(10); 24% had limited health literacy. IUGR alters lung morphometry in animal models (Karadag, 2009). CONCLUSIONS: This preliminary work suggests a relationship between parental health literacy and caretaker self-efficacy with child disease management. The NVS is a brief tool that may serve as a particularly useful measure for identifying parents with low self-efficacy for managing their child’s asthma.

9:45 AM

**The Role of Pre-Operative Pulmonary Function Testing as a Screening Tool in Patients with Adolescent Idiopathic Scoliosis**

Gina T. Coscia, Joshua P. Needleman, Lisa S. Ipp, Mary L. Ward.

**Objectives:** To test the relationship between parental health literacy and self-efficacy with managing child asthma. DESIGN/METHODS: We analyzed baseline data from an ongoing cohort study that enrolled parents of children with asthma at a primary care visit. Seventy-six percent of the children in this study had uncontrolled asthma, as measured by the Asthma Control Test. We used the Neale Vital Sign (NVS) a 6-item administered test to measure reading comprehension and numeracy. A trained research assistant administered a 22-item Caretaker Asthma Self-efficacy survey (CASE) previously validated in the National Cooperative Inner-City Asthma Study. CASE scores range from 20 (best self-efficacy) to 100 (worst). We used the NVS and CASE scores as ordinal variables, and used spearman correlation to test the relationship between them. We used education as an ordinal variable based on years of school completed. We used the Kucal-Wallis rank sum test to compare median CASE scores across the NVS categories of “limited literacy” (0-1), “possible limited literacy” (2-3), and “adequate literacy” (4-6).

**Results:** Complete data was available for 37 subjects; mean age (SD) was 36(10); 24% had limited health literacy. IUGR alters lung morphometry in animal models (Karadag, 2009). CONCLUSIONS: This preliminary work suggests a relationship between parental health literacy and caretaker self-efficacy with child disease management. The NVS is a brief tool that may serve as a particularly useful measure for identifying parents with low self-efficacy for managing their child’s asthma.

10:00 AM

**Exercise Improves Lung Function & Habitual Activity in Children with Cystic Fibrosis**

Shruti M. Parangiwa, Laura A. Barnes, Kathryn A. Carson.

**Objectives:** To test the relationship between parental health literacy and self-efficacy with managing child asthma. DESIGN/METHODS: We analyzed baseline data from an ongoing cohort study that enrolled parents of children with asthma at a primary care visit. Seventy-six percent of the children in this study had uncontrolled asthma, as measured by the Asthma Control Test. We used the Neale Vital Sign (NVS) a 6-item administered test to measure reading comprehension and numeracy. A trained research assistant administered a 22-item Caretaker Asthma Self-efficacy survey (CASE) previously validated in the National Cooperative Inner-City Asthma Study. CASE scores range from 20 (best self-efficacy) to 100 (worst). We used the NVS and CASE scores as ordinal variables, and used spearman correlation to test the relationship between them. We used education as an ordinal variable based on years of school completed. We used the Kucal-Wallis rank sum test to compare median CASE scores across the NVS categories of “limited literacy” (0-1), “possible limited literacy” (2-3), and “adequate literacy” (4-6).

**Results:** Complete data was available for 37 subjects; mean age (SD) was 36(10); 24% had limited health literacy. IUGR alters lung morphometry in animal models (Karadag, 2009). CONCLUSIONS: This preliminary work suggests a relationship between parental health literacy and caretaker self-efficacy with child disease management. The NVS is a brief tool that may serve as a particularly useful measure for identifying parents with low self-efficacy for managing their child’s asthma.

10:15 AM

**Fellow in Training**

### Intrauterine Growth Restriction Alters Lung Morphology and Function during Postnatal Growth in Rats

**Catalina Bazacliu, Melissa F. Carmen, Satyan Lakshminrusimha, Julie Basu-Ray, Rita M. Ryan, Daniel D. Swartz.**

Neonatology, University at Buffalo, Buffalo, NY.

**Background:** The effect of intrauterine growth restriction (IUGR) on later adult pathology is well known. IUGR alters lung morphology in animal models (Karadag, 2009).

**Objective:** To evaluate the differences in tracheal and pulmonary artery (PA) reactivity and lung morphology in an IUGR rat model.

**Design/Methods:** IUGR was induced by feeding the pregnant dams a low protein diet (LPD) during pregnancy. After weaning at 3wks the pups were fed standard (SRC) or high fat diet (HFD). The control group was fed standard diet throughout the study. Rat offspring were sacrificed at 3wks, 16wks and 1yr. The trachea and the PA were used for reactivity studies, while the lungs were used for inflated fixation and morphometric analysis.

**Results:** The pups born to dams fed LPD during pregnancy weighed significantly less at birth and 3wks. They caught up in growth to their controls by 16wks whether fed SRC or HFD post-weaning. The weights of the IUGR and control groups were similar at 1yr. IUGR lungs had increased cellularity and thickened alveolar walls. Mean linear intercept (MLI) varies with age in both IUGR and control rats but was significantly higher in IUGR rats at 3wks and 16wks and decreased to the control level by 1yr.
CONCLUSIONS: The lung morphometric and functional changes induced by IUGR start in early development and become attenuated with advancing in age.

Plenary II
Young Investigator Presentations
Saturday, March 26, 2011
2:00 PM-4:00 PM

Validation of a Pediatric Resident Disaster Triage Evaluation Tool
Mark X. Cicero, Antonio Riera, Veronika Northrup, Fangyou Li, Marc Auerbach, Carl R. Baum.

Pediatrics, Yale School of Medicine, New Haven, CT.

BACKGROUND: When disasters strike, patient triage is a crucial skill for pediatrics residents. No pediatric resident evaluation tool is widely used.

OBJECTIVE: To validate a resident triage evaluation tool created for use in a pediatric disaster medicine curriculum.

DESIGN/METHODS: We derived a checklist-based evaluation tool that includes expected knowledge and skills during disaster triage. Skill performance was rated via triarchomous scoring (yes, no, unable to determine). The tool was applied to a 10-patient school bus crash scenario, and included a global assessment of function. Actors and simulation manikins portrayed patients, and responded physiologically to airway maneuvers. Subjects were 1st – 4th year pediatrics residents at our institution. Subjects had previous training in JumpSTART triage, including airway and circulation assessment skills. Subjects triaged patients independently. Triage performance was video recorded. Videography angles were standardized, as was a script used by the facilitators. Three evaluators independently viewed the recordings and scored the performance using the tool.

We constructed a database of evaluator scores. Intraclass correlation among the evaluators was calculated for each patient, for each skill, and for the global assessment.

RESULTS: There were 37 video recordings and three repeat observations of each video, for 111 total observations. Overall correlation among scores was 0.83 (95% confidence interval 0.74-0.89). Scores showed high correlation regarding triage skills, including airway management (0.96 [0.93-0.98]), triage assessment (0.98 [0.96-0.99]), and triage speed (0.87 [0.80-0.92]). An exception to this was breathing assessment (0.53 [0.35-0.67]). Individual patient score correlation was high, including patients with head injury (0.86 [0.79, 0.91]), chest injury and tachypnea (0.86 [0.79, 0.91]), and an impaled patient with no signs of life (0.87 [0.88, 0.92]). Correlation was low for this was breathing assessment (0.53 [0.35, 0.67]). Individual patient score correlation was high, calculated for each patient, for each skill, and for the global assessment.

CONCLUSIONS: The lung morphometric and functional changes induced by IUGR start in early development and become attenuated with advancing in age.

House Officer
Epidemiology of Refractory Kawasaki Disease: Analysis of 42 US Pediatric Hospitals from 2005 to 2008
Sunil J. Ghelani, Kavita Parikh.

Children’s National Medical Center, Washington, DC.

BACKGROUND: Rising incidence of Kawasaki Disease (KD) has been reported in many countries and it continues to be a leading cause of acquired heart disease. A variety of infectious triggers have been speculated, but the underlying etiology remains unknown. About 10-15% of KD is refractory to initial intravenous immunoglobulin (IVIG) therapy.

OBJECTIVE: To describe the epidemiology of refractory KD (RKD) to better understand the disease process.

DESIGN/METHODS: This retrospective, descriptive study utilized the Pediatric Health Information System, an administrative database that includes demographic and diagnostic information for inpatients at 42 free-standing pediatric hospitals. Patients with principle discharge diagnosis of KD from January 2005 to June 2008 were included. RKD included patients who received more than one dose of IVIG or an alternate KD medication (methylprednisolone or infliximab).

RESULTS: Of 5540 patients meeting inclusion criteria, 4818(87%) patients received one dose of

2:30 PM
Cell Death after Oxidant Stress Is Determined by Inhibitory Proteins of the NF-κB Activation Cascade
Clayde J. Wright, Fadeke Aadebo, Manasa Muthu, Phyllis A. Denney.

Pediatrics, CHOP, Philadelphia, PA; Pediatrics, Univ of Penn, Philadelphia, PA.

BACKGROUND: Oxidant and inflammatory stress contribute to lung injury in preterm infants. The transcription factor NF-κB regulates the cellular response to these stresses. In contrast inflammatory stress, how oxidant stress induces NF-κB activation remains to be elucidated.

OBJECTIVE: To characterize the roles of members of the Inhibitory protein family (IkB), specifically IkBo and IkBβ, in mediating the cellular response to oxidant stress.

DESIGN/METHODS: Wild type (WT) and IkBoβ knock-in mice (AKBI), in which the IkBoα gene is replaced by the IkBβ δ cDNA, were used for this study. Adult mice were exposed to hyperoxia (95% O2) for 96h (n=5/pool) and BAL samples obtained. Lung injury was assessed by BAL protein content and multiplex cytokine analysis was performed. Survival curves were generated through 10d (n=20). Marine embryonic fibroblasts (MEF) were generated and exposed to glucose oxidase (GO) to generate intracellular H2O2 for 3 and 6h. Reactive oxygen species were measured by DCF assay. Levels of the NF-κB inhibitors, kinases and subunits were determined by Western blot. Cell cycle analysis was performed by flow cytometry and apoptosis by caspase-3 activity assay.

RESULTS: After 5d of hyperoxia, WT mice had 100% mortality; at this time point AKBI mice had 95% survival. AKBI mice did not have 50% mortality until 8d exposure (p<.001). WT lung protein content was significantly elevated at 96h exposure (p<.001) vs. AKBI. AKBI mice had blunted expression of the NF-κB targets IL6 and G-CSF at 96h. WT and AKBI MEF cells express similar amounts of p65, p50, cRel, IKKa, and IKKb; AKBI lacked expression of NF-κBα subunit and showed significantly higher levels of IkBoα subunites. WT and AKBI did not differ in ROS production following exposure to GO at increasing doses or longer time points. Degradation of both IkBoα and IkBβ occurred in WT MEF cells 6h after exposure to GO. For WT MEF, transition into subG1 phase, compared to <2% of AKBI cells (p<.001) and showed significantly higher levels of caspase-3 activity when compared to AKBI (p<.05).

CONCLUSIONS: These data demonstrate that individual IkBα isoforms are responsible for specific responses to oxidant stress. Both cells and animals lacking IkBoα and expressing IkBβ have increased survival following exposure to oxidant stress. This suggests that manipulation of this pathway could have therapeutic applications for neonates exposed to hyperoxia and oxidative stress.

2:00 PM
Reiterated Roles for Jun in the Second Heart Field and Neural Crest during Heart Development

Pediatrics/Neonatology, Children’s Hospital of Philadelphia, Philadelphia, PA; Cardiovascular Medicine, Wellcome Trust Centre for Human Genetics, Univ. of Oxford, Oxford, United Kingdom; Center for Cancer and Stem Cell Biology, Texas A&M Health Science Center, Houston, TX.

BACKGROUND: Mice missing the proto-oncogene Jun have a thin right ventricle, prominent endocardial cushions, and a 100% incidence of persistent truncus arteriosus (PTA). The common thread among these structures is their second heart field (SHF) origin. In concert with other cells, such as neural crest (NC), SHF derivatives play a critical in outflow tract development. Similar outflow tract defects are commonly seen in DiGeorge syndrome (DGS) and the DGS gene, Tbx1, is expressed in the SHF. Although Jun is critical for proliferation, cell cycle regulation, differentiation, and cell death, all biologic functions crucial for embryogenesis, there is little known about its role during cardiac development.

OBJECTIVE: To elucidate the role of Jun during heart development and in DiGeorge syndrome.

DESIGN/METHODS: Tbx1-interacting proteins were discovered in a high throughput mammalian coactivator trap. Functional interactions were confirmed in luciferase assays. Physical interactions were verified by protein complementation assays. Cre-loxP mouse models were utilized for tissue-specific knockout studies. Mouse embryos were analyzing using routine histology and/or Optical Projection Tomography.

RESULTS: The screen revealed multiple transcription factors, including the proto-oncogene Jun, which mediate a significant increase in Tbx1-dependent transcriptional activity. Tbx1 and Jun physically and functionally interact and are both expressed the SHF. Tissue-specific knockout of Jun in either SHF or NC cells recapitulates cardiac and aortic arch remodeling defects reminiscent of Tbx1 mutant mice, Tbx1 mutant mice and patients with DGS. Specifically, the loss of Jun in the SHF results in NC-like defects including interrupted aortic arch (IAA) and pulmonary valve defects, while the loss of Jun in NC cells results in PTA, IAA, right aortic arch, and exencephaly.

CONCLUSIONS: Our results suggest that Jun has reiterated roles in different tissues important for heart development including tissue-specific mouse knockouts of Jun phenotype important aspects of the DGS phenotype. Jun is required in the SHF and may have non-cell autonomous effects on NC cells. Independently, there is a cell autonomous role of Jun in NC cells. The role of Jun in the SHF may be due to a Th1-expressing subset of SHF progenitors. The role of JUN in human congenital heart disease remains to be determined. NHLBI K08-HL086633.
CONCLUSIONS: This is the first study describing multicenter epidemiology of RKD. RKD has similar age, sex, and ethnic distribution as standard KD, and follows the same seasonal pattern. Perhaps the etiology of standard KD and RKD are similar and it is the host inflammatory response that determines refactoriness. Further studies are necessary to understand KD triggers and host responses.

Staphylococcus aureus Infections in Women and Neonates Following Late Pregnancy Anovaginal Colonization
Karina A. Top, Amanda Buet, Jiang Yao, Susan Whittier, Adam J. Ratner, Lisa Saiman, Pediatrics, Columbia University Medical Center, New York, NY; Mailman School of Public Health, Columbia University, New York, NY; Biomedical Informatics, Columbia University Medical Center, New York, NY; Pathology, Columbia University Medical Center, New York, NY; Microbiology and Immunology, Columbia University Medical Center, New York, NY; Infection Prevention & Control, NewYork-Presbyterian Hospital, New York, NY.

BACKGROUND: In 2009, we studied the prevalence of Staphylococcus aureus anovaginal colonization among pregnant women undergoing Group B streptococcal screening at Columbia University Medical Center (CUMC) (Top et al., 2010). Among 2921 women, the prevalence of methicillin-susceptible S. aureus (MSSA) and methicillin-resistant S. aureus (MRSA) anovaginal colonization was 11.8% and 0.6%, respectively. The risk of MSSA and MRSA infections in these women and their infants was not determined.

OBJECTIVE: To determine the rate of S. aureus infections in pregnant women from 3 months before delivery to 3 months after delivery and the rate of infections in their infants in the first 3 months of life.

RESULTS: The cohort included 2702 women who delivered at CUMC and their 2789 infants. During the study period, 13 (0.49%) of 2702 women analyzed developed S. aureus infections: 9 women had skin and soft tissue infections (SSTIs), 2 of which were due to MRSA, and 4 women had MSSA urinary tract infections (UTIs). Only 4 of 13 women with S. aureus infections had concurrent anogenital colonization. Among infants born to women in the cohort, 11 (0.39%) of 2789 had S. aureus infections, including 1 MRSA SSTI and 10 MSSA infections. These were bacteremia (4), SSTI (5), ventriculoaboglobaled shunt infection (1), and UTI (1). Six additional infants were colonized with MSSA. The average postnatal age at initial S. aureus culture was 30 days. Among 17 infants with positive S. aureus cultures, 10 (58.8%) were born preterm (<37 weeks), 11 (64.7%) were admitted to our Neonatal ICU, and 2 (11.8%) were born to mothers colonized with MRSA. MRSA or MSSA anovaginal colonization was associated with a trend toward an increased risk of infection in mothers (risk ratio (RR) 3.09, 95% confidence interval (CI) 0.96–9.97, p=0.047), but not in their infants (RR 0.92, 95% CI 0.21–4.03, p=0.919).

CONCLUSIONS: The frequency of S. aureus infections in pregnant and post-partum women and their infants is low. Maternal anovaginal S. aureus colonization may be a risk factor for S. aureus infections in women, but was not associated with increased S. aureus infections in infants.
CONCLUSIONS: We conclude that in asphyxiated newborn lambs even brief exposure to 100% O₂ during resuscitation increases contractility and superoxide anion levels in PAs. Scavenging superoxide anions and H₂O₂ with SOD/catalase confirms that oxygen injury mediates this increased contractility.

### Cardiovascular & Critical Care Platform Session

**Saturday, March 26, 2011 4:15 PM-5:45 PM**

#### 4:15 PM Fellow in Training

**Outcomes of Tight Glycemic Control in Critically Ill Children**

Sarah B. Kandil, E. Vincent S. Faustino.

Pediatric Critical Care Medicine, Yale University School of Medicine, New Haven, CT.

BACKGROUND: Hyperglycemia is common in critically ill patients and is associated with increased mortality and duration of stay in the intensive care unit (ICU). Randomized controlled trials (RCT) on tight glycemic control (TGC) in critically ill adults, where blood glucose (BG) is controlled at 80-110 mg/dl with intravenous insulin, report conflicting effects on mortality and ICU stay. A single center RCT in critically ill children suggested that TGC is beneficial.

OBJECTIVE: Determine the outcomes of critically ill children treated with TGC.

DESIGN/METHODS: We performed a retrospective cohort study comparing outcomes in critically ill children where BG was controlled to 80-120 mg/dl (TGC group) using intravenous insulin with a similar historical cohort of children where no BG control (non-TGC group) was done. Non-diabetic children in the ICU with persistent BG ≥150 mg/dl and on mechanical ventilator or vasoressors were included. Primary outcome measure was ICU length of stay with organ dysfunction including mortality as secondary outcomes. Mann-Whitney and chi-square tests were used as appropriate.

RESULTS: The TGC and non-TGC groups had 63 and 69 patients, respectively. Patient characteristics including age and severity of illness were similar between the two groups. BG in the TGC group was 142±25 mg/dl compared to 159±35 mg/dl in the non-TGC group (P=0.01). Glucose variability in the TGC group was 16.6±12.8 vs. 11.3±16.4 mg/dl in the non-TGC group (P=0.01). Hypoglycemia rate was higher in the TGC group (16% vs. 3%, P=0.01). Patients in the TGC group received an average of 0.05±0.04 units of insulin/kg/hr. The TGC group stayed 4.1±1.7 days longer than in the non-TGC group (P=0.01). Duration of mechanical ventilation was increased in the TGC group (12.4±7.3 vs. 6.1±7.6 days, P=0.01). Duration of vasoressor use (6.0±9.9 days) and mortality (16%) in the TGC group were similar to the non-TGC group (4.8±10.1 days, P=0.60; and 16%, P=0.99 respectively). Infection rates were also higher in the TGC group (60%) compared to the non-TGC group (33%; P=0.01).

CONCLUSIONS: TGC appears to be associated with worse outcomes in critically ill children. The conflicting results of TGC in critically ill adults and our contrasting data in children strongly advocate the conduct of multicenter randomized trials on TGC in critically ill children.

#### 4:30 PM Fellow in Training

**Spontaneous and Pharmacological Closure of PDA in ELBW Infants**


Neonatology, Maria Fareri Children’s Hospital, Westchester Medical Center at New York Medical College, Valhalla, NY; Neonatology, Maria Fareri Children’s Hospital, Westchester Medical Center at New York Medical College, Valhalla, Select; Neonatology, Maria Fareri Children’s Hospital, Westchester Medical Center at New York Medical College, Valhalla, Select.

BACKGROUND: PDA is present in 49-70% of ELBW infants and is associated with significant mortality and morbidity if left untreated. Animal studies have shown that platelets contribute to the closure of PDA. Also, the relative risk for PDA has been noted to be significantly higher in infants who needed indomethacin or ibuprofen for PDA closure, the platelet counts during that time period were tabulated.

RESULTS:

**Spontaneous Closure is Decreased with Thrombocytopenia**

<table>
<thead>
<tr>
<th>Failure of PDA to close in thrombocytopenic patients (%)</th>
<th>IBOuprofen</th>
<th><em>Indomethacin</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Platelet count 1000/µL median (IQR)</td>
<td>112 (94-128)</td>
<td>199 (167-265)</td>
</tr>
</tbody>
</table>

Ibuprofen induced closure of PDAs 17/24 times when infants were thrombocytopenic and 31/63 times when infants were not thrombocytopenic (P=0.31). However for indomethacin, it was 4/12 and 12/12 respectively (P=0.001).

CONCLUSIONS: Spontaneous and indomethacin-treated ductal closure were significantly impaired in thrombocytopenic ELBW infants. Closure following ibuprofen treatment was not affected by thrombocytopenia.

#### 4:45 PM Fellow in Training

**Developmental Expression of Pepsinogen C in a Gene Trap Mouse Model**

Maria Y. Fragas, Brittany Perry, Peggy Zhang, Susan H. Guttentag.

Neonatology/Pediatrics, Children’s Hospital of Philadelphia, Philadelphia, PA.

BACKGROUND: Pepsinogen C (PGC), an alveolar type II cell specific apocrine proatease and a gastric proymogen, mediates the developmental and cell-type specificity of SP-B production in human lung and participates in protein hydrolysis in the stomach.

OBJECTIVE: To evaluate the developmental expression of PGC using a PGC gene trap animal model.

DESIGN/METHODS: Mice with a gene trap vector inserted LacZ in an intron sequence between exon 7 and 8 of the endogenous PGC gene were bred with C57Bl/6J (WT) mice for six generations to obtain an homogeneous genetic background. b-galactosidase activity and localization were analyzed by ß-Gal Assay and X-Gal staining in lungs and stomachs of postnatal mice. PGC and SP-B mRNA levels were determined by RT-PCR, and protein expression was evaluated by immunoblotting and immunohistochemistry (IHC). Results were expressed as mean ± SE and analyzed by ANOVA where applicable.

RESULTS: PCR genotyping demonstrated that the gene trap exhibited Mendelian inheritance (n=78, 22% wild type, 51% heterozygous, 27% homozygous). No perinatal lethality was observed. In WT littermates, PGC expression in stomach was low until 3 wks of age, but was not detectable in KO animals (RNA relative quantity WT 0.61 ± 0.2 vs KO 0.0007 ± 0.0003, n=3-5, P<0.01).

Reflecting the developmental expression pattern of PGC, KO animals demonstrated increased b-gal activity at 3-4 wks of age (19.4 ± 2.08 β-gal units at 0-2 wks vs 211.1 ± 36.77 β-gal units at 3-4 wks, n=13-16, P<.001). X-gal staining of KO stomachs showed LacZ expression in gastric chief cells, at the basal portion of the fundic glands. Expression of PGC and the LacZ reporter in lung was markedly different than in stomach. At 4 wks of age PGC expression was lower in lung than in stomach (Ct 15.48 ± 0.54 WT stomach vs 22 ± 2.49 WT lung by RT-PCR), yet it was still detectable in KO lungs compared with KO stomach (Ct 25.53 ± 2.91 KO lung vs 31.45 ± 3.53 KO stomach). b-gal activity was not detectable in KO lungs, and PGC protein was detected in KO lungs by WB and IHC. SP-B levels in KO lungs were not different from WT.

CONCLUSIONS: The PGC gene trap is functionally a knock-in/knock-out in the dominant site of PGC expression, the gastric mucosa, and displays developmental regulation with onset of expression at the time of weaning. By contrast, the gene trap did not express in mouse lung.

**5:00 PM**

**Undergraduate Student**

**Mutation of Ryanodine Receptor Type 1 Causes Fetal Heart Failure and Denise**

Matthew R. Kaufmann, Meier Olivia, Shey-Shing Sheu, George A. Porter, Jr.

Pediatrics, University of Rochester Medical Center, Rochester, NY; Pharmacology and Physiology, University of Rochester Medical Center, Rochester, NY; Aab
OBJECTIVE: We hypothesized that these YS/YS mice die during embryonic development of heart failure and not from skeletal defects. This is based on the observation that fetuses that die in utero typically die of heart or blood complications, not skeletal or muscular malfunction.

RESULTS: At embryonic day 13.0 (E13.0), the YS/YS mice appear to be morphologically identical to wildtype and heterozygous mice, but may have mild cardiac hypertrophy. By E16.5 the YS/YS fetuses develop skeletal and intestinal defects and appear to die of heart failure with edema and abnormal ventricular muscle. The +/+ and YS/+ fetuses appear normal.

CONCLUSIONS: These preliminary studies suggest that YS/YS fetuses die of heart failure and support our hypothesis that RyR1 is important in heart development.

5:30 PM

Medical Student

Prostaglandin E2 Receptor Gene Polymorphisms Are Associated with Reduced Spontaneous Closure of Ductus Arteriosus in ELBW Infants

Kristen A. Land, Kiran Dwarakanath, Johanna M. Calo, Lance A. Parton.

Pediatrics, Division of Newborn Medicine, Maria Fareri Children’s Hospital, Westchester Medical Center and Howard Hughes Medical Institute, Cincinnati, OH.

BACKGROUND: The heart is the first functional organ to form in the embryo, beginning at about embryonic day (E)9.5 in the mouse, becoming a looped tube at E9.5, and resulting in a fully septated heart at around E13.5. Embryos can survive with abnormally formed hearts, but cannot survive if the heart does not function well enough to provide effective circulation. Despite the recent advances, in many cases the exact causes of embryonic cardiac failure are not understood. A few studies demonstrated that dysfunction of the mitochondrial electron transport chain (ETC) can cause heart malfunction and embryonic death, suggesting that mitochondrial function is essential to cardiac function and survival of the embryo.

OBJECTIVE: To investigate the role of the mitochondrial permeability transition pore (mPTP) in mitochondrial permeability, and myocyte differentiation in the embryonic murine heart.

DESIGN/METHODS: Primary cultures of cardiac myocytes from E9.5 to E13.5 were stained using vital dyes and by immunocytochemistry using epithelial microscopy. Whole hearts from embryonic day E9.5 to E13.5 were examined using electron microscopy.

RESULTS: Mitochondria of E9.5 ventricular myocytes displayed less dense cristae and were shorter in length and less branched. By E11.5, mitochondria had abundant cristae, were longer, branched and networked, and were more closely associated with the contractile apparatus. Functional measurements demonstrated dramatic increases in mitochondrial membrane potential, an increased reliance on complex I, and a decrease in oxidative stress as the heart developed. These structural and functional data suggested an increase in inner mitochondrial membrane permeability, and closure of the mPTP using cyclophilin-D null embryos caused premature maturation of mitochondrial structure, mitochondrial function, and myocyte differentiation. Furthermore, long term opening of the mPTP using carboxyatractyloside after E9.5 inhibited mitochondrial maturation and myocyte differentiation.

CONCLUSIONS: These data suggest a critical role of the embryonic mPTP as a mediator of mitochondrial maturation and cardiac differentiation, and suggest that the mPTP may be a novel target to modulate cardiac development and function in the embryo and fetus and to enhance cardiac myocyte differentiation for cardiac regeneration.

CONCLUSIONS: We conclude that an A/G substitution for the SNP rs708494 of the PTGER2 gene is associated with the need for medical or surgical intervention for closure of PDAs in ELBW infants, while the presence of the wild-type AA genotype is associated with spontaneous closure of the ductus. We speculate that the presence of the G allele of this SNP increases the sensitivity of the prostaglandin receptor to circulating prostaglandins in ductal tissue, making this tissue more responsive to the vasodilatory effects of circulating prostaglandins, and less prone to spontaneous closure.

5:15 PM

Fellow in Training

The Embryonic Mitochondrial Permeability Transition Pore Controls Cardiac Myocyte Mitochondrial Maturation and Differentiation


University of Rochester, Rochester, NY; Cincinnati Children’s Hospital Medical Center and Howard Hughes Medical Institute, Cincinnati, OH.

BACKGROUND: The heart is the first functional organ to form in the embryo, beginning at about embryonic day (E)10.5 (or E11.5) in the mouse. Defective cardiac development during embryogenesis is a major cause of perinatal mortality and morbidity. Mitochondria are critical organelles that regulate cellular energy metabolism, survival, and death. In cardiomyocytes, the inner mitochondrial membrane is the site of the matrix-type voltage-dependent anion channel (VDAC), an important component of the mitochondrial permeability transition pore (mPTP). The mPTP has been shown to play a key role in the control of apoptosis and mitochondrial permeability in cardiac myocytes.

OBJECTIVE: To investigate the role of the mitochondrial permeability transition pore (mPTP) in mitochondrial permeability, and myocyte differentiation in the embryonic murine heart.

DESIGN/METHODS: Primary cultures of cardiac myocytes from E9.5 to E13.5 were stained using vital dyes and by immunocytochemistry using epithelial microscopy. Whole hearts from embryonic day E9.5 to E13.5 were examined using electron microscopy.

RESULTS: Mitochondria of E9.5 ventricular myocytes displayed less dense cristae and were shorter in length and less branched. By E11.5, mitochondria had abundant cristae, were longer, branched and networked, and were more closely associated with the contractile apparatus. Functional measurements demonstrated dramatic increases in mitochondrial membrane potential, an increased reliance on complex I, and a decrease in oxidative stress as the heart developed. These structural and functional data suggested an increase in inner mitochondrial membrane permeability, and closure of the mPTP using cyclophilin-D null embryos caused premature maturation of mitochondrial structure, mitochondrial function, and myocyte differentiation. Furthermore, long term opening of the mPTP using carboxyatractyloside after E9.5 inhibited mitochondrial maturation and myocyte differentiation.

CONCLUSIONS: These data suggest a critical role of the embryonic mPTP as a mediator of mitochondrial maturation and cardiac differentiation, and suggest that the mPTP may be a novel target to modulate cardiac development and function in the embryo and fetus and to enhance cardiac myocyte differentiation for cardiac regeneration.
CONCLUSIONS: Based on their response to performing the challenging counseling task, students’ responses were categorized into characteristic profiles that fit the previously recognized model of a doctor-centered to patient-centered continuum. Given that some students need help to develop a more patient-centered style of care, this challenging counseling task may have use as a diagnostic method to identify students who could benefit from interventions to increase their sensitivity to patient needs.

5:00 PM

Resident Medication Reporting Errors during Pre-Rounding
Mishal Bhat, Kathleen M. Donnelly, Swati Awarwal.
Dept. of Pediatrics, Inova Fairfax Hospital for Children, Falls Church, VA.

BACKGROUND: Changes in resident work hour regulations have increased the number of patient handoffs. One study estimated medication errors during handoffs to be 27%. Time available to pre-round is also limited and residents might eliminate checking the active medication list as a part of their pre-rounding task. An erroneous active medication list may then be reported during attending rounds leading to clinical misjudgment and improper documentation in the daily progress note. There is currently no data regarding the frequency of medication errors following pre-rounding.

OBJECTIVE: Our primary objective is to establish the frequency of resident medication reporting errors following pre-rounding. Secondary objectives include investigating resident medication reporting errors to resident workload and patient complexity.

DESIGN/METHODS: During a 4 week period, resident pre-rounding notes on the inpatient pediatric wards at one children’s hospital were compared to the active medication list. Scheduled and PRN medications were evaluated for accuracy. TPN and fluid rates were not included in the study. Resident workload was assessed noting the number of patients per resident and patient complexity was assessed by noting total medications per patient. Medications were labeled as completely correct, partially correct (with wrong or omitted route, dose or interval) or missed medications. For continuous medication infusions, the notes were compared to the bedside chart for accuracy regarding infusion dose. Residents were not informed of the purpose of the study and no data was recorded linking errors to a particular resident.

RESULTS: A total of 212 pre-rounding notes with 961 scheduled medications and 491 PRN medications were analyzed. Overall medication error reporting frequency was 32% with 22% of scheduled medications having missing or erroneous information. This is significantly different from PRN medications (<0.0001). Error rates were significantly lower with increased resident workload (>6 patients, p=0.04) and complexity (>10 medications, p=0.04).

CONCLUSIONS: Frequency of medication reporting errors following pre-rounding is 32%. Surprisingly error rates were lower with increased resident workload and patient complexity. In the future, direct communication between the sign out software and active medication lists should greatly reduce these errors.

5:15 PM

Reliability of Parental Self-Report of Inhaled Corticosteroid Adherence in Inner-City Children with Persistent Asthma
Marina Reznik, Philip O. Onuh.
Pediatrics, Children’s Hospital at Montefiore, Albert Einstein College of Medicine, Bronx, NY.

BACKGROUND: Physicians often rely on parental self-report of inhaled corticosteroid (ICS) medication adherence to guide asthma management in children with persistent asthma. The reliability of parental self-report of ICS adherence has not been well established in inner-city minority populations.

OBJECTIVE: To examine reliability of parental self-report in assessing ICS adherence in inner-city children with persistent asthma.

DESIGN/METHODS: Prospective observational study of parents of young children with persistent asthma. All children had been prescribed ICS with a dose counter by their physician prior to enrollment. At enrollment, children received a new, marked ICS at the prescribed dose. Parents were instructed to administer ICS as per physicians’ orders (2 puffs 2 times/day). If used as directed, 120 actuations in the new inhaler suffice for 30 days of treatment. Thirty days post-enrollment, we measured ICS adherence by parental self-report and objectively, using the number of puffs left as displayed on a dose counter. Parental self-reported ICS adherence was defined as follows: when parents administered ICS “every day” - 100%; “almost every day” - 75% “several times a week” - 50%; “once a week” - 25%; and “less than once a week” - 0%. Adherence was...
RESULTS: Overall, 40 parents participated (mean age=32.7 (SD 6.6), 66% Hispanic, 29% completed less than high school). Parental self-report overestimated IC adherence (40% of parents reported being 100% adherent as compared to 5% being 100% adherent as per dose counter). Parents under-reported nonadherence (3% of parents reported 0% adherence as compared to 10% having 0% adherence as per dose counter). Wilcoxon signed-rank test revealed a statistically significant overall difference between parental self-report and objectively measured adherence (p<0.001).

CONCLUSIONS: Parental self-report proved to be a non-reliable method for assessing IC adherence. A dose counter that most ICS inhalers are equipped with may be a more reliable alternative measure of IC adherence. These results may have implications for physicians using parental self-report in managing persistent asthma.

Infectious Diseases & Immunology Platform Session
Saturday, March 26, 2011
4:15 PM-5:45 PM

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House Officer

The Epidemiology of Respiratory Infection and Severity of Illness
Therese Canares, Paul Chambers, Kathryn Scharbach.
Pediatrics, Children’s Hospital at Montefiore, Bronx, NY.

BACKGROUND: Respiratory tract infections are a leading cause of hospital admission in children. Respiratory viral testing may predict severity of illness and limit costs associated with treating these illnesses.

OBJECTIVE: To determine whether certain respiratory infections are associated with increased severity of illness.

DESIGN/METHODS: This is a retrospective chart review at an urban, tertiary care children’s hospital evaluating respiratory viral testing from Oct 2009-Sept 2010. ED protocol dictated respiratory viral panel (RVP) testing for patients with influenza (flu)-like illness (fever plus cough, rhinorrhea, or sore throat), who were either admitted or had a risk factor for serious illness (<2 years old, pregnancy, chronic medical condition). RVP reports 12 viral subtypes. Fisher’s exact and chi-square tests were used to perform bivariate analysis of categorical variables, and Kruskal-Wallis tests to compare medians. Logistic regression was used for multivariate analysis.

RESULTS: 1,382 patients had RVP results: negative in 474 (34%), RSV (A,B) only in 172 (12%), flu A (human H1,Human H3,swine H1N1) in 67 (5%), flu B in 0, parainfluenza (1,2,3) in 84 (6%), hMPV in 1280 (9%), rhinovirus in 369 (26%), adenovirus in 15 (1%), and co-infections with >1 virus in 73 (5%). A negative RVP was associated with higher ICU admission rates (9.8% vs 5.8%, calculated as the number of puffs used relative to the number of puffs expected to have been used at 30-day follow-up. Wilcoxon signed-rank test compared the two adherence methods.

RESULTS: Overall, 40 parents participated (mean age=32.7 (SD 6.6), 66% Hispanic, 29% completed less than high school). Parental self-report overestimated IC adherence (40% of parents reported being 100% adherent as compared to 5% being 100% adherent as per dose counter). Parents under-reported nonadherence (3% of parents reported 0% adherence as compared to 10% having 0% adherence as per dose counter). Wilcoxon signed-rank test revealed a statistically significant overall difference between parental self-report and objectively measured adherence (p<0.001).

CONCLUSIONS: Parental self-report proved to be a non-reliable method for assessing IC adherence. A dose counter that most ICS inhalers are equipped with may be a more reliable alternative measure of IC adherence. These results may have implications for physicians using parental self-report in managing persistent asthma.

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Simulation of Nosocomial and Occupational Risks of Hepatitis C Virus Transmission
Elijah Paitolest, Brett D. Lindenbach, Robert Heimer.
Yale School of Medicine, New Haven, CT.

BACKGROUND: Nosocomial and occupational transmissions of hepatitis C virus (HCV) infection occur approximately ten times more frequently than that of human immunodeficiency virus (HIV). We hypothesized that the prolonged viability of HCV in fomites on work surfaces may contribute significantly to higher incidence. Healthcare workers may come into contact with HCV dried upon surfaces during preparation of plasma, handling of hemodialysis equipment, and providing care to patients with chronic hepatitis C. We hypothesized that HCV dried upon surfaces during preparation of plasma, handling of hemodialysis equipment, and providing care to patients with cirrhosis and chronic hepatitis C may contribute to higher incidence.

RESULTS: Overall, 40 parents participated (mean age=32.7 (SD 6.6), 66% Hispanic, 29% completed less than high school). Parental self-report overestimated IC adherence (40% of parents reported being 100% adherent as compared to 5% being 100% adherent as per dose counter). Parents under-reported nonadherence (3% of parents reported 0% adherence as compared to 10% having 0% adherence as per dose counter). Wilcoxon signed-rank test revealed a statistically significant overall difference between parental self-report and objectively measured adherence (p<0.001).

CONCLUSIONS: Parental self-report proved to be a non-reliable method for assessing IC adherence. A dose counter that most ICS inhalers are equipped with may be a more reliable alternative measure of IC adherence. These results may have implications for physicians using parental self-report in managing persistent asthma.

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Medical Student

Time to and Predictors of CD4+ T-Lymphocytes Recovery in HIV-Infected Children Initiating Antiretroviral Therapy in Ghana
Meghan Prin, Lorna Renner, Fang-Yong Li, Bamenla Goka, Veronika Northrup, Elijah Paintolest.
Department of Pediatrics, Yale University School of Medicine, New Haven, CT; Department of Pediatrics, University of Ghana Medical School, Accra, Ghana.

BACKGROUND: The therapeutic goal of highly active antiretroviral therapy (HAART) is to suppress HIV viral replication and reverse HIV-related immune deficiency. However, basic testing to monitor the efficacy of HAART, like CD4+ T-lymphocyte measurements, is not routinely available in most resource-limited settings.

OBJECTIVE: We sought to investigate predictors of the time to CD4+ T-lymphocyte recovery in HIV-infected children on HAART. This information could guide HAART in places where routine monitoring is not otherwise available.

DESIGN/METHODS: This is a retrospective study of a cohort of HIV-infected children who received HAART between April 2004 and December 2009 at Pediatric HIV Clinic of Korle-Bu Teaching Hospital in Accra, Ghana. The main study outcome was time to CD4+ T-lymphocyte recovery defined as time from HAART initiation to CD4+ T-lymphocytes ≥250 cells/mm³. Descriptive statistics were calculated.

RESULTS: Overall, 40 parents participated (mean age=32.7 (SD 6.6), 66% Hispanic, 29% completed less than high school). Parental self-report overestimated IC adherence (40% of parents reported being 100% adherent as compared to 5% being 100% adherent as per dose counter). Parents under-reported nonadherence (3% of parents reported 0% adherence as compared to 10% having 0% adherence as per dose counter). Wilcoxon signed-rank test revealed a statistically significant overall difference between parental self-report and objectively measured adherence (p<0.001).

CONCLUSIONS: Parental self-report proved to be a non-reliable method for assessing IC adherence. A dose counter that most ICS inhalers are equipped with may be a more reliable alternative measure of IC adherence. These results may have implications for physicians using parental self-report in managing persistent asthma.

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Medical Student

Do Caregivers of Children with Persistent Asthma Know How To Use Metered Dose Inhaler Plus Spacer Device?
Yu Cao, Jacquelyn Dorsky, Marina Reznik.
Pediatrics, Children’s Hospital at Montefiore, Albert Einstein College of Medicine, Bronx, NY.

BACKGROUND: Metered dose inhaler (MDI) with spacer is the most recommended delivery system used for administering medications to children with asthma. Improper MDI-spacer technique can result in decreased drug delivery and poor children outcomes. Limited data exists on the caregiver ability to correctly use MDI-spacer technique when administering medication to inner-city minority US children with persistent asthma.

OBJECTIVE: To determine whether caregivers of young children with persistent asthma can correctly demonstrate MDI-spacer technique.

DESIGN/METHODS: A pilot study of caregivers of children (ages 2-9 years) with persistent asthma receiving care at an inner-city comprehensive health care center. First, we asked caregivers if their child has a spacer and frequency of its use. Then, subjects were asked to demonstrate how they would administer two puffs of Albuterol with an MDI-spacer device. We decided to use the two-way valve AeroChamber Plus with mask (Monaghan Medical, Plattsburgh, NY), the most commonly used spacer device in pediatric asthma management. We coded the subject’s performance as correct or incorrect using the manufacturers’ instructions as the criterion standard.

RESULTS: 66 caregivers participated (mean age 32.3 yrs (SD 8.3); 59% Hispanic; 96% mothers; 57% of caregivers had attained >12th grade education, 27% attained less than a high school diploma). Overall, 92% of caregivers reported that their child has a spacer and 78% stated that their child is using the spacer every time they use MDI. While 97% of caregivers reported that “a doctor explained how to use pump-spacer device”, only 49% stated that a doctor had asked them to demonstrate how they would use the MDI-spacer device, only 2% of subjects correctly demonstrated all the steps (see Table).

Proportion of caregivers who correctly demonstrated the steps of MDI-spacer use

<table>
<thead>
<tr>
<th>Step</th>
<th>% demonstrated correctly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shakes MDI for 5 sec</td>
<td>87%</td>
</tr>
<tr>
<td>Forms tight seal</td>
<td>97%</td>
</tr>
<tr>
<td>Instructs to exhale</td>
<td>24%</td>
</tr>
<tr>
<td>Presses down once</td>
<td>83%</td>
</tr>
<tr>
<td>Correct no. breaths</td>
<td>99%</td>
</tr>
<tr>
<td>Waits correct interval for next puff</td>
<td>27%</td>
</tr>
</tbody>
</table>

CONCLUSIONS: Although physicians instructed caregivers on MDI-spacer use, the caregivers did not know how to use the device. Further improvement efforts should include formal assessment of physician ability to teach the technique as well as repeated caregiver instruction to ensure proper use of the device.

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5:00 PM
Medical Student

Correction of No. Breaths
Shakes MDI for 5 sec
Forms tight seal
Instructs to exhale
Presses down once
Correct no. breaths
Waits correct interval for next puff
51
**The Utility of Rapid RSV and Influenza Testing Versus a Multiplex PCR Viral Assay in Cohorting Hospitalized Patients**

**Theres Canares, Kathryn Scharbach**

Pediatrics, Children’s Hospital at Montefiore, Bronx, NY.

BACKGROUND: Rapid RSV and influenza (flu) testing significantly reduce length of ED stay, hospitalization rates, diagnostic testing, and antibiotic prescription. These tests are frequently used in the hospital to cohort patients. Most sensitivity and specificity reports for rapid RSV and influenza tests are published by test manufacturers.

OBJECTIVE: To determine the sensitivity and specificity of rapid RSV and influenza detection as compared to respiratory viral panel (RVP), a multiplex PCR assay, as the gold standard.

DESIGN/METHODS: The 3M Rapid Detection RSV and Influenza A&B assays, as well as RVP (STAG, Luminox Corp), were performed as per hospital protocol on children in the ED with influenza-like illness (fever plus cough, rhinorrhea, or sore throat), who either required admission or had a risk factor for severe illness (<2 years old, pregnancy, or chronic medical condition). Patients seen in the pediatric ED of an academic, urban, tertiary care children’s hospital from Oct 2009-Sept 2010 with the above testing were included in this retrospective chart review.

RESULTS: A total of 1,401 patients had results available for rapid and RVP testing. A subset of 630, 690, and 673 results for rapid RSV, flu A and flu B, respectively, were analyzed. Sensitivity for rapid RSV was 51% and specificity was 95%. Sensitivity for rapid flu A was 27% and specificity 97%. No subjects were positive for flu B on RVP, and rapid flu B specificity was 95%. False positives for rapid RSV, flu A and flu B were 5%, 2%, and 100%, with 62% of false positives for rapid B positive for another virus on RVP. The sensitivities of rapid RSV (38%) and flu A (8%) were lower among the patients > 2 years old.

CONCLUSIONS: The sensitivity of 3M Rapid Detection RSV and Influenza A&B found here is lower than reported by the manufacturer (80% and 58.3%, respectively). Specificity of this study is comparable to manufacturer reports. The use of rapid RSV and influenza tests as a screening tool for cohorting in-patients may be limited. The decreased sensitivity in patients > 2 years old demonstrates a further limitation of rapid tests. The benefits of cohorting to prevent nosocomial infection by using a more sensitive multiplex PCR test must be weighed against the costs of such tests.

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**Neonatology - Clinical Studies I Platform Session**

**Saturday, March 26, 2011 4:15 PM-5:45 PM**

**5:15 PM**

**Distribution of Respiratory Syncytial Virus (RSV) Subtypes A and B among Infants Presenting to the Emergency Department (ED) with Lower Respiratory Tract Infection (LRI) or Apnea**

Hasan S. Jafri, Kelly J. Henrickson, Xionghua Wu, Doris Makari, Hanaa Elhefni, MedImmune, LLC, Gaithersburg, MD; Medical College of Wisconsin, Milwaukee, WI.

BACKGROUND: RSV is a leading viral respiratory pathogen worldwide. RSV has two major subtypes, A and B. Data on the distribution of RSV A and B across the U.S. and parameters of disease severity associated with these subtypes are limited.

OBJECTIVE: To describe the distribution and parameters of disease severity associated with RSV A and B in infants with LRI or apnea in the ED.

DESIGN/METHODS: A U.S. multi-center active surveillance study was conducted over 2 RSV seasons (Season 1: 23 states, 31 sites; Season 2: 20 states, 27 sites). Infants <1 yr of age with symptoms of LRI or apnea were enrolled during Sep 1, 2006 - May 31, 2007 (Season 1), and Sep 1, 2007 - May 31, 2008 (Season 2). RSV subtypes were detected in nasal or nasopharyngeal swabs by PCR assays for RSV A and B.

RESULTS: 4172 patients were enrolled: 2023 in season 1 and 2149 in season 2. 656/2023 (32.4%) were positive for RSV A or B in season 1, while 643/2149 (29.9%) were positive in season 2. In season 1, 492/2023 (24.3%) were positive for RSV A, while 160/2023 (8.4%) were positive for RSV B. In season 2, 361/2149 (16.8%) had RSV A, and 284/2149 (13.2%) had RSV B. The distribution of RSV A and B was also analyzed by CDC-defined geographic regions dividing the U.S. into 10 regions and Florida. Both subtypes were detected in each region except for region 1 as no sites participated in this study. Demographic parameters were consistently associated with RSV subtype infection, except in season 1 where RSV A infection was significantly higher than B among Whites (RSV A, 64.8%; RSV B, 48.5%; P<0.0008). In season 1 alone, a higher proportion of hospitalizations were observed in RSV A-positive cases compared with those with RSV B (RSV A, 54.9%; RSV B, 39.1%; P<0.0005). In seasons 1 and 2, a higher proportion of RSV B cases had antibiotic use (RSV A, 32.4%; RSV B, 47.8%; P<0.0004).

CONCLUSIONS: RSV subtypes A and B were documented across all U.S. regions studied in this protocol in seasons 1 and 2. The only demographic or disease severity parameter consistently associated with either subtype was higher use of antibiotics in RSV B cases. To date, this is the largest epidemiologic study reporting the trends in RSV subtypes. More studies across additional geographic regions within and outside the U.S. may be needed to expand on the findings of this study.

**5:30 PM**

**Genetic Variation in Antimicrobial Peptide, Human-β-defensin 1 (DEFB1) Is Associated with Recurrent Staphylococcus aureus Skin Infection in Children**

Hitish S. Dushemukh, Howard R. Faden, Lucy C. Holmes, Steven R. Gill, Pediatrics, State University of New York, University at Buffalo, Buffalo, NY; Microbiology, University of Rochester, Rochester, NY.

BACKGROUND: Skin infections due to *Staphylococcus aureus* (*S. aureus*) remain a serious, common, and costly medical concern in children. Antimicrobial peptides (AMP) expressed by keratinocytes are the key mediators of skin innate immunity. Clinical significance of variation in innate immunity genes response in initiation, severity and recurrence of skin infections caused by *S. aureus* is incompletely understood.

OBJECTIVE: To determine if genetic variations in AMP expressed by keratinocytes, human β-defensin (DEFB1) 1, DEFB2, cathelicidin antimicrobial peptide (CAMP), secretory leukocyte protease inhibitor (SLPI) and lipocalin 2 (LCN2) are associated with serious *S. aureus* skin infection.

DESIGN/METHODS: We used a family based cohort study to investigate the genetic association of innate immunity genes with serious *S. aureus* skin infections requiring surgical drainage. 10 haplotype tagging single nucleotide polymorphisms (ht-SNPs) in DEFB1, DEFB2, CAMP, SLPI and LCN2 were chosen from the CEU (European) population of the International HapMap project. DNA from the first 44 nuclear families (affected child with *S. aureus* skin infection, mother and father) out of 102 nuclear families recruited for this study was genotyped for these htSNP. The presence of Hardy-Weinberg equilibrium was examined using the chi-squared test for goodness of fit. Single-point and haplotype association was assessed using the Transmission Disequilibrium Test (TDT) in Haploview.

RESULTS: Of 44 families, 25 (56%) were Black, 10 (23%) were White and 6 (14%) were Hispanic. Of 44 children (mean age 7.5 ± 1.3 yr), 33 (75%) were female, 11 (25%) were male and 14 (33 %) had prior *S. aureus* skin infection. After adjusting for co-variates; age, gender, ethnicity and history of prior infection, the single-point analysis revealed that the risk allele (A) of htSNP rs2741127, was over transmitted to affected children with *S. aureus* skin infections (2:3.84, P=0.0476, df=1). Genotyping and testing for association of ht-SNPs in DEFB2, hCAP-18, SLPI and NAGL is underway.

CONCLUSIONS: These data suggest that some children presenting with serious *S. aureus* skin infection, in the present outbreak of community acquired *S. aureus* skin infections have increased susceptibility due to genetic variation in DEFB1. Anti-microbial peptides play a crucial role in *S. aureus* infection and are thus clinically relevant.

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**4:15 PM**

**Low Vagal Tone Is Associated with Impending Necrotizing Enterocolitis in the Preterm Infant**

Kim Kopenhaver Hajed, Charles Palmer, Pediatrics/Newborn Medicine, Penn State University, Hershey, PA

BACKGROUND: Necrotizing Enterocolitis (NEC) is a common and often devastating GI disorder that primarily afflicts preterm infants with an incidence of approximately 6-10%. Success of treatment depends on early diagnosis. Heart rate variability (HRV) provides information on the balance of sympathetic and parasympathetic (vagal) systems. Autonomic dysregulation is an early marker of impending illness. We hypothesized that diminished GI motility and low vagal tone measured by HRV would predict susceptibility to NEC.

OBJECTIVE: To determine if low vagal tone measured by HRV during the first week of life would be associated with the development of NEC in preterm infants.

DESIGN/METHODS: 30 infants (29-36 wks) were enrolled in this prospective, observational study. Infants were excluded for congenital anomalies, CNS lesions, or if they required ventilation. On day 5-7 of life, resting HRV was measured postprandially and analyzed using frequency domain analysis. The high frequency (HF) power spectrum band (0.2-2Hz) was selected specifically to reflect parasympathetic (vagal) activity. Infant health outcomes were obtained by chart audit by coders blinded to HRV analysis.

RESULTS: Subjects were 32:6:1.5wks GA (mean:SD) and weighed 1878±409 gms. Four (13%) of the 30 study infants developed NEC confirmed by radiologic (pneumatosis intestinalis) and clinical findings. Of the 26 infants that did not develop NEC, we excluded 7 who were treated for sepsis within the first 10 days of life. 19 infants who remained healthy for the first month of life were compared to those infants with confirmed NEC. NEC infants had significantly lower power in the HF band, 2.8±1.4ms2 versus 2.2±1.2ms2 (mean:SE) compared to healthy infants, 45±10ms2 (p<0.001). Interestingly, the detection of low HF power was obtained from 12 hrs to 9 days prior to the confirmatory diagnosis of NEC.

CONCLUSIONS: Our pilot study findings were that markedly lower HF power (ie. lower vagal tone) was associated with the onset of NEC in preterm infants. Low vagal tone identifies a subgroup of infants most susceptible to developing NEC.
4:30 PM  Fellow in Training

**Intrauterine Growth Restriction Alters Vascular Reactivity in Adult Female Rats**

Melissa F. Carmen, Catalina Bazacliu, Bobby Mathew, Sylvia Gugino, Satyan Lakshminrusimha, Daniel D. Swartz.

**Pediatrics, State University of New York at Buffalo, Buffalo, NY.**

**BACKGROUND:** Intrauterine growth restriction (IUGR) affects 10% of all newborns. There is a link between low birth weight and the subsequent development of disorders that contribute to cardiovascular disease in adulthood. Gender affects the onset and severity of certain adult diseases. Further research into the roles of IUGR and gender in the onset of adult disease is warranted.

**OBJECTIVE:** To evaluate gender differences in aortic reactivity of IUGR and control rats at 1 year of age.

**DESIGN/METHODS:** Control rats were fed a standard diet throughout the study. Pregnant dams were fed a low protein diet (LPD) to induce IUGR in the pups. After birth, the mothers continued on a LPD while nursing the pups. Once the pups were weaned, they were placed on a high fat diet in an effort to obtain “catch-up” growth. At 1 year of age, aortic rings were constructed to test for constriction response to norepinephrine (NE) and to relax to SNAP (nitric oxide donor). Some vessels were pretreated with L-arginine (LNA) to evaluate to effects of IUGR on the eNOS system.

**RESULTS:** Maternal protein restriction did not affect NE-induced contractility in male rat vessels but significantly impaired contractility in the vessels of female IUGR rats at 1 year of age (FigA). There is a significant increase in aortic reactivity to NE in female IUGR rats following pretreatment with LNA (FigB). There is no significant difference in vascular reactivity in male rats, both control and IUGR, when the vessels were pretreated with LNA. Relaxation response to SNAP was similar in control and IUGR rats, regardless of gender.

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![Graph A](image1.png)

![Graph B](image2.png)

* *p < 0.05 IUGR Female vs. Control; # p < 0.05 IUGR Female vs IUGR Female + LNA.

**CONCLUSIONS:** Maternal protein restriction during pregnancy induces long term alteration of vascular reactivity in female offspring. Increased constriction of the aorta in female IUGR rats following LNA treatment suggests an increased endogenous production of NO in these tissues. We speculate that IUGR due to maternal undernutrition increases endogenous NO release, thereby reducing aortic contractility in adult females.

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4:45 PM  Location of Spontaneous Intestinal Perforation (SIP) – Role of Initial Peristalsis

Bobby Mathew, Jayasree Nair, Melissa F. Carmen, Daniel D. Swartz, Sylvia F. Gugino, Satyan Lakshminrusimha.

University at Buffalo, Buffalo, NY.

**BACKGROUND:** SIP occurs in premature neonates at approximately 8d of age. Similar to necrotizing enterocolitis, SIP is more common in the ileum. Unlike NEC, ischemia does not play a role in the etiology of SIP. The reason for localization of SIP to the ileum is not known. Gordon et al. have suggested that the role of initial intestinal peristalsis in the etiology of SIP. As intestinal peristalsis reaches the ileum that is predisposed to perforation, the ileum perforates to the increased intraluminal pressure. Early peristalsis may be induced by feeding the premature gut or by increased air swallowing that occurs with mechanical ventilation.

**OBJECTIVE:** The objective of the study was to evaluate the intestinal burst pressures in the jejunum, terminal ileum and ascending colon in a preterm lamb. We also evaluated the effect of early peristalsis induced by ventilation and feeds on intestinal burst pressures.

**DESIGN/METHODS:** Lambs were delivered at 134 d gestation by cesarean section. The animals were studied in four groups: (1) fetal lambs sacrificed at delivery (n=5), (2) lambs ventilated for 6 h (n=7), (3) lambs ventilated for 24 hours without feeds (n=11) and (4) lambs fed for 24 hours (n=4). Animals were sacrificed and intestinal burst pressures were evaluated by injecting saline into a 5 cm portion of the intestine connected to a pressure transducer.

**RESULTS:** Terminal ileal burst pressures were significantly lower compared to jejunum and ascending colon. Terminal ileal burst pressures were significantly lower following 6 hours of ventilation as compared to the fetus. Animals that were fed for a period of 24 hours had the lowest ileal burst pressure.

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5:00 PM  Randomized Controlled Trial of Early Total Parenteral Nutrition (TPN) Cycling To Prevent Cholestasis in VLBW Infants (VLBW)

Agnes Salvador, Michael Janezcko, Rachel Porta, Romal Sekhon, Anja Mowes, David Schutzman.

**Pediatrics, Albert Einstein Medical Center, Philadelphia, PA.**

**BACKGROUND:** Cholestatic jaundice as a complication of prolonged TPN (TPNAC) is the most common cause of direct hyperbilirubinemia in premature infants. Since no effective therapy is currently available, focus should be on prevention. Cycling of TPN infusion has been used in children with short bowel syndrome to prevent cholestasis. To date, there is limited data on the efficacy of cycled TPN in VLBWI.

**OBJECTIVE:** (1) Compare the incidence of cholestasis in VLBWI receiving cycled vs. continuous TPN. (2) Determine factors that predispose to TPNAC.

**DESIGN/METHODS:** We conducted a randomized controlled trial of cycled TPN (CyTPN) vs. continuous TPN (ConTPN) initiated within the first 5 days of birth in VLBWI ≤ 1250-g birth weight (BW). ConTPN received amino acid (AA) infusion for 24 hours. CyTPN received AA for 20 hours with a 4-hour break, when dextrose water was infused. Demographics, morbidity, feeding profile and hepatic lab data were collected. Cholestasis was defined as direct bilirubin >2 mg/dL.

**RESULTS:** 70 infants completed the study; CyTPN = 34, ConTPN = 36. CyTPN and ConTPN groups were similar in gestational age (GA) (25.9 vs. 26.1 weeks) and BW (0.81 kg vs. 0.83 kg). Morbidities (early-onset sepsis, RDS, BPD, PDA, and NEC ≥ Stage 2) were similar in both groups. Groups were similar in duration of TPN, total NPO days, number of infants NPO >2 wks, postnatal age (PNA) trophic feeds were started, and PNA full feeds were reached. Incidence of TPNAC was similar in both groups (32% vs. 31%). Mean peak direct bilirubin in CyTPN and ConTPN (2.9 mg/dL ± 2.2 vs. 1.5 mg/dL ± 1.9) occurred at week 10 in both groups. More babies in CyTPN vs. ConTPN had presumed and culture proven late onset-sepsis (P<0.05). Multiple logistic regression of risk factors for cholestasis showed that GA (OR = .36, 95% CI = 0.16-0.82, P =.014) and NEC (OR = .18, 95% CI = 0.05-0.63, P =.007) were significant risk factors for TPNAC. For each one-week decrease in GA, the odds of cholestasis increased 2.8 times. Prolonged feeding increased ileal burst pressure to fetal values (data not shown).

**CONCLUSIONS:** Terminal ileum is the part of the intestines that is most prone to rupture by distending pressure. Factors such as feeding, ventilation (swallowed air) that initiate peristalsis may transiently predispose to the perforation of the premature ileum.

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5:15 PM  Fellow in Training

**Enteral Feeding and Antenatal Betamethasone Alter Mesenteric Vascular Reactivity in Late Preterm Lambs**

Jayasree Nair, Bobby Mathew, Melissa Carmen, James Russell, Satyan Lakshminrusimha.

**Neonatology, SUNY Buffalo-Women and Childrens Hospital, Buffalo, NY; Physiology, State University of New York, Buffalo, NY.**

**BACKGROUND:** Intestinal ischemia is an important predisposing factor for necrotizing enterocolitis. Ischemia due to hypotension following the administration of antenatal betamethasone (BETAMETHASONE) is known to cause intestinal ischemia in preterm infants. Studies have shown that enteral feeding (NPO status) decreases the intestinal burst pressure and increases the blood flow to the gut. We speculate that BETAMETHASONE may alter the intestinal mesenteric vascular reactivity.

**OBJECTIVES:** (1) To determine the effects of enteral feeding and BETAMETHASONE on mesenteric vascular reactivity in late preterm lambs. (2) Determine factors that predispose to TPNAC.

**DESIGN/METHODS:** We conducted a randomized controlled trial of cycled TPN (CyTPN) vs. continuous TPN (ConTPN) initiated within the first 5 days of birth in VLBWI ≤ 1250-g birth weight (BW). ConTPN received amino acid (AA) infusion for 24 hours. CyTPN received AA for 20 hours with a 4-hour break, when dextrose water was infused. Demographics, morbidity, feeding profile and hepatic lab data were collected. Cholestasis was defined as direct bilirubin >2 mg/dL.

**RESULTS:** 70 infants completed the study; CyTPN = 34, ConTPN = 36. CyTPN and ConTPN groups were similar in gestational age (GA) (25.9 vs. 26.1 weeks) and BW (0.81 kg vs. 0.83 kg). Morbidities (early-onset sepsis, RDS, BPD, PDA, and NEC ≥ Stage 2) were similar in both groups. Groups were similar in duration of TPN, total NPO days, number of infants NPO >2 wks, postnatal age (PNA) trophic feeds were started, and PNA full feeds were reached. Incidence of TPNAC was similar in both groups (32% vs. 31%). Mean peak direct bilirubin in CyTPN and ConTPN (2.9 mg/dL ± 2.2 vs. 1.5 mg/dL ± 1.9) occurred at week 10 in both groups. More babies in CyTPN vs. ConTPN had presumed and culture proven late onset-sepsis (P<0.05). Multiple logistic regression of risk factors for cholestasis showed that GA (OR = .36, 95% CI = 0.16-0.82, P =.014) and NEC (OR = .18, 95% CI = 0.05-0.63, P =.007) were significant risk factors for TPNAC. For each one-week decrease in GA, the odds of cholestasis increased 2.8 times. Prolonged feeding increased ileal burst pressure to fetal values (data not shown).

**CONCLUSIONS:** Terminal ileum is the part of the intestines that is most prone to rupture by distending pressure. Factors such as feeding, ventilation (swallowed air) that initiate peristalsis may transiently predispose to the perforation of the premature ileum.

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**2011 ESPR Abstracts**

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enterocolitis (NEC). We previously showed that noradrenaline (NE) mediated mesenteric artery (MA) constriction peaks at late preterm gestation in fetal lambs (Naïr et al. PAS 2010) corresponding to the peak of incidence of NEC (31-33 wk postconceptional age). Increased response to contractile agents like NE and decreased relaxation to nitrergic (NO) donor increases the risk of intestinal ischemia and NEC. Antenatal steroids reduce the incidence of NEC. The effect of early enteral feeds and antenatal steroids at this gestation on mesenteric vasoreactivity is not known.

OBJECTIVE: To study changes in contractile response of ovine MA at late preterm gestation (134 d, term = 145 d) to NE and relaxation to NO donor S-nitroso-N-acetylpenicillamine (SNAP). We also evaluated the effect of antenatal betamethasone (beta) and early enteral feeds on mesenteric vasoreactivity.

DESIGN/METHODS: Time dated pregnant ewes received antenatal beta (n = 6) to 133 and 134d gestation. Lambs were delivered by C-section at 134d gestation and sacrificed at birth. 8 lambs, not exposed to beta were delivered at the same gestation. Of these, 5 were sacrificed at birth and 3 were fed expressed maternal milk for 24h and then sacrificed. MA of lambs were dissected, pretreated with probanolol and constricted with increasing doses of NE (10⁻⁶ M - 10⁻⁵ M) and relaxed with SNAP (10⁻⁴ M).

RESULTS: NE constricted 134d gestation fetal lamb MA in a dose dependent manner. Exposure to antenatal beta significantly reduced contractile response to NE as did postnatal enteral feeds. Relaxation to SNAP improved with antenatal beta and postnatal feeds.

CONCLUSIONS: In the late preterm lamb, decreased constriction to NE and enhanced relaxation to SNAP may be indicative of NO mediated mesenteric vasodilation in response to antenatal beta and enteral feeds. Antenatal betamethasone and early enteral feeds may reduce NEC by facilitating ovine mesenteric vasorelaxation.

5:30 PM
The Prolinflammatory Role of Serotonin in a Murine Model of Necrotizing Enterocolitis
Maria M. Talavera, Kara Gross, Sam Li, Korey Stevanovic.
Neonatology, Morgan Stanley Children’s Hospital/Columbia University, New York, NY; Pathology, Columbia University, New York, NY.

BACKGROUND: Necrotizing enterocolitis (NEC) is a devastating gastrointestinal disease of prematurely born infants, characterized by extensive hemorrhagic inflammation of the distal ileum and proximal colon. Pathogenesis is unknown but known risk factors include prematurity, formula feeding and bacterial translocation.

While serotonin (5-HT) is a neurotransmitter that has classically been recognized for its functions in the brain, 95% of 5-HT is stored in the gut where it plays a large role in motility, secretion and intestinal inflammation. Mucosal 5-HT can only cross lipid bilayers of the plasma membrane with the assistance of serotonin transporter (SERT). Thus, inhibition of mucosal SERT leads to high extracellular levels of 5-HT. The role of 5-HT and SERT in an animal model for NEC has never been evaluated.

OBJECTIVE: Because 5-HT and SERT have been shown to potentiate the inflammation seen in animal models of chemically induced colitis, we hypothesized that 5-HT is an important proinflammatory mediator in NEC as well.

DESIGN/METHODS: Used a previously established animal model for NEC to study the role of serotonin as a proinflammatory mediator. The two experimental groups were SERT KO mice (C57 Bl6 background) and WT mice at day 10 of life. The NEC protocol includes every 3h formula feedings and twice daily hypoxic exposure. The control groups included SERTKO and WT groups that were not exposed the NEC protocol. Weight loss and mortality rates were followed in the experimental groups. At the conclusion of the 5 days, tissue was harvested for histological evaluation and RT-PCR.

RESULTS: Out of the two groups exposed to the NEC protocol, the SERT KO mice exhibited a significantly faster and higher rate of weight loss than the WT group (P-value < 0.0001). Preliminary histological analysis of the tissue sections showed a trend toward worsened histological scores in the SERTKO group. RT-PCR of the intestinal tissue taken from both groups demonstrated significantly higher upregulation of the proinflammatory cytokines IL-18 (P = 0.025) and iNOS (P-value 0.013) in SERTKO vs WT group.

CONCLUSIONS: Our findings suggest that SERT and mucosal serotonin do indeed play a proinflammatory role in necrotizing enterocolitis. Future studies evaluating the protective effect of serotonin antagonism may further confirm the role that 5-HT plays in NEC and may ultimately lead to the design of novel therapies for its treatment.

Neonatology - Epidemiology & Follow Up Platform Session
Saturday, March 26, 2011
4:15 PM-5:45 PM

4:15 PM
Fellow in Training
Variation in NICU Late Preterm Admission Rates without Identifiable Cause
Kathryn Ziegler, David A. Paul, Matthew Hoffman, Jonathan Cohn, Robert Locke.
Neonatology, Christiana Hospital, Newark, DE; Pediatrics, Thomas Jefferson University Hospital, Philadelphia, PA; Obstetrics and Gynecology, Christiana Care Health Services, Newark, DE.

BACKGROUND: NICU admission rate is an important indicator of birth outcome. In addition to infant physiologic compromise, admission to the NICU can be influenced by hospital care protocols, especially in the case of late preterm and older gestation infants. Providing appropriate level of monitoring in an NICU setting must be balanced with minimizing costs, and other potential adverse consequences, of NICU admission.

OBJECTIVE: To determine the variation in NICU admissions rates among term and late preterm infants.

DESIGN/METHODS: Consortium on Safe Labor Database was used to determine NICU admission rates and infant health data from 156,983 infants ≥ 35 wks and ≥2500 grams birthweight within 13 centers in the US from 2002-2008. NICU admission rates were controlled for infant health compromise: any oxygen use (including all modes of ventilation), sepsis, pneumonia, intracranial hemorrhage, asphyxia, HIE, seizures, NEC, TTN, blood product transfusion, and maternal chorioamnionitis. Process control charts were utilized to evaluate the variation among different hospitals in their NICU Admission rates.

RESULTS: The percent of all births per center that did not have a clearly identifiable cause for a NICU admission ranged from 1.1 - 6.8%.

Within all NICU admissions per center, the percentage of infants ≥ 35 wks and ≥ 2500 gms without an identifiable cause for intensive care services ranged from 19.7 - 36.3%.

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4:30 PM
Fellow in Training
Very Early Language Skills of Late Preterm Compared to Term Infants at Birth and 44 Weeks Corrected Age
Pediatrics, Warren Alpert Medical School of Brown University, Providence, RI.

BACKGROUND: Late preterm infants are the largest group of preterm infants, yet limited data exist about their neurodevelopmental outcomes. The effect of prematurity and missed exposure to maternal speech in late fetal life on language outcomes is unknown.

OBJECTIVE: To evaluate 1) early language skills of late preterm and term infants by measuring infant vocalizations and conversational turns (reciprocal vocalizations within 5 sec) 2) exposure to adult speech by measuring adult word counts.

DESIGN/METHODS: This prospective cohort study of medically stable infants without identified hearing impairment, congenital anomalies, or significant comorbidities includes late preterm infants from the NICU (LPNICU n=19, mean GA=34.5wks) and newborn nursery (LPBN n=13, mean GA=35.8wks) compared to healthy term infants (n=15, mean GA=39.3wks). Language assessment during their birth hospitalization and at home at 44 weeks corrected age (44wCA) included a 16h recording using the LENA® system to measure adult word count, infant vocalizations, and conversational turns. Statistical analysis included ANOVA and regression models controlling for gestational age to determine independent effects of adult words on child vocalizations.

RESULTS: (To date) The groups differed only by gestational age (p<.0001). During the newborn period, LPNICU infants had less exposure to adult language, fewer infant vocalizations, and fewer conversational turns compared to infants primarily rooming-in with their mothers (LPBN and term). At 44wCA, these differences did not persist.
After adjusting for gestational age, adult word count independently predicts child vocalizations during the newborn period. For each 100 adult words/hr, child vocalization rates increase by 2% (p = 0.05).

CONCLUSIONS: Late preterm infants in the NICU had less exposure to adult speech and fewer infant vocalizations in the newborn period, but displayed equal skills to other infants by 44wk/CA. The analysis uncovered independent effects of adult speech on infant vocalizations for the cohort in the first days of life.

4:45 PM

Fellow in Training

Adult-Infant Conversations in the NICU Are Associated with Higher Cognitive and Language Scores at 7 Months in Very Preterm Infants

Melinda A. Caskey, Bonnie Stephens, Richard Tucker, Betty Vohr. Pediatrics, Women’s & Infants Hospital, Providence, RI.

BACKGROUND: Language delays are common among preterm infants. Our previous studies have shown that preterm infants begin to make vocalizations in response to caregivers prior to their expected due date and increase vocalizations and conversational turns with caregivers significantly over time. Studies in older children have shown an association between adult-child conversation and improved measures of child language.

OBJECTIVE: To test the effects of mean adult daily word counts, conversational turns and child vocalizations at 32w & 36w post-menstrual age (PMA) in the NICU with Bayley-III Cognitive and Language scores at 7m corrected age (CA).

DESIGN/METHODS: Prospective cohort study, 36 medically stable and non-intubated infants ≤ 1250 grams b wt. (mean= 896 ± 195g) and gestational age at birth of 27 ± 2 wks were enrolled. 16 recordings were made using a digital language processor inserted into a vest worn by the infant at 32w and 36w PMA. Bayley-III was completed at 7m corrected age (CA). Regression analyses were performed to determine the impact of adult word count, conversational turns and child vocalizations in the NICU on 7m Bayley scores and adjusted for gestational age at birth.

RESULTS: More conversational turns/hr at 32w correlated with higher 7m Bayley III cognitive composite (r= 0.36; p=0.04), language composite (r= 0.38; p=0.048) and receptive language scores (r=0.36; p=0.045) in unadjusted regressions. After adjustment of gestational age at birth, higher 36w adult word count/hr (r= 0.42; p=0.003), conversational turns/hr (r= 0.45; p<0.002) and child vocalizations/hr (r= 0.37; p=0.05) were associated with higher 7m Bayley-III cognitive composite scores . For every turn count per hour, the 7m cognitive score increased on average by 1.7 points (p = 0.005). In regression analysis to predict 7m cognitive scores, 36 week turn count/hr accounted for 26% of the variance (p = 0.02).

CONCLUSIONS: Increased number and quality of parent and caregiver early conversations with preterm infants in the NICU are associated with higher 7m CA Bayley language and cognitive scores. These findings open the door for language intervention in the NICU.
The increase in the respiratory morbidity within vaginal births with lower gestational age was not significant. The average length of NICU stay of the newborn born via C-section was 5 days compared to 4 days for vaginal births.

CONCLUSIONS: Delivery by cesarean section markedly increases respiratory morbidity at 37 and 38 weeks gestational age. Attempts to postpone cesarean section to 39 weeks or later as recommended by American Congress of Obstetricians & Gynecologists in elective situations may reduce respiratory morbidity and admission to the NICU.
Fellow in Training

5:00 PM

Hyperthermia Following Hypoxia-Ischemia in the Neonatal Rat Has a Biphasic Response: Increased Infarct or Selective Hippocampal Damage

Matthew A. Rainaldi, Susan F. Vannucci, Jeffrey M. Perlman

Pediatrics, Weill Cornell Medical College, NY, NY.

BACKGROUND: Hypoxic-ischemic encephalopathy (HIE) remains one of the most common causes of mortality and neurologic morbidity in the term neonate. Evidence suggests an association between injury and temperature during and after HI. A recent clinical study demonstrated that spontaneous hyperthermia following HI in term neonates was associated with increased risk of adverse outcome; whether this is due to hyperthermia or reflects an underlying brain injury was not determined.

OBJECTIVE: To determine the effect of hyperthermia on HI brain damage in the term-equivalent rat pup.

DESIGN/METHODS: Postnatal day (P) 10-12 Wistar rat pups underwent unilateral common carotid artery ligation plus hypoxia (8% O2; bal N2) for 75-90 minutes. Following HI, rat pups were exposed to normoxic normothermia (NORMO) (36.5°C, n = 23) or hyperthermia (HYPER) (38.5°C, n = 22) for 2 hrs. After 48-72 hrs, animals were sacrificed, brains removed and frozen in isopentane (−30°C). 18 µm coronal cryosections were obtained with a cryostat. Infarct area (%) of the ipsilateral hemisphere was calculated using Image J, NIH software. Data were analyzed using Fisher’s exact test and Student’s t-tests.

RESULTS: When the entire cohort was analyzed, the % infarct was not different between NORMO vs HYPER groups, i.e. 63.5 ± 11.9 vs 59.9 ± 24.11%, respectively (p = 0.53). However, HYPER produced a nearly biphasic response: 4/22 rats demonstrating only selective hippocampal damage vs 23/23 in NORMO rats (p = 0.04). Re-analysis of the remaining HYPER group (n = 18) resulted in significantly increased damage, 70 ± 10.5 vs 63.5 ± 11.9% (p = 0.03).

CONCLUSIONS: Exposure to mild hyperthermia immediately following HI in the neonatal rat produced a wider spectrum of damage than in rats recovered in a normothermic environment. In those rats with significant infarcts, HYPER recovery was associated with increased risk of selective hippocampal damage without extensive infarct was observed in ~ 18% of HYPER rats. These results support that hyperthermia alone following HIE is sufficient to produce increased damage in most animals. The selective hippocampal vulnerability with hyperthermia in a subset of HIE requires further investigation. These observations may have important implications regarding the optimum temperature to achieve during and following delivery room resuscitation of a depressed newborn.

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5:15 PM

House Officer

DNA Methyl-Transferase Activity during Hypoxia in Neuronal Nuclei of Newborn Piglets

Amit Mukhia, David Frankling, Anli Zhu, Om P. Mishra, Maria Delivorias-Papadopoulou.

Dept. of Pediatrics, Drexel University and St. Christopher’s Hospital for Children, Philadelphia, PA.

BACKGROUND: Methylation of DNA at the cytosine phosphate guanine (CpG) islands is known to regulate the expression of a number of genes including proapoptotic proteins Bax and Bad. Demethylation allows access to the promoter triggering gene transcription. We have shown that hypoxia results in increased expression of proapoptotic proteins Bax and Bad. We have also shown that hypoxia results in increased methylation of nuclear DNA. The relative activities of DNA methyl-transferase and DNA demethytransferase regulate gene expression by regulating the level of DNA methylation.

OBJECTIVE: The present study tests the hypothesis that increased methylation of nuclear DNA during hypoxia is due to increased DNA methyl-transferase activity in the cerebral cortex of newborn piglets.

DESIGN/METHODS: Newborn piglets were divided into normoxic (Nx, n = 5) and hypoxic (Hx, n = 5) groups. Hypoxia was induced by decreasing inspired oxygen (FiO2 = 0.07) for 60 min. Necropsy was performed and brain examined for regional differences. DNA methylation was determined using the HpaII methylase.

RESULTS: The HpaII methylase is an efficient method to study DNA methylation. The mean levels of DNA methylation in the cerebral cortex of newborn piglets were significantly increased in hypoxia compared to normoxia.

CONCLUSIONS: The increased DNA methylation in the cerebral cortex of newborn piglets indicates that the DNA methyl-transferase activity is increased in hypoxia, resulting in the increased DNA methylation.

General Pediatrics

Poster Session

Saturday, March 26, 2011

6:00 PM-7:30 PM

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Teaching Airport Personnel about Children with Autism

Yahaira I. Marquez, Rebecca B. Jackel, Roger Ichedis, Angela Jones, Clara E. Notredame, Matilde M. Irgiovon, Wendy J. Ross.

Department of Pediatrics, Albert Einstein Medical Center, Philadelphia, PA; University of the Sciences in Philadelphia, Philadelphia, PA; Private Practitioner, Philadelphia, PA.

BACKGROUND: Families of children with autism frequently avoid air travel because of prior negative experiences with airport personnel secondary to the child’s behavior. Airports seek compliance with the American with Disabilities Act (ADA). Access for children with autism falls within this purview.

OBJECTIVE: To assess the knowledge of autism among airport personnel before and after an educational intervention.

DESIGN/METHODS: In collaboration with the ADA liaison at the Philadelphia International Airport, we designed a multi-faceted initiative to improve access for families with children with autism. At part of this initiative, a developmental pediatrician and a child psychologist conducted a 30-minute educational session on autism during an annual ADA training for airport personnel. Participants were invited to complete the Practical Knowledge about Autism Questionnaire (PKAQ) Airport Workers Edition pre- and post- session. The 10-item questionnaire assesses four basic areas of autism: general perception, language, stereotypical behaviors, and social skills.

RESULTS: The sample included 131 participants; 31% were 20-30 yrs, 13% 31-40 yrs, 24% 41-50 yrs, 32 % 50-; 43% were males; 45% were African American, 31% White, 8 % Hispanic; 44 % had worked at the airport < 5 yrs, 36% 6-10 yrs, 20%-11 yrs, 34% worked securely, 18% gate, 12% curbside, 10% check-in, 26% worked at multiple sites. A third of participants had learned about autism from airport training, a third from family or friend, more than half from media. The educational session resulted in a significant increase in the number of correct answers (p< 0.001). For example, “Children with autism usually make eye contact”. Correct answer NO: 11% pre vs. 87% post. “Children with autism can communicate wants and needs easily”. Correct answer NO: 58% vs. 85% post. “Children with autism should be given medication to relax them when they travel” Correct answer NO: 23% pre vs. 72% post. “Children with autism may repeat what they hear”: Correct answer YES: 51% pre vs. 92% post. Older workers with more years of experience obtained a lower score on the posttest knowledge score. Overall, airport personnel showed great interest in learning more about autism.

CONCLUSIONS: This study revealed airport personnel is in need and interested in education about autism. A brief educational intervention was effective increasing autism knowledge among the airport personnel.
157 Development and Initial Validation of the Baby Pediatric Symptom Checklist (BPSC)
Shela Merchant, Brandi S. Henson, R. Christopher Sheldrick, Ellen C. Perrin, J. Michael Murphy.
Pediatrics, Floating Hospital, Tufts Medical Center, Boston, MA; Child Psychiatry, Massachusetts General Hospital, Boston, MA.

BACKGROUND: The American Academy of Pediatrics’ Task Force on Mental Health recommends behavioral health screening with a validated instrument for all children. The Pediatric Symptom Checklist (PSC) is a validated and frequently-used measure for children over 5 years of age.

OBJECTIVE: As part of the process of developing a comprehensive instrument to identify young children with developmental-behavioral problems, we have created a downward extension of the PSC for children 2 to 18 months of age.

DESIGN/METHODS: After review of a range of instruments that measure behavior and temperament among very young children, we wrote and piloted 25 questions relevant to infants. We enrolled 260 babies from pediatric waiting rooms to complete the BPSC questions, the Ages & Stages Questionnaire, Social/Emotional (ASQ-SE), and demographic data. We chose final BPSC items based on results of Principal Components Analysis (PCA) and Item-Response Theory (IRT), and calculated sensitivity and specificity of the BPSC in detecting ASQ-SE status.

RESULTS: PCA identified three factors: Reactivity, Dysregulation, and Child Care Issues. Within each factor, IRT analysis determined the discrimination and difficulty of each item. Based on these analyses, 18 items predicted ASQ-SE scores in the clinical range with sensitivity = 70 and specificity = 74. Cronbach’s alpha for scales ranged from .74 to .79.

CONCLUSIONS: The BPSC shows promise as a brief screening instrument for use in pediatrics. The BPSC assesses three domains that are highly relevant to infant mental health and can be reported reliably by parents in the context of a pediatric waiting room. Further research using independent samples is in process.

158 Exploring the Risks, Trends, and Opportunities for Improvement Regarding Security for Hospitalized Children at Baystate Children’s Hospital
Jacky Jacob, Karine Issa-El-Khouy, Linda George, Jennifer Friderici, Nancy Miller.
Baystate Medical Center/Tufts University School of Medicine, Springfield, MA.

BACKGROUND: Children’s Hospitals (CH) must provide a secure and safe environment. Federal standards (Conditions of Participation) mandate, “The patient has the right to receive care in a safe setting.” Nationally CHs have reported significant threats to the security of hospitalized children.

There is neither a national standard nor best practice for security in CHs.

OBJECTIVE: To identify the nature and extent of security risks reported via incident reports at a CH.

DESIGN/METHODS: A retrospective review and analysis of security incident reports during 2007 in all non-Nursery pediatric units of a CH in Western MA was conducted to identify patterns such as type or date/time of event and to assign a harm score (HS) to each event: 0: No actual event; 1: Event-No Harm; 2: Event-Harm. Binary scores were compared by unit, shift, and time of event. For events with potential or real harm, diagnosis of the patient was documented when available.

RESULTS: 407 security reports filed over 403,189 patient days (PD) were reviewed. Most (75%) were coded as “No actual event” (HS=0) and were primarily false baby security alarms. These occurred most frequently between the hours of 1500-1900 on Sundays (P=0.013); during the months of June or July (34/1000 PD vs. average of 21/1000 PD).

Only 102 of 407 reports were coded as “true events” (HS=1-2); these were described most frequently as stand-by related to Child Protective Services cases (34%) or restraint (30%). True events were more likely to occur during 0600-1800, and were more likely to occur in December than any other month (25.9/1000 PD vs. an average of 9.9/1000 PD).

Only 39 events (HS=2) resulted in any harm to patient, visitor, or staff. Harm events occurred more frequently on the pediatric ward (27 vs. 1; 7 events/1000 PD, P=0.03) and were concentrated overnight between 1200-0600 than all other 6 hour shifts (23% vs. 9%, P=0.001). There was a non-significant trend towards higher rates of temporary harm vs. event-no harm in patient who held a psychiatric diagnosis.

CONCLUSIONS: The BPSC assesses three domains that are highly relevant to infant mental health and can be reported reliably by parents in the context of a pediatric waiting room. Further research using independent samples is in process.

159 Exploring Opportunities for Improving Security in Children’s Hospitals: Focus Groups
Nancy H. Miller, Karine Issa-El-Khouy, Jacky Jacob, Terry Kuta.
Pediatrics, Baystate Children’s Hospital, Springfield, MA.

BACKGROUND: Children’s Hospitals (CH) must provide a secure and safe environment. There is no national standard or best practice for security in CHs.

OBJECTIVE: To explore employees’ understanding of security policies and risks for hospitalized children, visitors and staff.

DESIGN/METHODS: As part of a study of security in non-Nursery units, employees at a CH in Western MA (nursing staff [NS], physicians, child life specialists [CLS]) were invited to 90 minute focus groups. Self selected groups yielded 8 NS and 6 CLS.

RESULTS: Transcript analyses revealed the following issues.

1. Staff security training: No recall of initial training topics; yearly computer training recall only of

2. Patient/family education: No specific staff, time, topics or print material to orient patients/families to CH security; staff inconsistently provide security education; concern that security education may cause anxiety in patients/families

3. Physical environment: Unlocked/unmonitored halls, stairs and doors; inconsistent nursing station presence where baby security alarms sound; “panic button” location on unit unknown by most.

4. Security policy implementation: staff differently enforce visiting policies; posted visitor restrictions at hospital entrances unheeded by adults with children; no follow up after security reports; few security concerns relayed during shift hand off; no training to respond to agitated patients/families.

5. Security: Personal security of staff threatened by psychiatric patients, child placed into protective custody, verbal threats or show force/weapons by families, illegal drugs in patient room.

6. Perception of families’ security concerns: Family may voice concern with patient/family in double occupancy room, unidentified person may approach their child, patient observation by hospital/nursing staff inadequate when parents leave; “admission information overload” decreases family’s interest in security.

Best actions to improve security ranked: 1. lock units, 2. screen all visitors at hospital entrances, 3. hallway security cameras.

CONCLUSIONS: Focus groups identified opportunities for improving CH security, and voiced confidence in reporting concerns. “We are trained to keep our patients safe”. These issues informed a survey for all CH employees. CH implemented a locked infant/child unit after the focus groups convened.

160 Nonresident Fathers and Fatherhood: A Needs Assessment
Lysette Ramos, David Jones, Tanya White-Davis, Peter Sherman.
Department of Family and Social Medicine, Montefiore Medical Center, Bronx, NY; Bronx Fatherhood Program, Visiting Nurse Service of New York, Bronx, NY.

BACKGROUND: Research has shown that a father’s involvement in a child’s life impacts every domain in their functioning, from birth through adolescence. However, 24 million children in the United States do not live with their biological father. This trend is more pronounced for African American children, with 50% living in single mother homes (2007). Despite the magnitude of this issue little is known about the experiences of nonresident fathers and the roles they play in their children’s lives.

OBJECTIVE: To obtain data on the parenting experience of nonresident fathers by exploring their perceived roles, learning processes, challenges, and supports.

DESIGN/METHODS: A qualitative study was undertaken using semi-structured interviews (n=5) with nonresident fathers recruited from a community health care center in the Bronx and a focus group recruited from a community-based organization. The data was professionally transcribed and coded for themes by two investigators, with differences resolved by a third investigator.

RESULTS: Participants ranged in age from 25 to 52 years and 28% were self-identified as Hispanic, 39% as African American, and 11% as other. 44% reported incomes of <$10,000 per year and 22% reported completing some middle school, 39% some high school, and 17% some college education. The nonresident fathers emphasized the importance of their role as fathers. In exploring how they learned to parent, observing other fathers and recall from their own childhood experiences were highlighted. Many of the subjects reported being raised with an absent father and commented on how that affected their parenting; making decisions based on what they had wanted from their own fathers but had not received. Significantly, many of the fathers had desired to be reached out to and integrated into the prenatal time period and described how removal from this heightened their sense of isolation. The unique challenges of nonresident fatherhood, such as distance, and emotional strains of these challenges were all illustrated. Finally, several of the subjects expressed anger about being made to feel invisible, even when present at child health care visits, and emphasized the importance of being included in the provision of their child’s care.

CONCLUSIONS: In order to provide quality family centered care, physicians need to be aware of the unique challenges and perspectives of nonresident fatherhood in order to provide appropriate education, support, and anticipatory guidance.

161 Accessing Sources and Knowledge of Reproductive Health in 14-21 Year-Old High School Students in the Bronx
Ravi Saksena, Molly Broder, Laura Polizzi, Peter Sherman.
Department of Family and Social Medicine, Albert Einstein College of Medicine, Bronx, NY.

BACKGROUND: Adolescents in inner cities bear some of the highest burdens of the negative consequences of sexual behavior with high rates of teen pregnancy, STI’s, and HIV. There is limited research focused on where this population receives its information regarding sexual health. Moreover, there is little data on the emergence of the internet and social networking technologies in disseminating accurate health information to adolescents.

OBJECTIVES: The objectives of this study are to obtain information about where teenagers receive their information about sexual health topics, to obtain information about the use of the internet/social networking, and to evaluate adolescent knowledge concerning reproductive health.

DESIGN/METHODS: Male and female adolescents between the ages of 14 and 21 were recruited at a community health center in the South Bronx during their clinic visits. They were interviewed utilizing a validated instrument which incorporated basic demographic information (83%). The most common websites used were Google (66%), Yahoo (32%), and Wikipedia (32%). The top four search terms were birth control (67%), sex (64%), HIV (52%), and plan b (32%).

CONCLUSIONS: As this was a sample of teenagers who sought medical care, it was not surprising that almost all respondents received information from a medical professional and found it useful. However, the poor performance on reproductive knowledge questions is concerning. A novel finding was the extent to which inner city youth are using the internet to access reproductive health information. This study suggests the importance of incorporating the internet into sexual health education in clinical and nonclinical settings.
NYC Girls Are Steps Away from Growing up Healthy: Patterns of Activity Behaviors in an Inner City Minority Cohort


Department of Preventive Medicine, Mount Sinai School of Medicine, New York, NY.

BACKGROUND: Childhood obesity is epidemic in the US, especially in low income, minority communities. Physical inactivity is a major contributing factor.

OBJECTIVE: The aim of this project was to characterize physical activity in NYC girls and compare reported physical activity levels to current recommendations.

DESIGN/METHODS: Physical activity data was collected by interviewer administered questionnaires from a cohort of 367 African American and Latina girls aged 6-8 in NYC. In addition, a subgroup of 300 girls wore a pedometer for seven days. Weekly physical activity, daily number of steps, and daily screen time were compared with national averages and AAP recommendations.

RESULTS: 85% of girls reported walking to school ≥3 days per week, compared to less than 16% for national children aged 5-15. Yet, pedometer data averaged 9,933 steps/day compared to AAP’s 11-12,000 steps/day recommendation. Girls reported 6.2 hrs/week in non-scheduled physical activity, 4.7 hours of which were spent outdoors. However, only 34% of girls reported participating in organized sports or after school programs, compared to 56% of national 9th grade girls. This accounted for 43 min/week in organized sports. This is less than AAP’s 1 hour/day recommendation. In addition, girls spent only 56 min/week in P.E. classes per week compared to 180 min/week for national 8th graders. With respect to sedentary behaviors, girls reported an average of 2.6 hours of screen time daily, compared to the AAP’s < 2 hours recommendation.

CONCLUSIONS: NYC girls reported unique physical activity patterns which can inform targeted interventions. While the majority of girls walk to school this is insufficient to meet daily step requirements. Targeted interventions to decrease childhood obesity could focus on increasing participation in organized activities, enhancing opportunities for moderate to vigorous physical activity in non-scheduled activities, and enhancing the outdoor environments, both built and natural, where NYC girls report spending active time.
CONCLUSIONS: In an urban minority population, intention to breastfeed was low overall and many women either plan to breast and formula feed or have not made deliberate decisions before birth. Strategies are needed to promote breastfeeding prenatally among urban minority women.

House Officer

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Impact of Delivery Type and Maternity Care Practices on Initiation of Breastfeeding in an Inner City Population

Shilpa G. Hundalani, Stefan Mandakovic Falconi, Ramesh Matam, Matilde Iriyoguen.

Pediatrics, Albert Einstein Medical Center, Philadelphia, PA.

BACKGROUND: Type of delivery and maternity care practices have been shown to significantly affect whether a woman chooses to start breastfeeding and how long she continues to breastfeed.

OBJECTIVE: To examine the relative contribution of type of delivery and maternity care practices on initiation of breastfeeding in an inner city population.

DESIGN/METHODS: We conducted an observational retrospective study of mothers of infants born 7/10/9-10 and discharged from the term nursery at an academic community hospital in Philadelphia, PA. Mothers were classified as underweight (BMI ≤ 18.5), normal weight (BMI 18.5-24.9), overweight (BMI 25-29.9), and obese (BMI > 30). Outcome measures were prenatal intention to breastfeed (exclusive or breast and formula) and breastfeeding at discharge (exclusive or breast and formula).

RESULTS: 645 mothers participated. 61% were African American, 18% Latino; 85% had Medicaid; 26% were overweight, 24% obese.

Mothers with higher BMI were more likely to intend to breastfeed exclusively than to use both breast and formula or to use formula alone after controlling for ethnicity, age, parity and insurance (p = 0.001). Obese women were 3 times more likely than underweight women to intend to breastfeed (OR 3.08, 95% CI 1.17-8.15; p=0.023). However, rates of breastfeeding at discharge were not significantly different across BMI categories.

Intent to Breastfeed (BF) and BF at discharge by maternal Pregravida weight categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Intent to BF</th>
<th>Breastfeeding at discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>19%</td>
<td>19%</td>
</tr>
<tr>
<td>Normal Weight</td>
<td>19%</td>
<td>19%</td>
</tr>
<tr>
<td>Overweight</td>
<td>46%</td>
<td>43%</td>
</tr>
<tr>
<td>Obese</td>
<td>59%</td>
<td>55%</td>
</tr>
</tbody>
</table>

CONCLUSIONS: In this inner city population, obese women showed a higher intent to breastfeed but were less likely to progress to successful breastfeeding at hospital discharge. Increased support in the postpartum period may boost breastfeeding rates in obese women.

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House Officer

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Fellow in Training

Teaching Pediatric Code Leadership Skills: Integrated vs. Stand Alone Curriculum

Jan S. Goodman, Gerard Langlois, Blake Spirkos, Howard Smithline, Fidelia Blank, Olivia TeV. Fernandez.

Emergency Medicine, Baystate Medical Center, Springfield, MA; Surgery, Baystate Medical Center, Springfield, MA.

BACKGROUND: Simulation can be used to accurately educate, measure, and discriminate residency competencies in the medical management of pediatric urgent and emergent events.

OBJECTIVE: Previous studies have demonstrated that education of procedural skills and medical decision making is enhanced through a simulation program. This study was conducted to answer the question of whether a dedicated curriculum of leadership training, simulation sessions and teaching targeted at these topics; is superior to our traditional integrated approach, trying to teach these skills at the same time as medical care.

RESULTS: First year residents were educated using the integrated simulation curriculum and evaluated during their regularly scheduled simulation center times using the Ottawa Crisis Management Global Rating Scale (OCMGRS). A subset of these residents was then given an experimental educational session: a simulation session and debriefing with a focus on communication, leadership, and problem solving around a medical problem that was not within
RESULTS: Of the 29 first year residents in the three training programs, 18 were evaluated in 2 or more traditional simulation sessions. Within this group the first score was compared to the last score using a Wilcoxon signed-rank test for paired data. For the first score the median is 23 with an interquartile range (IQR) of 21 to 26. For the last score the median is 23 with an IQR of 20 to 26. p=0.11. A nonparametric test for trend across ordered groups where the groups are the time points revealed a p value of 0.81. 6 residents received the experimental educational session. For this group the pre intervention data and the post intervention data were compared using a Wilcoxon signed-rank test for paired data. The median score before intervention was 19.5 with an IQR of 16 to 26. The median score after intervention was 33 with IQR of 32 to 33 with a p<0.03.

CONCLUSIONS: The traditional curriculum of an integrated education of leadership skills within a simulation program was not effective in teaching code leadership skills to first year residents. An experimental simulation curriculum that focuses on communication, leadership, and problem solving markedly improved the OCMGRS for those residents who participated.

The Influence of Military Bases and Public University Campuses on Chlamydia Rates in Florida Counties: A Spatial Analysis Using a Geographic Information System (GIS)

James J. Burns, Lea A. Hobby, Alex Husslerl, John Lanza

Pediatrics, Florida State University School of Medicine (Sacred Heart Children’s Hospital), Pensacola, FL; School of Nursing, University of West Florida, Pensacola, FL; Director, Escambia County Health Department, Pensacola, FL.

BACKGROUND: Chlamydia is the most frequently reported sexually transmitted infectious disease in the United States with over 1 million cases reported annually. Recent studies have found high rates of Chlamydia in both military populations and college students. Complications of Chlamydia for women include chronic pelvic pain, ectopic pregnancy, pelvic inflammatory disease, infertility; and for men, epididymitis and infertility.

OBJECTIVE: The purpose of this study was to determine if Florida counties with major military bases or public university campuses have higher rates of Chlamydia when compared to counties without.

DESIGN/METHODS: Using a Geographic Information System, (ArcMap®), a digital color density map of 2008 Florida Chlamydia rates by county was created. Next, the locations of public universities and major military installations were plotted. Using the 2-proportion test statistic in MINITAB® rates of Chlamydia for counties with a military base (vs. no military base), major university (vs. no university) and both (vs. not having both military base and university) were compared.

RESULTS: Statistically significant increased rates of Chlamydia were seen in those counties which had a military base vs. no base (488 vs. 341 per 100,000; Z=36.56; p<0.001) or a public university campus vs. no campus (428 vs. 316 per 100,000; Z=39.49; p<0.001). Greater differences were seen in counties which had both a military base and university campus vs. not having both (576 vs. 338 per 100,000; Z=47.07; p<0.001). This corresponds to what was visually seen on inspection of the digitally created map.

CONCLUSIONS: Counties that have military or public university communities have higher rates of Chlamydia when compared to counties that do not. Focused Chlamydia screening, patient education, and preventive programs at military bases and public university campuses may be an efficient approach to reduce disease burden in the neighboring communities.

Emergency Medicine Poster Session

Saturday, March 26, 2011
6:00 PM-7:30 PM

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Fellow in Training

Pediatric Residents’ Procedural Experience: How Much Is Enough?

Michelle J. Alle tag, David O. Kessler, Marc A. Auerbach

Pediatrics, Yale University School of Medicine, New Haven, CT; Pediatrics, NewYork-Presbyterian/Columbia, New York, NY.

BACKGROUND: Procedural skills competencies are mandated for completion of pediatric residency training. Residents need adequate numbers of opportunities to practice these procedures in order to achieve competency. The purpose of our study was to quantify clinical experience, simulation experience, and self-perceived competence of recent pediatric residency graduates in eight of the required procedural skills.

OBJECTIVE: We hypothesized that recent graduates would report few experiences and low levels of competency with required procedures. Our secondary aim was to evaluate the effect of simulation-based training on perceived competency.

DESIGN/METHODS: A survey tool was distributed to 168 graduating residents from seven US tertiary care institutions (n=55, response rate = 33%). Data was collected on the number of real patient and simulated procedures performed and the number of each procedure they deemed necessary to achieve competence. Procedures assessed included endotracheal intubation, intravenous line placement, intravenous line insertion, arterial puncture, central venous line, lumbar puncture, suturing, and thoracentesis. Subjects were asked to rate the comparative effectiveness of real patient and simulated experience.

RESULTS: The majority of respondents had insufficient experience to achieve competency in 5 of the 8 procedures. 47% sought elective rotations to obtain additional procedural experience. 81% of respondents reported having had some form of simulation training, most commonly in endotracheal intubation. Simulation experience correlated with increased self-reported competence.

Among respondents who received both simulation and real patient procedural training, simulation experience was deemed to be 64% as effective as real patient experience.

House Officer

Identifying Patient Characteristics That Influence a Mandated Reporter’s Decision To Report Child Abuse

Erin Rawson, Kadja Toor, William Hauda, Riva Kamat

Department of Pediatrics, Inova Fairfax Hospital for Children, Falls Church, VA; FACT Department, Inova Fairfax Hospital for Children, Falls Church, VA.

BACKGROUND: Child abuse (CA) is prevalent and underreported in our society. Health care professionals are mandated to report suspected cases of CA in all states. Less than 10% of all maltreatment reports to Child Protective Service’s (CPS) come from medical personnel. Studies have demonstrated that barriers exist for health care professionals to recognize and report child abuse. The factors that affect a clinician’s decision to report child abuse are still being elucidated.

OBJECTIVE: We surveyed health care professionals in an urban, multicultural area to better understand how characteristics such as age, race, type and timing of injury can influence reporting of CA.

DESIGN/METHODS: A survey was developed with suspected CA case studies and distributed to health care providers in an urban hospital. Eighteen cases were given to each participant with 2 questions per case. The questions included variations of ethnicity, age, type and timing of injury. The first question asked about a clinician’s level of suspicion of CA ranging from no suspicion to certainty, recorded on a 10 cm visual analog scale (VAS). The second question asked whether the clinician would report the case to CPS. A 1-way ANOVA test was used to test for significance.

RESULTS: Results of the 86 survey’s completed, showed clinicians suspected and reported CA in an infant who presented with unknown timing of injury compared with immediate or delayed presentation of injury. Age of child was also statistically significant with a higher clinical suspicion and reporting of CA in a 1 month old infant compared to a 6 month and 18 month old child. Ethnicity and type of injury were not factors contributing to suspicion or reporting of CA.

Mean VAS scores for suspected CA cases in children ages 1,6 and 18mos.

<table>
<thead>
<tr>
<th>Age Groups</th>
<th>Mean VAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 month</td>
<td>9.7</td>
</tr>
<tr>
<td>6 month</td>
<td>8.4</td>
</tr>
<tr>
<td>18 month</td>
<td>5.5</td>
</tr>
</tbody>
</table>

p<0.0001

Mean VAS scores for Suspected CA Cases with No History or Varving History.

<table>
<thead>
<tr>
<th>History Groups</th>
<th>Mean VAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>No History</td>
<td>7.6</td>
</tr>
<tr>
<td>Immediate Presentation</td>
<td>5.1</td>
</tr>
<tr>
<td>Delayed Presentation</td>
<td>8.5</td>
</tr>
</tbody>
</table>

p<0.0001

CONCLUSIONS: This study suggests that health care professionals are more likely to suspect and report CA in younger infants and that history on presentation is important. It failed to demonstrate the increased likelihood of suspicion and reporting of CA among ethnic groups or based on type of injury. This could be survey inadequacy or because ethnicity and type of injury are not primary factors in suspecting or reporting CA.
Impact of BASE Camp: Simulation-Based Multidisciplinary Team Training for Pediatric Emergency Medicine Fellows
Kevin Ching, Marc Auerbach, Frank Overly, Linda Brown, Chao Yan Dong, Colleen Gillespie, Michael Falk, David Kessler.

Emergency Medicine and Pediatrics, New York University School of Medicine, New York, NY; Pediatrics, Columbia University Medical Center/New York Presbyterian Morgan Stanley Children’s Hospital of New York, New York, NY; Pediatrics, Yale University School of Medicine, New Haven, CT; Emergency Medicine and Pediatrics, Warren Alpert School of Brown University, Providence, RI; Emergency Medicine, SUNY Downstate College of Medicine, Brooklyn, NY.

BACKGROUND: Pediatric emergency medicine (PEM) fellows must acquire necessary knowledge and skills to lead a multidisciplinary team under crisis conditions. Without consistent training in teamwork however, many PEM fellows rely on mock codes or rare resuscitation events for experiential learning. In order to introduce, review, and practice teamwork behaviors and skills, we organized a 2-day multi-institutional, multidisciplinary program, BASE Camp 2010: Basic Training for Pediatric Emergency Medicine.

OBJECTIVE: To determine the skills PEM fellows identified as essential for effective teamwork, and to characterize potential barriers to integrating these principles in practice.

DESIGN/METHODS: Using qualitative methods, we conducted 2 focus group interviews (n=16). Fellows described their teamwork experiences at BASE Camp, how they would integrate team principles into future practice, and prior resuscitation experiences. Responses to open-ended questions were recorded, transcribed, and analyzed by a constant comparative method in Atlas.ti (qualitative data analysis program). Data was cross-coded to ensure agreement. Themes were identified by content analysis. The study was IRB approved and all subjects consented.

RESULTS: 17 PEM fellows (12 first and 5 second years) from 10 Fellowships in NY, CT, and RI participated in BASE Camp (Oct 23-24, 2010). 29% were male.

Five themes reflecting 5 core teamwork principles were identified; in order of response frequency: role clarity (37%), communication (26%), leadership (17%), situational monitoring (13%), and mutual support (7%).

A sixth theme emerged from an inductive interpretation of coded data segments. Barriers to integrating the 5 core principles are categorized by: Hierarchy (n=16): discomfort asserting teamwork principles with more experienced multidisciplinary practitioners. Inexperience (n=15): challenges to integrating teamwork principles when resuscitation events are rare. Communication (n=8): difficulty implementing communication strategies with colleagues untrained in teamwork principles.

CONCLUSIONS: Fellows acquired basic teamwork principles during BASE Camp training and are eager to incorporate these behaviors and skills into future practice despite the barriers identified. BASE Camp may be useful to overcome these challenges, and our results will help inform future iterations of our educational intervention.

House Officer
Communication Malfunction: Utilizing Electronic Order Systems To Improve Communication and Reduce Radiation Exposure for Children with Ventricular Shunts
Emily A. Spengler, Jennifer Anders, Mahadevappa Mahesh.

Pediatric Resident, Department of Pediatrics, Johns Hopkins Hospital, Baltimore, MD; Division of Pediatric Emergency Medicine, Johns Hopkins Hospital, Baltimore, MD; Department of Radiology, Johns Hopkins University School of Medicine, Baltimore, MD.

BACKGROUND: Patients with shunted hydrocephalus receive multiple head CTs in their lifetime for shunt evaluation. These scans expose them to excessive amounts of radiation. Multiple studies show that low dose radiation protocols evaluate shunt function with the same quality and less radiation exposure in patients with shunted hydrocephalus.

OBJECTIVE: To investigate if a change in an electronic ordering system can improve communication between physicians and radiology technicians and reduce radiation exposure in patients with shunted hydrocephalus.

DESIGN/METHODS: We reviewed electronic records to abstract data regarding physician ordering instructions and how these were presented to the Johns Hopkins Pediatric Emergency Department with a suspected shunt malfunction over a three-month period. The electronic ordering system submenus for Head CT was then altered to add the indication “Pediatric Shunt Malfunction.” The same data was then abstracted for patients with suspected shunt malfunction presenting to the Pediatric Emergency Department for the three-month period immediately after the change.

RESULTS: 133 patient visits met inclusion criteria, 70 with CT done in the control period and 63 after the intervention. Prior to the intervention, 33/70 (47%) of scans included communication of shunt malfunction in the electronic order. After the change, 53/63 (84%) orders included this information (P=0.001). However, this did not translate into a change in the scan performed by the CT technician: prior to the change, 56% of scans were low-dose vs. 31/63 (48%) afterwards (P=0.49). A result, mean effective radiation dose was 2.13 mSv before the intervention and 2.60 mSv after the intervention (P=0.1). When utilized, the low-dose protocol mean effective radiation dose was 1.24 mSv vs. 3.60 mSv for standard head CT protocol (P=0.001).

CONCLUSIONS: The effective radiation dose was approximately 66% lower for patients when the technician used a low-dose protocol scan. Rapid adoption of the new ordering indication led to a significant increase in orders that should have triggered the low-dose protocol. However, this increase in communication was paradoxically associated with decreased utilization of the low-dose scan in this tertiary care pediatric emergency department.

Endocrinology & Obesity Poster Session
Saturday, March 26, 2011 6:00 PM-7:30 PM

Fellow in Training
“Missing” Mutations: Post-Zygotische Mischung in Congenital Hyperinsulinism
Katherine Lord, Kara Snider, Courtney MacMullen, Susan Becker, Arupa Ganguly, Charles A. Stanley.

Division of Endocrinology, Children’s Hospital of Philadelphia, Philadelphia, PA; Department of Genetics, University of Pennsylvania School of Medicine, Philadelphia, PA.

BACKGROUND: Genetic analysis of peripheral blood DNA from 3 of 4 children with HI whose blood was negative for mutations in SUR1, Kir6.2, glutamate dehydrogenase (GHD), and glucokinase (GK).

RESULTS: Patient 1 had diazoxide-responsive HI, protein-induced hypoglycemia, and elevated blood amonias. She was diagnosed with hyperinsulinism/ hyperammonemia syndrome (HI/HA) and had a 95% pancreatectomy due to family concerns about diazoxide side effects. Pancreatic DNA identified a known HI/HA missense mutation (p.S454L) in GDI. Patient 2 had diazoxide-unresponsive HI that clinically was not consistent with a mutation in SUR1 or Kir6.2. GK-HI was suspected and she underwent a 92% pancreatectomy. Pancreatic DNA identified a low-level mosaic mutation (p.454d4a). In Patient 3, born at 27 weeks, had presumptual stress-induced HI that failed to resolve. GK-HI was suspected based on failure to respond to diazoxide and having a low glucose requirement. At surgery, a focal lesion was not identified and a 70% pancreatectomy was performed. Genetic analysis of the pancreas failed to identify a mutation in GKI. Patient 4 was diagnosed with HI/HHA after presenting with hypoglycemia and elevated amonias. She demonstrated protein-induced hypoglycemia. She was well controlled on diazoxide and did not require surgical intervention.

CONCLUSIONS: These four patients with negative mutation analysis from peripheral blood had clinical phenotypes suggestive of autosomal dominant forms of HI. In 2 of the 4, suspected mutations in GK and GBD were confirmed in pancreatic DNA. The third patient may have a mosaic GK mutation below the limit of detection by conventional sequencing. The possibility of post-zygotische mutation should be considered in children with the appropriate phenotype who are negative for mutations in peripheral blood.

Fellow in Training
Markers of Body Composition as Predictors of Total and Undercarboxylated Osteocalcin in Healthy Children
David R. Weber, Andrea Kelly, Rita Hershkovitz, Mary B. Leonard, Virginia A. Stullings, Babette S. Zemel.

Division of Endocrinology and Diabetes, Children’s Hospital of Philadelphia, Philadelphia, PA; Division of GI, Hepatology and Nutrition, Children’s Hospital of Philadelphia, Philadelphia, PA; Division of Nephrology, Children’s Hospital of Philadelphia, Philadelphia, PA.

BACKGROUND: Recent studies suggest a novel relationship between bone and energy metabolism. One postulated link is osteocalcin (OCN), a known marker of bone formation whose undercarboxylated form has been associated with insulin sensitization and secretion in animal models. A few studies have found a negative association between total OCN (tOCN) and obesity, however the relationship between body composition and either tOCN or undercarboxylated OCN (ucOCN) in healthy children has not been explored.

OBJECTIVE: To determine if serum OCN and ucOCN levels are associated with markers of body composition indicative of obesity in a cohort of healthy children.

DESIGN/METHODS: tOCN (175M/174F) and ucOCN (93M/84F) levels were obtained in a cross-sectional sample of healthy children recruited as part of the Reference Data Project on Skeletal Development at Children’s Hospital of Philadelphia. OCN was expressed as a Z score relative to BAP and sex to account for the expected changes in OCN associated with rapid bone formation across this age range. Height, weight, BMI, and pubertal stage were assessed. Bone mineral content (BMC), fat mass (FM) and lean body mass (LBM) were measured by dual-energy x-ray absorptiometry (DXA) and converted to age, sex, and race-specific Z-scores. Multivariable regression models were constructed using a multi-stage approach to determine the association of BMI-Z, FM-Z, and LBM-Z to tOCN after adjustment for age, sex, pubertal stage (TS), and bone specific alkaline phosphatase (BSAP). Similar analyses were used to study ucOCN.

RESULTS: 131% (46.31) and 12.6% (22.17) of subjects with tOCN and ucOCN were obese (BMI>95%). OCN-Z was negatively associated with LBM-Z (p<0.001) and females TS4 (p=0.01), TS5 (p=0.002), and BSAP (p=0.004); and positively associated with age (p=0.002), and female gender (p=0.014); R²=0.14. ucOCN was positively associated with LBM-Z (p=0.032), female gender (p=0.009), and OCN (p=0.001); and negatively associated with TS3 (p=0.033) and BSAP (p=0.001); R²=0.75. There was no association with BMI-Z or BMZ-C for either tOCN or ucOCN.

CONCLUSIONS: In a cohort of healthy and largely healthy weight children, tOCN and ucOCN are associated with LBM, and not FM or BMC. tOCN and ucOCN may not be sensitive markers of bone energy metabolism in children at a time of active bone remodeling.
25(OH)D
95
128
2.8
1.59#
98.0
27.7
QUICKI
62.4
54.6
0.30
TG/HDL
59.6
-10.1
844
13.5
0.33
14.3
2.52
1.0
98.5
α
13.4
-23.9
52.3
-2.4
78.4
98.4
69.2
3.55*
1.6
0.30
HOMA-IR, TNF-α
and altered lipid profile. Ceramide is a potential biomarker for development of insulin resistance in obese adolescents. Future longitudinal studies will address the correlation between serum sphingolipids and risk factors for the development of T2DM in adolescents.

RESULTS: Both patients were treated with vitamin D and calcium with normalization of serum levels of 25(OH)D and PTH, but continued to have elevated alkaline phosphatase and low serum phosphorus concentrations and TP/GFR. Based on these results, we suspected a primary defect in phosphorus metabolism and initiated treatment with calcitriol and phosphorus. The patients subsequently improved with this therapy, and were found to have likely disease causing mutations in the PHEx gene consistent with X-linked hypophosphatemic rickets.

CONCLUSIONS: The resumption of vitamin D deficiency, particularly among breastfed patients and those wearing religious dress, has heightened awareness of vitamin D rickets. The present cases emphasize that vitamin D deficiency can mask other causes for rickets, and thus nutritional vitamin D deficiency and genetic hypophosphatemic rickets may coexist in many children. It is important to carefully monitor alkaline phosphatase and phosphorus metabolism after conventional vitamin D treatment to confirm that vitamin D deficiency is the only cause for rickets.

Association of Serum Sphingolipids and Serum Adipocytokines with Insulin Resistance in Adolescents at Risk for Metabolic Syndrome
Indrjit Majumdar, Lucy D. Mastrandrea,
Pediatric Endocrinology, Diabetes Center, Women and Children’s Hospital of Buffalo, Buffalo, NY; Pediatrics, University at Buffalo, School of Medicine, Buffalo, NY.
BACKGROUND: Obesity is associated with low grade chronic inflammation mediated partially by tumor necrosis factor-alpha (TNF-α), free fatty acids (FFAs), and interleukin-6 (IL-6), and low serum adiponectin (AN). TNF-α increases sphingomyelinase activity in vitro. Serum ceramide (Cer), sphingosine (Sph) and sphingosine 1-phosphate (S1P), byproducts of sphingomyelin metabolism, are elevated in genetically obese (ob/ob) mice.

OBJECTIVE: 1) Compare serum levels of S1P, Sph, and ceramide in overweight vs. lean adolescents. 2) Correlate serum sphingolipid levels with anthropometric parameters (body mass index (BMI) and waist circumference (WC)), measures of insulin resistance (calculated homeostasis model of insulin resistance (HOMA-IR)), lipid profiles, and serum adipocytokines.

DESIGN/METHODS: Healthy overweight adolescents (age 13-18) with BMI ≥ 85% and lean (BMI 10-85%) controls were recruited. Anthropometric measurements and fasting blood samples were collected. Serum glucose, insulin, and fasting lipid profiles were measured. Serum adipocytokine levels were measured by ELISA or colorimetric assay. Serum sphingolipids were measured by HPLC mass spectroscopy.

RESULTS: The study enrolled 30 overweight and 15 lean adolescents. The subjects were similar in age and sex distribution. Significant differences in HOMA-IR (4.5±3.2 vs. 1.2±0.7*), FFAs (0.8±0.3 m.mol/l vs. 0.4±0.3 m.mol/l), and AN (6.4±3.8 µg/ml vs. 12.6±9.9 µg/ml*) were seen between groups (overweight vs. lean). There were no differences in TNF-α, IL6, or sphingolipid levels between groups. There were significant correlations between Sph and triglycerides (r=0.362*), Cer and to S1P ratio and LDL cholesterol (r=0.453*). Cer and TNF-α (r=0.429*); Cer and HOMA-IR (r=0.307*), which persisted after adjustment for BMI-Z, sex, and Tanner stage. Upper 20% vs. lower 80 percentile Cer levels were associated with HOMA-IR = 3.29 (95%CI = 1.64-24.9).#Means SD; **P<0.05; *P<0.005

CONCLUSIONS: This population of obese adolescents has significant insulin resistance and altered adipocytokine levels compared to lean controls. Elevated sphingolipid levels correlate with HOMA-IR, TNF-α and altered lipid profile. Ceramide is a potential biomarker for development of insulin resistance in obese adolescents. Future longitudinal studies will address the correlation between serum sphingolipids and risk factors for the development of T2DM in adolescents.
CONCLUSIONS: The strong correlation between PV and IGF-1 suggests that pituitary size may be an important component of the evaluation of children with growth failure.

## 182 House Officer

### Knowledge, Attitudes and Clinical Practices of Pediatric Residents in a Community Hospital Regarding Vitamin D: Pre- and Post-Intervention Analysis


Pediatrics, Flushing Hospital Medical Center, Flushing, NY; Graduate School of Psychology and Health Science, Touro College, NY, NY.

BACKGROUND: The American Academy of Pediatrics (AAP) has published new guidelines on Vitamin D (ViD) intake. However, ViD deficiency is still widespread in all age groups. Physicians may not address this issue adequately during routine health care visits due to lack of knowledge and training.

OBJECTIVE: To assess knowledge, attitudes and practices (KAP) of pediatric residents (PRs) regarding ViD and to assess if enhancing their knowledge improved clinical practice.

DESIGN/METHODS: This was a prospective, interventional study conducted at Flushing Hospital Medical Center. PRs at all years of training (YoT) were administered 28-item survey including knowledge assessment and practice assessment to assess their knowledge and practice. Knowledge scores (KS) on the survey ranged from 0-26. Based on the chart review of 4 patients (2 infants <1 year and 2 children aged 6-12 years) per resident regarding their assessment of the patients’ ViD intake and supplementation, each resident was graded with a practice score (PS). Afterwards, an educational intervention (EI) based on an Academic Pediatric Association designed module on ViD was provided to the PRs by either lecture or email. Post-EI, PRs were restested using the same survey and chart review repeated for their respective patients to determine change in PS.

RESULTS: Of the 28 total PRs who participated in the study, 9 were in their 1st YoT, 10 in the 2nd and 9 in the 3rd. 19 received EI via lecture and 9 by email. The pre-EI mean KS was 18.3 (SD: 3.60) which was not significantly affected by YoT, ethnicity, prior course in nutrition, being a parent or having completed an endocrinology rotation. The post-EI mean KS improved to 22.1 (SD: 2.51, p < 0.001) and was slightly higher in the lecture group (22.7) than PRs that received email (21). PRs level of comfort in providing anticipatory guidance to parents about ViD also improved (p = 0.034). The PS for infants <1 year was better than for children aged 6-12 years, both before (p = 0.012) and after EI (p = 0.001).

CONCLUSIONS: KAP about ViD is insufficient in PRs and improved significantly after EI. Further strategies are needed to improve clinical practice for older children.

## 183 Fellow in Training

### Novel Presentations of Congenital Hyperinsulinism Due to Mutations in Hepatocyte Nuclear Factor 1 and 4 Alpha

Diana E. Stanescu, Nkecha Hughes, Bernard Kaplan, Charles A. Stanley, Diva D. De Leon.


BACKGROUND: Hepatocyte nuclear factors 1 and 4 alpha are transcription factors implicated in the intricate transcriptional regulatory loops of the hepatocyte and pancreatic beta cell. Mutations of both factors cause familial monogenic diabetes (MODY3 & MODY1). Recently, HNF4 alpha MODY1 mutations were identified in infants with congenital hyperinsulinism (HI), resolving in early childhood and later progressing to insulinopenia.

OBJECTIVE: The purpose of this report is to describe 2 unusual cases of hyperinsulinism associated with mutations of these genes.

DESIGN/METHODS: Retrospective chart review and gene sequencing were used to characterize the 2 cases.

RESULTS: Case #1 presented at age 20 months with HI, was initially treated with diazoxide and was later found to have a patentarily inherited, known MODY3 mutation in HNF1 alpha (p.Glu32X). Multiple paternal relatives had diabetes, typical of MODY3. Case #2 presented as a newborn with diazoxide-responsive HI, but developed renal Fanconi syndrome, hypophosphatemic rickets and hepatomegaly with histologic evidence of increased hepatic glycogen stores. Although clinically suggestive of Fanconi-Bickel syndrome, genetic tests of the GLUT2 gene and her clinical improvement did not support this diagnosis. She was found to have a known, de novo MODY1 mutation in HNF4 alpha (p.Arg76Trp). In both cases, the HI improved with age, with no evidence of hypoglycemia after 6 years of age.

CONCLUSIONS: These results show that mutations of HNF1 alpha may cause congenital HI, adding to previous evidence implicating only HNF4 alpha. Moreover, as shown in Case #2, HNF4 alpha mutations may affect liver and kidney producing a non-progressive disease phenotype similar to GLUT2 deficiency. This also expands the list of genetic causes of Fanconi syndrome. We speculate that these 2 factors are not directly responsible for all the clinical findings, but rather their mutations perturb their regulatory loops and function of other proteins – such as GLUT2, in the case of HNF4 alpha – leading to a variable phenotype.
Etiology of Kidney Disease and Kidney Transplant Outcome in Pediatric Minoteitis
S. Beste, J. P. Guitnna, N. Samtani-Gaffney, M. DelRio, B. Gutay,
Nephrology, Children’s Hospital at Montefiore, Bronx, NY.
BACKGROUND: Most information currently available on the etiologies of pediatric chronic kidney disease (CKD) is drawn from studies of predominantly white populations. At our institution, an urban university-based hospital, the majority of patients are Hispanic or Black, and nearly 1/3 of the population lives below the poverty level. We examined the etiology of CKD, as well as management and outcomes after kidney transplantation (KT) to supplement the otherwise scarce data on minority populations.
OBJECTIVE: To explore how race impacts the underlying diagnosis of CKD and whether race affects management and outcome of children requiring KT.
DESIGN/METHODS: Retrospective chart analysis of 49 patients transplanted between 2000 and 2010 was performed. Information such as anthropometrics, demographics, race, underlying diagnosis, type of KT, and timing thereof were obtained. The rate of rejection episodes stratified by race was assessed as well.
RESULTS: Of 49 patients transplanted at our institution over the last decade, 45 KT recipients had complete records. Of them, 27 were M, 18 were F. Mean age at transplant was 11.5 years. 7 KT recipients had >1 KT (2-3). Mean follow up (fu) was 50 mos. 18% of KT were pre-emptive, while 30% of KT were from living donors (10% unrelated). A total of 10 rejections occurred during fu, of which 8 occurred within 12 mo post KT. Table 1 provides the breakdown of our study population by race for etiology of CKD, preemptive KT, live donation, and episodes of rejection.

<table>
<thead>
<tr>
<th>Characteristic of Study Population</th>
<th>Hispanic</th>
<th>Black</th>
<th>White</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Population</td>
<td>38</td>
<td>27</td>
<td>24</td>
<td>10</td>
</tr>
<tr>
<td>% Focal segmental glomerulosclerosis</td>
<td>33</td>
<td>53</td>
<td>33</td>
<td>14</td>
</tr>
<tr>
<td>% Diaplasia</td>
<td>90</td>
<td>80</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>% Reifex Obstr. Uropathy</td>
<td>63</td>
<td>43</td>
<td>43</td>
<td>14</td>
</tr>
<tr>
<td>% Glomerulonephritis</td>
<td>29</td>
<td>43</td>
<td>43</td>
<td>14</td>
</tr>
<tr>
<td>% Cystic disease</td>
<td>20</td>
<td>40</td>
<td>40</td>
<td>14</td>
</tr>
<tr>
<td>% Etiology</td>
<td>17</td>
<td>17</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>% Preemptive KT</td>
<td>17</td>
<td>17</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>% Living Donor</td>
<td>17</td>
<td>17</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>% of all Rejections</td>
<td>40</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

CONCLUSIONS: Our study is the first of its kind to assess etiology of pediatric CKD and KT outcomes in a population primarily comprised of minorities. National registries are vastly comprised of White children and offer a skewed statistical view of minority populations. Our study provides insight into the etiology of CKD and outcome of KT recipients and demonstrates that the data are not significantly different in minorities and children of low socioeconomic status, compared to white middle-class cohorts, when adequate care is provided.

Use of Screening Urine Dipsticks in Well-Child Care To Detect Asymptomatic Proteinuria without Proper Interpretation Leads to Unnecessary Referral of Pediatric Patients
Alexa Calero, Stephen P. Katz, Preethi Thomas, Jacob Rosenberg Rosenberg, David Fagan,
Pediatrics, Nassau University Medical Center, East Meadow, NY.
BACKGROUND: Pediatricians continue to use screening urine dipsticks in well-child care despite the American Academy of Pediatrics recommendation in 2007 to discontinue this screening. A previous review of our experience before that recommendation was made demonstrated that 9 of 9 patients would not have been referred if the primary care physician had used the algorithm published for the evaluation of asymptomatic proteinuria in 2000.
OBJECTIVE: To review our more recent experience to determine the nature of the referrals and compare them with our previous data to see if unnecessary referrals continue.

CONCLUSIONS: Use of screening urine dipsticks in well-child care does not detect asymptomatic proteinuria without proper interpretation. Physicians need to be made aware of the pitfalls associated with screening for proteinuria.

Conclusions of the study: Use of screening urine dipsticks in well-child care does not detect asymptomatic proteinuria without proper interpretation. Physicians need to be made aware of the pitfalls associated with screening for proteinuria.

Gastroenterology / Nutrition / Hematology & Oncology Poster Session
Saturday, March 26, 2011
6:00 PM-7:30 PM

Novel Coagulopathy and Severe Hemorrhage with Epstein-Barr Virus-Associated Disease
Department of Pediatrics, Division of Pediatric Critical Care Medicine, Morgan Stanley Children’s Hospital of New York-Presbyterian, Columbia University Medical Center, New York, NY. Department of Pediatrics, Division of Bone Marrow Transplant, Morgan Stanley Children’s Hospital of New York -Presbyterian, Columbia University Medical Center, New York City, New York.

BACKGROUND: The coagulopathy accompanying acute Epstein-Barr virus (EBV)-associated lymphoproliferative disorder (LPD) has not been well described. We reviewed the clinical course of recent pediatric patients with this disorder.
OBJECTIVE: To demonstrate the association of severe coagulopathy with EBV-LPD.

CONCLUSIONS: The novel coagulopathy with severe hemorrhage characterized by thrombin activation and vigorous fibrinolysis without intrinsic or extrinsic system abnormalities was noted in patients with acute EBV-associated LPD; most of these patients did not survive. We speculate that this coagulopathy is a marker of EBV-associated LPD.
**Fellow in Training**

Early Fortification of Expressed Breast Milk (EBM) Improves Calcium (Ca) and Phosphorus (P) Intake and Reduces Peak Alkaline Phosphatase (AlkP) Level in Premature Neona
tes

Jasseyee Nair, Maria Janina U. Pabalban, Nancy Garrison, Rita Ryan, Vivien Carrion, Saumya Sharma, Shane Clark, Kabir M. Abubakar, Martin Keszler.

**RESULTS:** Twenty eight patients were ventilated conventionally during this period. Mean ventilator settings, observed VT, respiratory rate (RR) and corresponding blood gas values were calculated for each patient and these mean values were subjected to descriptive statistical analysis. We also collected data from 40 term infants with severe uniform lung disease and MV/kg were calculated for each patient and these mean values were subjected to descriptive statistical analysis.

**CONCLUSIONS:** These findings are consistent with the known pathophysiologic derangements in MAS mainly air trapping with heterogeneous aeration and increased physiologic dead space. These are the first normative data to guide selection of VT in infants with MAS.

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**Mechanical Ventilation at Postnatal Day 7 and Bronchopulmonary Dysplasia among Extremely Preterm Infants**


**RESULTS:** BPD developed in 52% of the entire cohort of 633 infants, in 33% of the 357 infants not receiving MV at day 7, and in 77% of the 276 infants receiving MV at day 7. Factors associated with BPD in the final multivariate models for the entire cohort as well as for subgroups defined by MV status at day 7 are shown in Table 1.

**CONCLUSIONS:** Early fortification of EBM to 24Cal/oz at 50ml/kg/d feed volume significantly increased Ca and P intake and reduced peak AlkP. We speculate that in preterm infants on EBM, early fortification may improve bone mineralization and prevent MBD.

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**IFN-γ and IP-10 in Tracheal Aspirates from Premature Infants: Relationship with Bronchopulmonary Dysplasia**


**RESULTS:** Twenty infants who died or developed BPD/No BPD at day 7 and LOI represent potentially modifiable determinants of BPD.

**CONCLUSIONS:** Higher IFN-γ levels were higher in infants who died or developed BPD/No BPD at day 7, and in 77% of the 276 infants receiving MV at day 7. Factors associated with BPD in the final multivariate models for the entire cohort as well as for subgroups defined by MV status at day 7 are shown in Table 1.

**CONCLUSIONS:** IFN-γ and IP-10 are important biomarkers for the development or severity of BPD and can be considered for future clinical practice.

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**IFN-γ and IP-10 in Tracheal Aspirates from Premature Infants: Relationship with Bronchopulmonary Dysplasia**


**RESULTS:** Twenty infants who died or developed BPD/No BPD at day 7 and LOI represent potentially modifiable determinants of BPD.

**CONCLUSIONS:** Higher IFN-γ and IP-10 levels in TA samples are associated with the development of BPD or death in premature infants. We speculate that IFN-γ and IP-10 play an important role in acute lung injury in premature infants.
Impact of Histological Chorioamnionitis on Tracheal Aspirate Cytokines in Premature Infants


Pediatrics, Cooper University Hospital-UMDNJ-Robert Wood Johnson Medical School, Camden, NJ; Division of Perinatal Medicine, Yale University School of Medicine, New Haven, CT.

BACKGROUND: Elevated cytokines in tracheal aspirates (TA) of premature infants are associated with the development of bronchopulmonary dysplasia (BPD). Histological chorioamnionitis (CHORIO) may increase inflammatory mediators in the lungs of preterm infants. OBJECTIVE: To study the impact of CHORIO on TA cytokines in ventilated infants. DESIGN/METHODS: TA samples collected within 48 hours after birth from 40 ventilated neonates [gestational age (GA) <30 weeks (w), birth weight (BW) <1250 grams (g)] were analyzed. Levels of 12 cytokines (Interleukin-1 α (IL-1α), IL-1β, IL-2, IL-4, IL-6, IL-8, IL-10, Epidermal Growth Factor (EGF), Interferon-γ (IFN-γ), Monocyte Chemotactic Protein-1 (MCP-1), Tumor Necrosis Factor-α (TNF-α), Vascular Endothelial Growth Factor (VEGF)) were measured using a biochip multi-analyte immunoassay (Random Laboratories, Antrim, UK). Total protein in TA was measured by Bradford assay to correct for sampling related dilution. Assessment of CHORIO was done by a blinded pathologist.

RESULTS: Twenty six infants (GA 26.6±1.4w, BW 852±162g) had no CHORIO and 14 infants had CHORIO (GA 25.1±1.0w, BW 776±164g) had CHORIO. The levels of IL-1α, IL-1β, IL-8 and VEGF were significantly higher in TA samples of preterm infants with CHORIO with levels remaining higher after correcting for dilution with protein. There was also a trend towards higher levels of EGF, MCP-1 and TNF-α in CHORIO infants.

CONCLUSIONS: CHORIO is associated with the increased pro-inflammatory mediators in TA samples of preterm infants, which may contribute to the development of bronchopulmonary dysplasia.

Screening for Autism in Former Preterm Infants

Raja R. Senguttuvan, Jordan S. Kase.

Division of Newborn Medicine, Maria Fareri Children’s Hospital at Westchester Medical Center, Valhalla, NY; Division of Newborn Medicine, Maria Fareri Children’s Hospital at Westchester Medical Center, Valhalla, NY.

BACKGROUND: Autism spectrum disorder (ASD) is a complex, behaviorally defined disorder of the brain. The Modified Checklist for Autism in Toddlers (MCHAT) has been validated to be a sensitive screening tool for ASD. When followed by a structured follow up interview (SFI) its positive predictive value increases from 57% to 76%. Few studies have looked at screening for ASD in preterm infants (PT). Those that have, showed a positive screening rate of 21% to 25% of the PT population. A study done by Gorelick et al. showed a positive rate of 18% in PT infants. This study was to determine if a similar rate of screening positive would be seen in PT infants post SFI. 6% of VP, 10% of MP and 0% of LP had an abnormal MCHAT score post SFI. Significant post SFI positive screening rate was 6%. 10% of VP, 18% of MP and 6.5% of LP screened positive post SFI. Significant factors associated with a positive screen.

RESULTS: Interim analysis is based upon 165 former PT children. Subjects were evaluated at an average of 32±12 months after their last MCHAT/SFI. Of the 165 PT children, 22 were abnormal on their initial MCHAT and their MCHAT was not complete on their SFI. Of the 143 children the SFI was completed, 26 were abnormal on their initial MCHAT, 27 had a post MCHAT complete SFI, 12 were positive on the SFI. Significant correlations with positive screening were maternal age (35.5±3.6y) male sex (9/90%) and PVL (7/70%).

CONCLUSIONS: Amongst PT infants, a significant number of them will screen positive for ASD. This may be due to morbidity of prematurity affecting a rapidly growing brain such as PVL. However the SFI will significantly reduce the amount of infants who will need further referral for more formal testing.
**Fellow in Training**

**Localization of Sirtuin 1 in Fetal Membranes: Possible Role in Perinatal Inflammation**


*Pediatriics/Surgery/Pathology, Cooper University Hospital-UMDN-Robert Wood Johnson Medical School, Camden, NJ.*

**BACKGROUND:** Infection induced up-regulation of inflammatory cytokines has been proposed to be the causative link between chorioamnionitis and adverse neonatal outcomes. Sirtuins (SIRTs) are class III histone deacetylators and play a role in regulating key inflammatory mediators. In animal models and adults, SIRTs are protective against inflammation. The role of SIRTs in the pathogenesis of chorioamnionitis is unknown.

**OBJECTIVE:** To study the effect of chorioamnionitis on expression of SIRT1 in fetal membranes from preterm placenta.

**DESIGN/METHODS:** In an IRB approved protocol, stored blocks of fetal membranes from 41 preterm (GA < 32 W) placentas were analyzed. Sixteen preterm placentas had histological evidence of chorioamnionitis (CHO group) on H & E stain and 25 did not (NO-CHO group). The immunoreactive SIRT1 was localized by immunohistochemistry using rabbit polyclonal antibodies. SIRT1 staining was quantified in the cytoplasm and the nuclei by 3 independent observers on a score of 0-4 as described by Yan et al (Placenta 2002 (23): 288-293).

**RESULTS:** There was no significant difference in GA (25.7±7.2 vs 26.7±3.5 W) and BW (949±328 vs. 851±341 G) between the CHO and NO-CHO groups. SIRT1 was localized in the cytoplasm (C) and the nuclei (N) of all tissue studied. There was no significant difference in SIRT1 localization in the cytoplasm of amnion epithelium (AE), mesenchyme (M) and chorion (Ch) between the two groups. The localization of SIRT1 was significantly decreased in the nuclei of AE in the CHO group.

**CONCLUSIONS:** SIRT1 is expressed in the fetal membranes from preterm placenta and its localization is decreased in the nuclei of AE cells with chorioamnionitis. We speculate that SIRT1 plays an important role in perinatal inflammation.

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**Contaminant or Pathogen: Predictors of Coagulase Negative Staphylococcal Bacteremia in the NICU**

Kathleen A. Gibbs, Betsy C. Herold, Robert S. Green.

*Pediatriics, Mount Sinai School of Medicine, New York, NY; Pediatrics, Albert Einstein College of Medicine, Bronx, NY.*

**BACKGROUND:** Coagulase-negative staphylococci (CoNS) are the most frequent cause of neonatal infections. However, the role of CoNS in neonates is not well understood. The role of CoNS in the pathogenesis of chorioamnionitis is unknown.

**OBJECTIVE:** To determine the effect of CoNS on the short-term levels of TLR4, MyD88, Interleukin-1 Receptor Associated Kinase (IRAK) and lymphocyte subsets CD3, CD4, CD8, CD14 & CD45 in the lungs after gram-negative infection.

**DESIGN/METHODS:** 4 litters of time-pregnant Sprague-Dawley rat pups were exposed 10 ug of intranasal lipopolysaccharide (LPS) or saline control after birth. 24hrs later, a litter was exposed to 6 hours of 100% hyperoxia or control. Immediately after hyperoxia, lungs were harvested and immuno-histochemistry was performed on frozen sections to assay for levels of TLR4, MyD88, IRAK, CD3, CD4, CD8, CD14 & CD45.

**RESULTS:** TLR4 levels decreased with LPS administration but increased with hyperoxia & in combination resulted in no difference compared to control levels.MyD88 levels were reduced with LPS alone, hyperoxia alone and in combination, compared to control. IRAK levels were increased with LPS exposure, but were unaffected by hyperoxia and in combination, did not differ from control levels.CD4 & CD14 levels were reduced in all study groups. CD45 levels were increased with LPS exposure, but unaffected by hyperoxia and in combination, did not differ from control. LPS reduced levels of CD3 in the lung, and remained low despite hyperoxia. CoNS exposure decreased IRAK & CD4, and increased CD14 & CD45. This was not statistically significant. The effect of CoNS alone or in combination with hyperoxia was not statistically significant.

**CONCLUSIONS:** The effect of CoNS on the short-term levels of TLR4, MyD88, Interleukin-1 Receptor Associated Kinase (IRAK) and lymphocyte subsets CD3, CD4, CD8, CD14 & CD45 is unknown. Further study is needed to determine the role of CoNS in the pathogenesis of chorioamnionitis.

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**Short-Term Hyperoxia Alters Lung Levels of T-Lymphocytes in Newborn Gram-Negative-Infected Sprague-Dawley Rat Pups**

Simran Buttar, Shetal Shah, Avinash Chander.

*Stony Brook University School of Medicine, Stony Brook, NY.*

**BACKGROUND:** Hyperoxia causes oxidative stress & inflammation, leading to simplified alveolarization & disrupted vascularization, resulting in progression toward chronic lung disease. Gram-negative infection similarly increases inflammation, leading to fibrosis and remodeling. Recognition of gram-negative infection in the lung is mediated by the CD14-Toll-Like Receptor 4 (TLR4) complex, which not only causes CD4 lymphocyte activation via secondary messengers MyD88 and IRAK, but also affects the immune response via cytokines and cytokine receptors. In this study, we aimed to determine the effect of TLR4, MyD88, Interleukin-1 Receptor Associated Kinase (IRAK) and lymphocyte subsets CD3, CD4, CD8, CD14 & CD45 in the lungs after gram-negative infection.

**OBJECTIVE:** To determine the effect of hyperoxia on the short-term levels of TLR4, MyD88, Interleukin-1 Receptor Associated Kinase (IRAK) and lymphocyte subsets CD3, CD4, CD8, CD14 & CD45 in the lungs after gram-negative infection.

**DESIGN/METHODS:** 4 litters of time-pregnant Sprague-Dawley rat pups were exposed to 10 ug of intranasal lipopolysaccharide (LPS) or saline control after birth. 24hrs later, a litter was exposed to 6 hours of 100% hyperoxia or control. Immediately after hyperoxia, lungs were harvested and immuno-histochemistry was performed on frozen sections to assay for levels of TLR4, MyD88, IRAK, CD3, CD4, CD8, CD14 & CD45.

**RESULTS:** TLR4 levels decreased with LPS administration but increased with hyperoxia & in combination resulted in no difference compared to control levels.MyD88 levels were reduced with LPS alone, hyperoxia alone and in combination, compared to control. IRAK levels were increased with LPS exposure, but were unaffected by hyperoxia and in combination, did not differ from control levels.CD4 & CD14 levels were reduced in all study groups. CD45 levels were increased with LPS exposure, but unaffected by hyperoxia and in combination, did not differ from control. LPS reduced levels of CD3 in the lung, and remained low despite hyperoxia. CoNS exposure decreased IRAK & CD4, and increased CD14 & CD45. This was not statistically significant. The effect of CoNS alone or in combination with hyperoxia was not statistically significant.

**CONCLUSIONS:** The effect of CoNS on the short-term levels of TLR4, MyD88, Interleukin-1 Receptor Associated Kinase (IRAK) and lymphocyte subsets CD3, CD4, CD8, CD14 & CD45 is unknown. Further study is needed to determine the role of CoNS in the pathogenesis of chorioamnionitis.

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**Short-Term Hyperoxia Alters Lung Levels of T-Lymphocytes in Newborn Gram-Negative-Infected Sprague-Dawley Rat Pups**

Simran Buttar, Shetal Shah, Avinash Chander.

*Stony Brook University School of Medicine, Stony Brook, NY.*

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**CONCLUSIONS:** The effect of CoNS on the short-term levels of TLR4, MyD88, Interleukin-1 Receptor Associated Kinase (IRAK) and lymphocyte subsets CD3, CD4, CD8, CD14 & CD45 is unknown. Further study is needed to determine the role of CoNS in the pathogenesis of chorioamnionitis.
RESULTS: TNF-a levels were increased with both Hyperoxia & LPS exposure compared to the Room Air, Room Air plus Saline & Hyperoxia plus Saline groups (p<0.001). IL-8 levels were increased in the Hyperoxia plus LPS group compared to other study groups (p<0.001). Levels of IL-1B & IL-10 were increased in the Hyperoxia plus LPS group compared to the Room Air plus Saline group (p<0.05) [36x78]. IL-6 levels increased in the Hyperoxia plus Saline group vs. the Room Air plus Saline group (p=0.05) & the Hyperoxia plus LPS group vs. the Room Air plus LPS group (p<0.001). Levels of IL-2 were increased in the Room Air plus LPS & Hyperoxia plus LPS group compared to their respective controls (p=0.01) [36x103].

CONCLUSIONS: In the LPS-primed newborn rat, birth hyperoxia results in synergistic increases in TNF-a, IL-1B & IL-8 levels. IL-6 increases in the presence of hyperoxia are more sensitive to hyperoxia than LPS exposure, while IL-2 & IL-10 levels respond greater to gram-negative infection than hyperoxia.

203 Clinical Characteristics, Demographics and Outcomes of Neonates with Fetomaternal Hemorrhage, 1993-2008

Annamaria Stroouhas, Leonard Ticianelli
Division of Newborn Medicine, Kravis Children’s Hospital, Mount Sinai Medical Center, New York, NY; Department of Pediatrics, Kravis Children’s Hospital, Mount Sinai Medical Center, New York, NY; Department of Preventive Medicine, Mount Sinai Medical Center, New York, NY; Mount Sinai School of Medicine, New York, NY.

BACKGROUND: Fetomaternal hemorrhage (FMH) occurs when the placenta fails and fetal blood flows into the maternal circulation. Life-long disability is common in fetuses who survive the severe anemia that can result. Despite the potential severity of this disease, no comprehensive epidemiologic studies of the condition exist.

OBJECTIVE: To determine 1) clinical characteristics, 2) socioeconomic demographics, and 3) common clinical outcomes of neonates with FMH over the past 15 years.

DESIGN/METHODS: We analyzed a multiyear dataset concatenated from the 1993-2008 Nationwide Inpatient Sample. Data were analyzed using a statistical representative sample of hospital care in the United States. Among peripartum mother and baby hospitalizations, patients diagnosed with FMH were identified via the ICD-9 codes 762.3 (placental transfusion syndromes) and 772.0 (fetal hemorrhage into mother). Twin pregnancies were removed from the analysis to avoid confusion with twin-twin transfusion syndrome. Frequencies, univariate, and multivariable regression analyses were used to identify clinical characteristics and sociodemographic factors of the patient population with FMH and associated clinical outcome diagnoses of interest. Trends in diagnosis incidence were calculated based on weighted frequencies.

RESULTS: Fetomaternal hemorrhage was identified in 0.02% of non-twin births. Patients with FMH required mechanical ventilation with 26.3% receiving mechanical ventilation, 22.4% receiving blood product transfusion, and 27.8% undergoing central line placement. On multivariable analysis, preterm delivery (OR 11.97, p<0.0001) was the most significant clinical characteristic of neonates with FMH. Important racial and socioeconomic differences were identified. Increasing patient income was associated with increased likelihood of FMH diagnosis (OR 1.19-1.21, p<0.01-0.001), and patients were more likely to be diagnosed than blacks (OR 1.60, p<0.001), Hispanics (OR 1.90, p<0.001), or Asians (OR 1.56, p<0.004). The diagnosis was more commonly made at teaching than community hospitals (OR 1.27, p<0.006).

CONCLUSIONS: Fetomaternal hemorrhage, as identified in this large, nationally representative dataset, causes significant morbidity and mortality. Further study is needed to distinguish between diagnostic coding bias and true epidemiology of the disease. This is the first report of socioeconomic and racial/ethnic disparities in FMH, which may represent disparities in detection of disease that require national attention.

204 Protein Binding at 5’UTR mRNA in Surfactant Protein A Splice Variants

Faiyaz N. Bhatti, Patricia Silveira, Joanna Flores
The Center for Host Defence, Inflammation and Lung Disease (CHILD Research), Department of Pediatrics, The Pennsylvania State University College of Medicine, Hershey, PA; Department of Obstetrics and Gynecology, The Pennsylvania State University College of Medicine, Hershey, PA.

BACKGROUND: Surfactant protein A (SP-A) is one of the immune regulatory proteins for the lung. SP-A dysfunction may be related to quantitative or qualitative defects. SP-A 5’ UTR mRNA is transcribed from four different exons (A, B, C, D). Prior studies identified exon B as an important contributor to SP-A translation and as such exon B may reflect a site for protein-RNA binding via electron mobility shift assay (EMSA) run on 6% acrylamide gels. The gels were exposed to x-ray films.

RESULTS: Purity of cell lysates fractions was shown by western blot for cell fraction specific antibodies that bind to Exon B and 5’UTR mRNA of common -acting factors that bind to Exon B and 5’UTR mRNA of common splice variants of four different exons (A, B, C, and D). Prior studies identified Exon B as an important contributor to SP-A translation and as such Exon B may reflect a site for protein-RNA binding via electron mobility shift assay (EMSA) run on 6% acrylamide gels. The gels were exposed to x-ray films.

CONCLUSIONS: Overexpression of EC-SOD preserves phagocytosis function of alveolar macrophages in neonatal mice after exposure to hyperoxia.

205 Fellow in Training

Risk Factors for Surgical Necrotizing Enterocolitis in VLBW Infants Admitted to a Tertiary Care Neonatal Unit

Division of Newborn Medicine, Penn State Children’s Hospital, Hershey, PA; Department of Public Health Sciences, Penn State College of Medicine, Hershey, PA.

BACKGROUND: Necrotizing enterocolitis (NEC) is a serious illness in premature babies. Causal factors include ischemia injury including infection, inherent weakness in the neonatal immune system, alterations in mesenteric blood flow and milk feeding. Surgical intervention is required in 27% to 63% of confirmed cases. The risk factors predisposing to surgical intervention have not been well defined.

OBJECTIVE: To determine which risk factors predict the greatest risk of need for surgical intervention in NEC.

DESIGN/METHODS: The primary outcome was need for surgical intervention. All babies with a birth weight of less than 1500 grams admitted to the Penn State Hershey Children’s Hospital NICU who developed necrotizing enterocolitis (N=57) between 2005-2009 were included. Risk factors analyzed were birth weight, sex, gestational age, breast milk or formula feeds prior to development of NEC, ventilation and oxygen requirements, presence of a patent ductus arteriosus (PDA), treatment of PDA with indomethacin or surgical ligation, and the use of caffeine and steroids. Demographic variables were analyzed by frequency distributions and chi-square testing. Logistic regression was used to evaluate risk factors. A p-value <0.05 was considered significant.

RESULTS: A total of 457 eligible babies were admitted to the NICU during the study time period. Incidence of NEC was significantly different within inborns (10.6%) vs. outborns (18%) p-value<0.001. Similarly among patients with NEC, need for surgical intervention was also significantly different (inborns 5.4% vs. outborns 16.8%, p-value<0.001). Baseline characteristics of the outcome groups were similar. Presence of a PDA was associated with an increased risk of surgery [OR 10.119 (CI 2.892-35.466, p-value 0.0004)]. Similarly treatment of PDA with indomethacin was associated with an increased risk for surgery [OR 3.9 (CI 1.182-13.113, p-value 0.0256)]. Treatment of PDA with surgical ligation was also associated with an increased risk [OR 6.052 (CI 1.180-31.048, p-value 0.0309, adj. p-value 0.0325)]. When analyzed for early vs. late ligation of PDA, there was no statistical difference seen.

CONCLUSIONS: Risk for surgical treatment in NEC is increased with the co-morbidity of a PDA. This risk remains regardless of medical or surgical intervention. This needs to be evaluated with a larger prospective study to establish a potential causal relationship.

206 Fellow in Training

Overexpression of Extracellular Superoxide Dismutase (EC-SOD) Preserves Macrophage Function in Neonatal Mice Exposed to Hyperoxia

Kanchan Mishra, Champa Codipilly, Lin Mantell, Mohamed Ahmed.
Pediatrics/neonatology, Cohen Children’s Medical Center of New York, New York, NY.

BACKGROUND: Oxidant injury and infection with released cytokines, are major contributors to chronic lung disease in premature infants. Deficient antioxidant systems, especially (EC-SOD), are implicated in this injury. Exposure to reactive oxygen species may result in macrophage damage that reduces their phagocytosis function.

OBJECTIVE: 1. To demonstrate that hyperoxia impairs phagocytosis in alveolar macrophages. 2. To demonstrate that TG mice (with an extra copy of hEC-SOD gene) have preserved macrophage phagocytosis when exposed to hyperoxia as compared to WT mice.

DESIGN/METHODS: TG and WT mice were exposed to hyperoxia (95% oxygen x 7 d) or room air (RA). Macrophages were harvested from bronchoalveolar lavage samples on day 8 and cultured. To assess phagocytosis function macrophages were incubated with labeled latex beads and evaluated using an immunofluorescent microscope. To assess killing capacity, macrophages were incubated with Pseudomonas aeruginosa and assessed by counting colony forming unit (CFU/ml).

RESULTS: There was marked inhibition of phagocytosis (by immunofluorescence) during hyperoxia in WT mouse cells but not in TG or room air exposed mice.

CONCLUSIONS: Overexpression of EC-SOD preserves phagocytosis function of alveolar macrophages in neonatal mice after exposure to hyperoxia.

93
Morbidity and NICU Admissions among Early Term (37-38 wk) and Term (39-41 wk) Neonates in Erie County (NY)

Shayan Sengupta, Alyssa Hermann, Priya Singhal, James Shelton, Vivien Carrion, Ralph Wynn, Rita M. Ryan, Kamal Singh, Satyan Lakshminrusimha.

University at Buffalo, Buffalo, NY; Sisters of Charity Hospital, Buffalo, NY; Department of Gynecology-Obstetrics, State University at Buffalo, Buffalo, NY.

BACKGROUND: Full term neonates are perceived as a homogenous, low risk population. The difference in morbidity by gestational age (GA) among term neonates is not known.

OBJECTIVE: We hypothesize that amongst full term neonates, early term neonates (37-38 6/7wk GA) would have significantly increased rates of NICU admission and morbidity compared to term neonates (39-41 6/7wk).

DESIGN/METHODS: We obtained data from the birth registry regarding all live births and NICU admissions among full term neonates born in Erie County (NY) between Jan 1, 2006 & Dec 31, 2008. The medical records of all early and term neonates admitted to NICUs within the county in 2007 were reviewed to determine the incidence of respiratory morbidity, antibiotic use, and need for IV fluids.

RESULTS: Of the 33,488 live births in Erie County over the 3 year period, 27% were early term births.

<table>
<thead>
<tr>
<th>NICU Admission in Erie County (2006-2008)</th>
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<tr>
<td>Early Term (37-38 6/7 wks)</td>
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<td>Year</td>
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<td>Total 2006-2008</td>
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More than 10% of early term neonates were admitted to the NICU. In 2007, the incidence of NICU admission, respiratory morbidity, need for respiratory support and/or intubation, and need for IV fluids as well as requirement for antibiotics was significantly higher in the early term babies compared with term births.

CONCLUSIONS: We conclude that the early term neonates are at significantly increased risk for morbidity in the immediate neonatal period. Even a modest increase in the morbidity in the early term group adds a significant health burden because of the large number of births at this GA.

Increased Methemoglobin (MHB) Levels Predict Response to Inhaled Nitric Oxide (iNO) in Persistent Pulmonary Hypertension of the Newborn (PPHN)

Rita Dadiz, Jayasree Nair, Linda Reubens, Carl T. D’Angio, Rita M. Ryan, Satyan Lakshminrusimha.

Pediatrics, University of Rochester Medical Center, Rochester, NY; Pediatrics, Women & Children’s Hospital at Buffalo, Buffalo, NY.

BACKGROUND: About 1/3 of infants with PPHN do not respond to iNO delivered. Response to iNO depends on success of delivery to pulmonary vessels. Since methemoglobin (MHB) is formed when iNO reacts with hemoglobin in red blood cells of pulmonary vessels, increases in MHB may indicate iNO delivery and predict response. A retrospective analysis showed a higher MHB/iNO exposure ratio among infants who respond to iNO compared to non-responders.

OBJECTIVE: To determine whether infants with PPHN who respond to iNO (increase in PaO2/FiO2 ratio ≥20 mmHg) have a greater increase in MHB after starting iNO, as compared with non-responders (≥20 mmHg increase).

DESIGN/METHODS: In this two-center, prospective study, data (including ventilator support and arterial blood gases in the first 8h after starting iNO) were collected on 18 infants with PPHN requiring iNO at ≤1 wk of age. PaO2, PaCO2, and oxygenation indices (OI) were calculated. MHB levels were analyzed before and after starting iNO. Data were analyzed by Fisher’s exact or t test.

RESULTS: Of 18 infants, 12 were responders and 6 were non-responders to iNO (Table). In contrast to non-responders, responders showed significant improvements in their mean PaO2, PaCO2, and OI. Improved oxygenation was associated with a significant increase in the mean MHB level.

CONCLUSIONS: Improved oxygenation with iNO is associated with increased MHB levels. Successful iNO delivery to pulmonary vessels may be an important determinant of response. We speculate that optimal alveolar recruitment before starting iNO may be critical in PPHN associated with lung disease.

Medical Student

The Role of Manganese Superoxide Dismutase Dismutase in the Pathogenesis of Neonatal Lung Disease and Other Newborn Ailments


Pediatrics, New York Medical College, Valhalla, NY; Division of Newborn Medicine, Maria Fareri Children’s Hospital at Westchester Medical Center, Valhalla, NY.

BACKGROUND: The development of neonatal lung disease is a multi-factorial clinical condition that involves inflammation, mechanical trauma, genetic factors and oxidative stress. We examined how a specific antioxidant enzyme, MnSOD, affects both the development and severity of BPD. MnSOD is encoded by genomic DNA but functions in the mitochondria, where it converts superoxide anion to hydrogen peroxide. We investigated 2 SNPs in the MnSOD gene. The first SNP is rs4880, which is believed to affect how the enzyme is transported into the mitochondria. The second, rs2758330, is an intronic SNP, whose function is unknown.

OBJECTIVE: We hypothesize that certain genotypes for MnSOD SNPs affect the development and severity of BPD in neonates.

DESIGN/METHODS: DNA was isolated from buccal mucosal swabs (N=193). Infants were enrolled if they weighed <1 kg at birth and had no congenital or chromosomal abnormalities. Real-time PCR discriminated alleles for the rs4880 SNP. BPD severity was classified by the criteria of Jobe and Bancalari.

RESULTS: The rs4880 SNP shows association with both the presence and severity of BPD, especially in Caucasian subjects. Caucasian subjects with at least one C allele were more likely to have BPD (P=0.018), and if they do have BPD then it was more severe (P=0.001). Caucasian subjects with the CC genotype were also more likely to have chorionicamnionitis (P=0.006). There were no similar correlations for nonwhite subjects. The presence and severity of BPD of SNP rs4880 approached significance (P=0.055), when comparing the presence of any C allele to TT.

Subjects with the CC/CT genotype tended to have more severe BPD (P=0.066). Subjects with the CC genotype required surfactant treatment more (P=0.05), while those with CC/CT genotypes received significantly more surfactant doses (P=0.038).

CONCLUSIONS: The rs4880 SNP for MnSOD is associated with the presence and severity of BPD in EL-BW white infants. Our data is significant for the wild-type allele, not the mutant allele. The second, rs2758330, is an intronic SNP, whose function is unknown.

Increased oxidative stress via a yet unknown mechanism. We argue that the racial difference in sensitivity to rs4880 is likely due to other SNPs, that are either protective or promotive.

Fellow in Training

Omegaven™ (O) a Novel Omega-3 Fatty Acid Emulsion

Reverses Parenteral Nutrition Associated Cholestasis (PNAC) in Infants Requiring Prolonged PN without Side Effects

Michael M. ESPiritu, Jeffrey M. Perlman.

Department of Pediatrics, Weill Cornell Medical College, New York, NY.

BACKGROUND: PNAC (Direct Bilirubin (DB) > 2mg/dl) is an important clinical problem with reported incidence of between 40 – 60%. Risk factors include ¯ GA and BW, delay in feedings and/or lipids based on triglyceride levels to determine whether PNAC can be reversed without side effects i.e. bleeding.

OBJECTIVE: We evaluated O (Fransen Kabi) in a Phase 1 study (IND # 102802) in infants with PNAC who had failed strategies to limit liver dysfunction including trophic feedings (TF), cycling PN, and limiting lipids based on triglyceride levels to determine whether PNAC can be reversed (DB <2mg/dl) as well as improvement in liver synthetic and secretory function and without side effects i.e. bleeding.
RESULTS: The diagnoses were NEC (n=4), gastroesphagitis (n=1). O3 was started on DOL 72±32 (range 40-126d) and has been continued for > yr (n=2), 6m (n=1), 48 d (n=1), 36 d (n=1). The PNAC resolved within 1 week after initiation with normalization of DB and liver enzymes in all cases despite the continued requirement for PN (see table). No side effects attributed to Omegaven were identified.

CONCLUSIONS: In this single center Phase I clinical trial, O3 was successfully in slowly reversing PNAC as reflected by normalization of DB levels and hepatic enzymes in all 5 patients treated. Given the anti-inflammatory properties of O3 these preliminary findings suggest the value of a randomized study comparing it to soy IL.

211 Medical Student

Lipopolysaccharide and Hyperoxia Effects on Alveolar Development and Surfactant Protein B in Newborn Rats

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Neonatology, Stony Brook University School of Medicine, Stony Brook, NY.

BACKGROUND: Hyperoxia and bacterial infection are serious concerns in the NICU; as associated lung injury can have persistent long-term effects on lung development. Newborns with bacterial sepsis and respiratory distress would require oxygen therapy, but can suffer from resulting lung injury and infection related lung inflammation and elevated cytokines. Although hyperoxia, bacterial sepsis, and/or hyperoxia and bacterial infection have been extensively reported, limited studies have reported their combined effects in the newborn lung.

OBJECTIVE: Since lungs continue to develop and differentiate in the early post-natal life, we aimed to determine if supplemental oxygen in the newborns with bacterial infection would exacerbate the lung injury and be reflected in alveolar differentiation.

DESIGN/METHODS: Newborn rats at 2 days of post-natal life (PN2) received intra-nasal saline or 10mg/ml lipopolysaccharide (LPS), the principal virulence factor in gram negative bacteria. Twenty four hours later, some animals were treated for 48hrs with 100% O2, while others remained in room air. At the end of the exposure, all rats were sacrificed and the lungs harvested. Immuno-staining for ABCA3 (exclusive to type II cells) and eNaC (predominantly in type I cells) were performed for evaluating alveolar development. A total of 11-20 fields were evaluated for eNaC and ABCA3. Western blots were performed for lung surfactant protein B (SP-B) and for myeloperoxidase (MPO), a marker for neutrophils.

RESULTS: LPS with or without hyperoxia caused modest increase in MPO levels in the lungs. Objects staining for ABCA3 were normalized to the number of nuclei. The ABCA3 positive objects were 38% in the Controls (saline with room air), 43% in the LPS with room air, 30% in the hyperoxia group and 42% in the LPS plus hyperoxia group. In comparison to controls, hyperoxia increased the levels of mature SP-B, but not of proSP-B. Hyperoxia exposure in LPS-treated animals, however, caused an increase in proSP-B, but not in the mature SP-B. Thus, the LPS effect on type II cell number did not alter with superimposition of hyperoxia. Similarly, hyperoxia did not affect the LPS-mediated decrease in type I cells as determined by eNaC staining.

CONCLUSIONS: Both hyperoxia and LPS, alone or together, do not acutely affect the cellular composition of alveolar epithelium. However, these insults, alone or in combination, cause acute changes in post-translational processing of surfactant proteins.

212 House Officer

Selective Fluconazole Prophylaxis for Very Low Birth Weight (VLBW) Infants Colonized with Candida

M. Roger Kim, Praveen Chandrasekharan, Mummun Rawat, Dominique Jean-Baptiste, Myron Sokol,
Pediatrics, Brookdale University Hospital and Medical Center, Brooklyn, NY.

BACKGROUND: The effectiveness of Fluconazole prophylaxis in very low birth weight (VLBW) infants has studies including our study in 2004-2006. We report the updated analysis of the study.

OBJECTIVE: To reduce the morbidity and mortality of VLBW infants by Fluconazole prophylaxis.

DESIGN/METHODS: During 07/2004 to 12/2008 surveillance/cultures were performed for fungal colonization in all infants weighing less than 1500g at birth and weekly thereafter. Prophylactic Fluconazole was instituted at a dose of 3mg/kg every 48 hrs in colonized infants for 6 weeks or when weight reached 1500g. Fungal blood cultures were taken if the infant showed signs of sepsis. Deaths in L&D or less than 4 days of life were excluded. We compared a pre-fluconazole period (1/2005-4/04) with the intervention period (7/2004-12/08). Fluconazole prophylaxis given to the VLBW infants colonized with Candida.

RESULTS: During the intervention period the incidence of invasive Candidiasis significantly decreased from 12.9% to 5.8% (p<0.035).

CONCLUSIONS: An intense fungal surveillance with Fluconazole prophylaxis has reduced the risk of candida sepsis in VLBW infants. Multicenter randomized trial for further defining criteria for prophylaxis is needed.
OBJECTIVE: To assess how FCRs in practice embody the theory of family centered care.

BACKGROUND: Family centered rounds (FCRs) are a means to incorporate family centered care. Prior research has focused on the development of FCRs theory and practice. Further in-depth perspectives from families who participate in FCRs may help to clarify these evaluations.

DESIGN/METHODS: Retrospective administrative-data study with admission-discharge-transfer (ADT) data for inpatient admissions for July 1, 2007 to June 30, 2008. Data included date/time of all arrivals and departures from inpatient units, as entered by unit clerks into electronic ADT system. Peak daily census was extracted for each day using a SAS macro. Using timestamps, LOS was calculated; theoretical LOS values were created by reducing it by absolute hours and relative % amount. For hypothetical reductions, limits were placed, so that patients could not be discharged after 11 PM or before 7 AM. The macro was run again using hypothetical discharge times to generate daily peak census figures.

RESULTS: 22,310 patients were admitted with median LOS of 2.3 days. Mean peak census was 375 and reductions of 8 hours in LOS resulted in a mean decrease of census by 4 patients (1.1%) and maximum reduction of 10 patients (2.2%) (Table 1).

CONCLUSIONS: Realistic earlier discharge times have a minimal impact on census, particularly at time of day when beds would be most in need: daily peak. While % reductions in LOS have a larger impact, those findings must be interpreted with caution, as reductions of that size may not be realistic. While optimizing discharge is an important part of patient flow, its limitations should be recognized and it may raise risk for other negative outcomes. Steps to improve LOS, such as reducing specific outcomes, days missed from school/work, duration of respiratory illness, and length of hospital stay may improve patient flow and provide some additional bed capacity, but other strategies may be required to substantially increase functional capacity.
Communication between Families and Physicians: A Comparison Study of Family Centered Rounds

Amrapali Subramony, Talia Schwartz, Szeigen Waitokiz, Patricia Hametz
Department of Pediatrics, Columbia University College of Physicians & Surgeons, New York, NY; Mailman School of Public Health, Columbia University, New York, NY; Duke University, Durham, NC.

BACKGROUND: Family centered rounds (FCRs) are increasingly becoming the predominant way rounds are conducted in pediatric hospitals. Although most studies show family satisfaction, there are no outcome measures showing effectiveness.

OBJECTIVE: To compare family knowledge of discharge plans between teams that conduct FCR and teams that do not conduct FCR.

DESIGN/METHODS: Families of patients on pediatric medicine services, including FCR patients whose attendings conduct FCR and non-FCR patients whose attendings do not conduct FCR, at an urban academic tertiary care hospital were approached to complete a survey assessing knowledge of discharge plans. A research assistant blinded to patient type approached families identified as being within 24 hours of discharge to complete a self-administered written survey in English/Spanish.

Family knowledge of discharge date, discharge medications and discharge criteria were compared to the medical chart. Demographic differences between groups were compared using chi-square and t-test; multivariable regression was used to assess for differences in survey responses between groups.

RESULTS: Of the families approached, 75% (n=167) completed the survey, with 118 FCR patients and 49 non-FCR patients. There were no significant differences between FCR and non-FCR families in language, respondent (mother/other), gender and insurance. Patients in the FCR group had a shorter length of stay, were younger aged and were more likely to be White-Hispanic and Black compared to the non-FCR group. Controlling for patient age, length of stay and race/ethnicity, significantly more FCR families reported being knowledgeable about discharge criteria compared to non-FCR families (AOR 2.14; 95% CI 1.11,4.14). There was no significant difference between FCR families’ and non-FCR families’ answers to when they were being discharged. Controlling for patient age, length of stay, race and number of discharge medications, there was no difference between FCR and non-FCR groups on whether families knew which medications they were being discharged on.

CONCLUSIONS: Patients’ families on pediatric teams that routinely conduct FCRs are more likely to know what discharge criteria are for their children compared to those on teams that do not routinely conduct FCRs. FCRs may improve communication between the medical team and families and hasten timely discharge.

Practice Differences of Hospitalists vs Non-Hospitalists in Bronchiolitis: A Multi-Center Study

Russell McCulloh, Sarah Smitherman, Solomon Adelsky, Morgan Congdon, Jamie Librizzi, Kristin Kohrn, Brian Alverson.

Pediatrics, Rhode Island Hospital, Providence, RI; Child Health, University of Missouri Healthcare, Columbia, MO; Brown Medical School, Providence, RI.

BACKGROUND: Hospitalist management of bronchiolitis does not affect length of stay or readmission rates. Physicians routinely discontinue unneeded racemic epinephrine but insufficiently stop albuterol when proven ineffective. Hospitalists stop systemic corticosteroid therapy and antibiotic therapy when no indication exists more frequently than non-hospitalists. These data suggest hospitalists better adhere to bronchiolitis guidelines and so provide higher quality of care.

CONCLUSIONS: Hospitalist management of bronchiolitis does not affect length of stay or readmission rates. Physicians routinely discontinue unneeded racemic epinephrine but insufficiently stop albuterol when proven ineffective. Hospitalists stop systemic corticosteroid therapy and antibiotic therapy when no indication exists more frequently than non-hospitalists. These data suggest hospitalists better adhere to bronchiolitis guidelines and so provide higher quality of care.
Emergency Medicine Platform Session

Sunday, March 27, 2011
9:45 AM-12:00 PM

223
9:45 AM
House Officer

Fever: What Is an Effective Way of Educating Parents?

Pediatrics, Flushing Hospital Medical Center, Flushing, NY; Graduate School of Psychology and Health Science, Touro College, NYC, NY.

BACKGROUND: Fever in children is common and lack of parental knowledge about it can be problematic, resulting in often unnecessary visits to the emergency department (ED). Educating parents regarding fever is an effective way to increase their knowledge and decrease their frequency of seeking medical advice.

OBJECTIVE: To examine the effectiveness of verbal versus written information about fever and its management as a means of educating parents.

DESIGN/METHODS: This was a prospective study. A sample of convenience comprising parents of children over 3 months old seen in the ED at Flushing Hospital Medical Center (FHMC) without a life-threatening illness from August to November 2010 was considered for the study. Inclusion criteria were the ability to understand both written and oral instructions in English or Spanish. Signed consent was obtained, and demographic data about the age of the child and the level of education and native language of the parent were recorded. A 14 item questionnaire was administered to the parent to assess their knowledge (K) and practices (P) about fever. Parents were then divided into two groups: group 1 (G1) parents were given a brochure regarding fever, and group 2 (G2) parents were told the content of said brochure without being given one. Parents were then called 1-2 weeks later and re-asked the same questions. Pre-test and post-test scores were compared for G1 and G2. Data on the frequency of correct answers were collected, and means and standard deviations (SD) were calculated. Comparisons between the two groups were done by t-test, with confidence interval of 95% and p values of <0.05 considered significant.

RESULTS: Of 100 subjects enrolled, 98 completed the study, 48 in G1 and 50 in G2. The demographics of these groups were similar, and their pre-test scores were not significantly different (p value >0.05). No significant post-test improvement was found for G1 (p value >0.05), but there was significant improvement for G2 (mean = 7.74 ± SD 2.16 pre-test vs mean = 8.6 ± SD 2.29 post-test, p = 0.008). Neither level of education nor language spoken had contributed (p value >0.05).

CONCLUSIONS: Giving verbal information about fever and its management was found to be a more effective method than providing written information for educating parents. Further study is needed to determine whether such educational efforts would change the frequency of seeking medical advice.

224
10:00 AM
Undergraduate Student

Multiple Critically Ill Children in the Pediatric Emergency Department Impacts Quality of Care as Indicated by Prolonged Length of Stay
Alexandra E. Remus, Sharon Smith, Christopher Carroll, Adam M. Silverman.

University of Connecticut, Storrs, CT; Emergency Medicine, Connecticut Children’s Medical Center, Hartford, CT; Critical Care, Connecticut Children’s Medical Center, Hartford, CT.

BACKGROUND: Critically ill children in the PED (Pediatric Emergency Department) require significant resources. We theorize that when more than one critically ill child presents to the PED, quality of care represented by length of stay (LOS) is prolonged for the non-critically ill children exposed to this potentially resource-depleting situation.

OBJECTIVE: To determine if multiple critically ill children in the PED prolongs LOS for non-critically ill children.

DESIGN/METHODS: During calendar year 2009, we identified all times in which there was overlap in the care of critically ill children in the PED. Critical illness was defined as admission to a pediatric intensive care unit. We defined the study group as those children exposed to >1 critically ill child and matched these children to controls seen in the PED without a critically ill child. Demographics, confounding variables, and outcomes were compared between study patients and controls.

RESULTS: There were 36 periods in which multiple critically ill children were seen in the PED. During these periods, there were 1573 non-critically ill children also seen. These were compared to 1694 controls. Children in both the control and study population were similarly classified as patients and controls.

CONCLUSIONS: During time periods when multiple critically ill children are present in the PED, LOS was increased for children with low risk diagnoses and low acuity triage levels. During such times, high resource utilization and a need for critical care resources are anticipated. Having a specific team or area of the PED set aside for these low acuity patients could help maintain flow through the PED, improving quality of care.

225
10:15 AM
House Officer

Draining Ears and Tympanostomy Tubes: A Survey of Pediatric Otolaryngologists and Pediatric Emergency Medicine Physicians

Department of Pediatrics, Inova Fairfax Hospital For Children, Falls Church, VA; Advanced Pediatrics, Vienna, VA; Department of Pediatric Otolaryngology, University of Texas Southwestern Medical Center, Dallas, TX.

BACKGROUND: Post-tympanostomy tube otitis (AOMT) occurs in 30% of children with tympanostomy tubes. Although the management of acute otitis through tympanostomy tubes has become fairly standardized among pediatric otolaryngologists (PENTs), physicians specializing in pediatric emergency medicine (PEMs) have few guidelines to use for management of this condition. Use of evidence-based guidelines can maximize the use of topical antibiotics to the middle ear mucosa and reduce unnecessary use of oral antibiotics.

OBJECTIVE: The purpose of this survey is to compare management of AOMT by PENTs, who have recommendations published by the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS), with PEMs, who do not have such guidelines.

DESIGN/METHODS: A 27-question online survey was formulated for the purpose of obtaining information on the care of children who present with AOMT. An initial e-mail was sent out to consecutive PENT and PEM physicians nationwide who were listed in membership directories of their respective subspecialty organizations. During the following 2 months, three reminder e-mails were sent to those who did not respond. A print copy of the survey, along with a self-addressed/ stamped envelope, was mailed to all non-responders. Our goal was to receive 150 evaluable surveys from each group.

RESULTS: One hundred eighty-three and 174 responses were received from PEM and PENT physicians, respectively (66% of each group). Twenty-eight percent of the PEM, versus 80% of PENT, respondents routinely cleaned the ear canal prior to starting ototopical antibiotic drops (p < 0.001), and 7% and 79%, respectively, used suction for aural cleaning (p < 0.001). Oral antibiotics were prescribed by 54% of PEMs versus 9% of PENTS (p<0.001). Eighty-six percent of PEM and 99% of PENT respondents prescribed ototopical antibiotics, preferably fluoroquinolone/steroid ear drops (p<0.001).

CONCLUSIONS: This study on AOMT management highlights an opportunity for PEMs to reduce the use of oral (systemic) antibiotics and, thereby, decrease the threat of antibacterial resistance. Ototopical fluoroquinolone/steroid drops should be first-line treatment; they are non-ototoxic compared to aminoglycosides and have a high cure rate without significant systemic absorption. To improve the efficacy of ototopical therapy, cleaning the ear canal with aural suction and not dry mopping of the ear should be practiced by PEMs.

226
10:30 AM
Fellow in Training

Does the IVC Diameter Correlate with Central Venous Pressure (CVP) in the Assessment of Intravascular Volume in Children? 
Lorraine Ng, Benjamin Taragin, Jeffrey Avner, Michael Ushay, Denise Nunez.

Pediatric Emergency Department, Children’s Hospital at Montefiore/Albert Einstein College of Medicine, Bronx, NY; Pediatric Critical Care, Children’s Hospital at Montefiore, Bronx, NY; Pediatric Radiology, Children’s Hospital at Montefiore, Bronx, NY.

BACKGROUND: Clinical parameters of hydration status are not always reliable, and while invasive hemodynamic monitoring of central venous pressure (CVP) is a reliable, objective guide in directing early resuscitative efforts in acute ill children, it has practical limitations in the pediatric emergency department (PED) setting. Bedside emergency ultrasound (BEU) may provide a rapid, painless, non-invasive and objective modality to determine a patient’s volume status. Collapsibility index (CI) of the inferior vena cava (IVC) of <0.8 and an IVC/Aorta ratio of <0.8 by BEU have been suggested to predict intravascular volume based on studies using clinical parameters as determinants of hydration status.

OBJECTIVE: To determine if BEU measurements of the CI of the IVC of <0.8 and an IVC/Aorta ratio of <0.8 correlate with CVP measurements as an indicator of hydration status in acute ill children.

DESIGN/METHODS: Children < 18 years old who were admitted to the Pediatric ICU and required CVP monitoring had IVC and Aortic measurements using BEU at the same time as CVP bedside monitors were placed in the supine position and the IVC was measured in two views: (1) subxiphoid sagittal view and (2) transverse view at the level of the renal vein. The CI and IVC/Aorta ratio were calculated from these measurements. Dehydration was considered as a CVP <8 mm Hg.

RESULTS: One hundred twenty-seven patients were studied; the mean age was 39 months (range 2 days- 14 years). Of these 27 participants, 15 (56%) had a CI <8. 6 of 26 (22%) children had a CI >50% and 9 of 22 (33%) had an IVC/Aorta ratio of <0.8. The correlation between CI and CVP was 0.10 (p=NS) and between IVC/Ao and CVP was -0.13 (p=NS). There were no significant differences in the ability of either the CI or the IVC/Aorta to predict the presence of dehydration as determined by the CVP.

CONCLUSIONS: IVC and Aortic measurements by BEU, at this time, are not reliable indicators of hydration status (as determined by CVP) in acutely ill children.
The average experiences are listed in Table 1.

<table>
<thead>
<tr>
<th>Skill</th>
<th>Mean Number of Experiences</th>
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<tbody>
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<td>Central Venous Line</td>
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<tr>
<td>Chest Tube</td>
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<td>Thoracotomy</td>
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<td>Perioperative</td>
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<td>Intubation</td>
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<tr>
<td>Team Leader for trauma</td>
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<tr>
<td>Skill Reporting</td>
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</table>

CONCLUSIONS: PEM fellows do not have sufficient teamwork and procedural experiences or training prior to fellowship. There is a need for formal instruction in these skills as well as clinical or simulated experiences for fellows in training. BASE Camp is one educational strategy that employs both formal instruction and experiential simulation to teach these behaviors and skills. Further research is needed to determine the full impact of such training on fellow clinical performance.

11:00 AM Training Experiences of Pediatric Emergency Medicine Fellows before Fellowship

Kevin Ching, Marc Auerbach, Frank Overly, Linda Brown, Chaocong Dong, Colleen Gillespie, Michael Falk, Nikhil Shah, Eric Weinberg, David Kessler.

Emergency Medicine and Pediatrics, New York University School of Medicine, New York, NY; Pediatrics, Columbia University Medical Center/New York Presbyterian Morgan Stanley Children’s Hospital of New York, New York, NY; Pediatrics, Yale University School of Medicine, New Haven, CT; Emergency Medicine and Pediatrics, Warren Alpert Medical School of Brown University, Providence, RI; Emergency Medicine, SUNY Downstate College of Medicine, Brooklyn, NY; Emergency Medicine and Pediatrics, Weill-Cornell Medical College, New York, NY.

BACKGROUND: Pediatric emergency medicine (PEM) fellows are expected to possess an aptitude for crisis resource management and to graduate with an ability to perform multiple life-saving surgical procedures and advanced airway maneuvers. We organized a 2-day multi-institutional, multidisciplinary fellowship program, BASE Camp 2010: Basic Training for Pediatric Emergency Medicine, to introduce, review, and provide practice opportunities in teamwork skills, surgical procedures, and advanced airway skills. Little is known about the training and skills fellows possess at the start of their fellowship.

OBJECTIVE: To determine what experiences and training PEM fellows possess in critical teamwork and procedural skills before beginning fellowship.

DESIGN/METHODS: BASE Camp participants were asked to complete an anonymous online survey (multiple choice and open-ended) about their training and experiences before fellowship in crisis resource management, surgical trauma procedures, and advanced airway techniques. This study was IRB approved and all subjects granted consent.

RESULTS: 17 PEM fellows from 10 fellowships in NY, CT, and RI participated in BASE Camp (Oct 23-24, 2010). 29% were male. 15 fellows responded (11 first and 4 second years). 53% had prior experiences as an attending before or during their fellowship. 67% reported prior teamwork training (only 1 with formal training). 50% had limited training in surgical trauma procedures, 50% had advanced airway training, and 50% had central line training. The average experiences are listed in Table 1.

Table 1. Average team management and procedural experience at the start of fellowship

11:15 AM Analgesia Use for Infant Lumbar Puncture by Interns after an Educational Intervention

Daniel M. Fein, Jeffrey R. Avner, Marc O. Auerbach, Eileen J. Klein, Geetanjali Srivastava, Elizabeth B. Seelbach, Joshua A. Rocker, Christopher Strother, David O. Kessler.

Pediatric Emergency Medicine, Children’s Hospital at Montefiore, Bronx, NY; Pediatric Emergency Medicine, Yale-New Haven Children’s Hospital, New Haven, CT; Pediatric Emergency Medicine, New York Presbyterian Morgan Stanley Children’s Hospital of New York, New York, NY; Pediatric Emergency Medicine, Cohen Children’s Medical Center of New York, New Hyde Park, NY; Hospital Medicine, Children’s National Medical Center, Washington, DC; Pediatric Emergency Medicine, Seattle Children’s Hospital, Seattle, WA; Pediatrics, UT Southwestern Medical Center, Dallas, TX; Mount Sinai Medical Center, New York, NY.

BACKGROUND: Despite increasing evidence that appropriate pain management for infant lumbar puncture (ILP) improves success rates, ILP is often performed without the use of any analgesia. Rates of analgesia use by interns for ILP and associated factors have not been clearly established.

OBJECTIVE: To describe rates and associated factors of analgesia use for ILP by interns after an educational intervention.

DESIGN/METHODS: Interns from 24 pediatric or emergency medicine training programs in the POISE network were enrolled in a study to assess the utility of Just-in-time-training (JITT) sessions on ILP success. JITT is an educational strategy where brief training sessions are conducted in close temporal proximity to a clinical encounter. Included in this procedural training was instruction on analgesia use. Interns watched an online procedure video and participated in an individualized hands-on LP mastery training session (MTS) during orientation. Throughout the year, interns completed a JITT session with their supervisor prior to performing an LP on an infant < 1 year of age. Information about the clinical LP (including analgesia use) was collected by the instructor.

RESULTS: 501 interns were enrolled in the study. 165 ILPs were performed; the median age of the patients was 27 days (IQR = 11 to 47 days). Some form of analgesia was used in 117 ILPs (74%). Methods of analgesia included one or more of the following: topical analgesics (60%), oral sucrose (37%), injectable lidocaine (17%), sedation (8%) and other (1%). A family member was present during the LP in 64 (39%) cases. If a family member was present, ILP was more likely to be performed with analgesia (84% vs 66%; 95%CI for difference = 5% to 31%). Analgesia use was more common in the ED (79 of 101, 78%) when compared to the NICU (12 of 22, 55%; 95%CI for difference = 1% to 45%).

CONCLUSIONS: Analgesia use for ILP by interns who had a MTS and JITT is in the higher range of what is reported in the literature. Presence of a family member during the procedure and performance in the ED are associated with increased use of analgesia. Further research should identify and address barriers of analgesia use for ILP.

11:30 AM Electrocardiograms in Children with Lyme Meningitis: Should We Screen for Lyme Carditis?

Elizabeth J. Welsh, Kori A. Cohn, Lise E. Nigrovic, Amy D. Thompson, Elizabeth M. Hines, Samir S. Shah.

The Children’s Hospital of Philadelphia, Philadelphia, PA; Children’s Hospital Boston, Boston, MA; A.I. DuPont Hospital for Children, Wilmington, DE.

BACKGROUND: Both meningitis and carditis are serious complications of early disseminated Lyme disease. The prevalence of cardiac manifestations of Lyme disease in children with Lyme meningitis is unknown.

OBJECTIVE: To determine the prevalence of and identify risk factors for electrocardiographic (EGK) changes in children with Lyme meningitis.

DESIGN/METHODS: We performed a multi-center case-control study nested within a cohort of children 90 days to 19 years of age seen at one of three pediatric emergency departments and diagnosed with Lyme meningitis. Patients who underwent EKG testing were included. The primary outcome measure was the presence of one of the following EKG abnormalities associated with early disseminated Lyme infection: atrioventricular block, ST-T wave changes and prolongation of the corrected QT interval. Cases had EKG abnormalities while controls did not. We performed multivariate logistic regression to identify factors independently associated with carditis in patients with Lyme meningitis.

RESULTS: 69 (59%) of the 117 children with Lyme meningitis underwent EKG testing. The median age of children who underwent EKG testing was 9.8 years (interquartile range, 7.4 - 12.9 years), 70% were male. Of those patients that underwent EKG testing, 21 (33%) had the following EKG abnormalities consistent with Lyme carditis: atrioventricular block (n=14; 20%), ST-T wave changes (n=10; 15%), and prolongation of the corrected QT interval (n=6; 9%). Fever was present in 61% of patients with carditis and 36% of those without carditis. After adjustment for cranial nerve palsy and erythema migrans rash on presentation, history of fever (adjusted odds ratio, 3.20; 95% CI: 1.09-9.35) and older age (adjusted odds ratio, 1.22 for each 1 year increase in age; 95% CI: 1.06-1.41) were each independently associated with carditis.

CONCLUSIONS: Lyme carditis occurs commonly in children with Lyme meningitis. Screening EGKs should be performed routinely on children presenting with Lyme meningitis.
OBJECTIVE: To determine whether fluid restriction speeds resolution of respiratory distress in neonates with TTN.

BACKGROUND: Respiratory distress due to TTN requires ICU admission and inhibits early parent-child interaction of the first days of life caused by delayed pulmonary salt channel switching and fluid clearance. Respiratory distress due to TTN includes: review of anatomical landmarks and procedure rehearsal prior to the performance of the clinical LP; an opportunity to ask questions in the absence of parents; and improved comfort and confidence with the procedure.

Some interns reported that JITT was not performed prior to each of their clinical LP attempts. Common barriers to the performance of JITT included lack of time in a busy clinical setting and lack of interest by instructors.

A reported negative effect was that the mannequin, as well as the training, did not provide an accurate representation of the clinical infant LP. Interns mentioned that the variability with the skill of the holder and movement of the baby, as well as parental anxiety, were not simulated in the JITT.

CONCLUSIONS: JITT was perceived to improve procedural comfort and confidence with an infant LP, but identified barriers to JITT performance included time constraints and lack of instructor interest. Optimal JITT may include considerations beyond the mannequin. This qualitative data will aid in the iterative development of future simulation-based training.

### Table: Quality Criteria Reported

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<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inclusion/exclusion criteria</td>
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</tr>
<tr>
<td>Primary outcomes</td>
<td>142/179 (79)</td>
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<tr>
<td>Sample size estimate</td>
<td>138/179 (77)</td>
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<tr>
<td>Randomization method</td>
<td>106/179 (59)</td>
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<tr>
<td>Allocation concealment method</td>
<td>123/179 (69)</td>
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<tr>
<td>Blinding method</td>
<td>96/115 (83)</td>
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<tr>
<td>No. centers if multicenter</td>
<td>75/80 (94)</td>
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<tr>
<td>Study diagram</td>
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<td>No. study participants</td>
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<td>No. subjects analyzed</td>
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</tr>
<tr>
<td>Result of primary outcome</td>
<td>137/142 (96)</td>
</tr>
</tbody>
</table>

CONCLUSIONS: This is the first study to demonstrate benefit of a treatment for TTN beyond supportive care. Mild fluid restriction mimicking physiologic breast milk production is safe in otherwise healthy term and late preterm neonates with TTN. Fluid restriction reduces duration of respiratory distress in neonates with TTN who require respiratory support beyond 48 hours of life. Mild fluid restriction is recommended for all patients with TTN who require respiratory support.
10:30 AM  
Fellow in Training  
A Novel Murine Model of Preterm Birth Based on the Genetic Ablation of Decorin and Biglycan  

Department of Pediatrics, Women and Infants’ Hospital of Rhode Island/Brown University, Providence, RI; Department of Pathology, Anatomy and Cell Biology, Thomas Jefferson University, Philadelphia, PA.

BACKGROUND: Preterm premature rupture of fetal membranes causes one third of preterm births. Ehlers-Danlos Syndrome (EDS) is associated with preterm premature rupture of fetal membranes in humans; an EDS variant is caused by a mutation resulting in abnormal biglycan and decorin secretion. Decorin and biglycan are highly homologous proteoglycans expressed in reproductive tissues. Decorin/biglycan double knockout mice are a model of Ehlers-Danlos Syndrome.

OBJECTIVE: We utilized this model to test the hypothesis that biglycan and decorin play a role in the attainment of successful term gestation.

DESIGN/METHODS: Wild type, single and double knockout pregnancies were assessed for length of gestation, pup and placenta weight and litter size. Quantitative real-time PCR was performed to measure biglycan and decorin transcript and immunohistochemistry was performed to assess protein expression in placenta and fetal membranes at embryonic day E12, E15 and E18.

RESULTS: Decorin/biglycan double knockout dams and dams with only one biglycan or decorin allele display preterm birth. The possession of at least two biglycan or decorin alleles is protective of preterm birth. In mixed litters, homozygous double knockout pups are deceased at postnatal day P1 but not at embryonic day E18. Biglycan and decorin are upregulated in the placenta in each other’s absence and are developmentally regulated in placenta and fetal membranes.

CONCLUSIONS: The decorin/biglycan double knockout mouse is a model of genetically induced preterm birth and perinatal loss. Biglycan and decorin display compensatory mechanisms and contribute to gestational success in a dose dependent manner. This model presents novel targets for preventive or therapeutic manipulation of preterm birth.

10:45 AM  
Fellow in Training  
Effects of Bilirubin on Neutrophil Inflammatory Responses in Newborn Infants  

Pediatrics, UMDNJ-Robert Wood Johnson Medical School, New Brunswick, NJ.

BACKGROUND: Newborns are susceptible to inflammatory diseases due to intrinsic defects in clearing activated immune cells from affected tissues. Therefore, it is likely that mechanisms have evolved to protect neonates from leukocyte-mediated cytotoxicity. While moderate levels of bilirubin in jaundiced infants have antioxidant effects comparable to α-tocopherol, bilirubin may also exert effects directly on cellular immune responses, such as cytokine production and generation of antioxidant enzymes. Bilirubin has also been shown to decrease expression of the heme-dependent enzymes NOX-1 and COX-2, which mediate inflammatory responses in neutrophils.

OBJECTIVE: We hypothesize that bilirubin increases expression of antioxidant genes, and decreases production of inflammatory cytokines and expression of inducible heme-dependent enzymes in neonatal neutrophils.

DESIGN/METHODS: Cord blood neutrophils were isolated by density centrifugation and treated with bilirubin in medium control, in the presence or absence of bacterial lipopolysaccharide (LPS). Bilirubin concentration of 100 µM was used to model concentrations of free (unbound) bilirubin present in neonatal serum under normal physiologic conditions. Bilirubin was dissolved in 0.1 M NaOH and neutralized using an equal volume of 0.1 M HCl. Production of inflammatory cytokines was quantified by cytozymet cell array analysis. RNA expression of antioxidant genes (SOD, HO-1) and heme-dependent enzymes (NOX-1, COX-2) was measured by real-time PCR.

RESULTS: Bilirubin increased basal production of cytokines, but down regulated LPS-induced generation of IL-1β, IL-6, IL-8, MCP-1, and MIP-1. It increased SOD and HO-1 expression in both resting and LPS-activated cells. In addition, we observed an unexpected bilirubin-induced increase in gene expression of NOX-1 and COX-2 in both resting and activated cells.

CONCLUSIONS: Bilirubin suppresses inflammatory activity and increases antioxidant enzyme generation in activated neonatal neutrophils. The unexpected increases in NOX-1 and COX-2 expression may represent an early response to LPS stimulation, with physiologic effects that are abrogated by increased production of antioxidants. Elevated levels of unconjugated bilirubin may represent a protective effect against inflammatory diseases in infants. Further studies will be required to define levels that optimize these effects while minimizing potential neurotoxicity.

11:00 AM  
Fellow in Training  
Elevated Blanket Temperatures during Whole Body Cooling with Servo-Controlled Blanketrol III  
Mario Zichella, Dorothy McElwee, Susan Adeniyi-Jones.


BACKGROUND: Therapeutic hypothermia (TH) is neuroprotective in newborns with hypoxic ischemic encephalopathy (HIE). Conversely, hyperthermia worsens prognosis following HIE. During whole body cooling (WBC) infants are placed on a cooling blanket for 72 hours. Using the servo-controlled Blanketrol III (Cincinnati Sub-Zero) in Gradient 10°C/Smart mode we noted elevated blanket temperatures (BT) >40°C during WBC while the infant’s occiput was in direct contact with the blanket. There are no data available describing the extent of this phenomenon.

OBJECTIVE: To determine the frequency of BT elevations above 35°C, 37°C, and 40°C during the 72 hours of WBC.

DESIGN/METHODS: 22 infants with GA 37.9 ± 2.0 weeks and BW 3.038 ± 0.6 kg underwent WBC at Thomas Jefferson University Hospital from 2/17/08 to 10/11/10 were studied. During WBC hourly rectal temperatures (RT) and BT are routinely recorded. The number of times the BT exceeded 35°C, 37°C, and 40°C were calculated for each subject. The entire infant was placed on the cooling blanket in 21/24 of subjects. Following a practice change 3/24 infants were placed on the blanket from should to feet (excluding the head). The mean ± SD and median (range) number of time points at ≥35°C, ≥37°C, and ≥40°C were calculated for all subjects.

RESULTS: Wide fluctuations in BT from 10°C to ≥ 40°C were observed in 22/24 infants. During WBC, BTs were recorded an average of 71.5/72 times per patient. The mean number of BTs recorded per patient at ≥35°C was 31.4 ± 14.2 (44%, median 33, range 7-51); BT ≥37°C was present ≥ 14.1 (38%, median 27, range 5-49) times and BT 35°C was noted on 17.9 ± 11.55 (25%, median 18.5, range 1-47) occasions. In some instances, up to 8 consecutive BT elevations (≥35°C) were observed. The RTs for all infants cooled with blankets under their entire body remained tightly controlled at 33.28 ± 0.13. Following a practice change to avoid direct contact between the heated blanket and the occupant by placing the cooling blanket at the level of the shoulders, optimal RTs were still achieved during WBC [BT < 33.16 ± 0.1 (p=0.03)].

CONCLUSIONS: When the entire infant is placed on the Blanketrol III during WBC inadvertent application of heat directly to the occupant occurs for > 25% of the cooling time. This may have implications for neurologic outcomes. WBC may be safely achieved with the blanket placed at the level of the shoulders. Additional patients are needed to fully evaluate the reliability of this method of WBC.

11:15 AM  
House Officer  
Yield of Surveillance Cultures for Infants Transferred to the NICU  
Theodore Macnow, Dana O’Toole, Lisa Saiman, Jennifer Duchon.

Pediatrics, Columbia University Medical Center, New York, NY; Villanova University, Villanova, PA; Infection Prevention & Control, New York Presbyterian Hospital, New York Presbyterian Hospital, NY.

BACKGROUND: Infections caused by antibiotic resistant organisms (AROs) have increased in the neonatal intensive care unit (NICU) during the past decade. Efforts to reduce ARO infections include identification of infants colonized with these potential pathogens. We routinely perform surveillance cultures for methicillin-resistant Staphylococcus aureus [MRSA], vancomycin-resistant enterococci [VRE] and extended spectrum ß-lactamases [ESBL]-producing organisms in infants transferred to our NICU, but the yield of this strategy has not been systematically evaluated.

OBJECTIVE: To examine the yield of our targeted surveillance strategies, trends in colonization and infection with AROs in infants transferred to our NICU, and risk factors for ARO colonization.

DESIGN/METHODS: We performed a retrospective chart review of patients transferred to our NICU from 2004-2009 to determine compliance with surveillance cultures, yield of such cultures, and risk factors for ARO colonization. The natures and skin were cultured for MRSA and the rectal verge was cultured for VRE and ESBL-producing organisms.

RESULTS: Of 1555 transferred infants, 67%, 64%, and 50% had cultures performed for MRSA, VRE, and ESBL-producing strains, respectively, although compliance significantly improved during the study period. The overall yield was 3.7%, 2.0%, and 1.0% for MRSA, VRE and ESBL-producing strains, respectively. In all, 67 infants had ≥ one positive surveillance culture of whom only 2 developed an ARO infection. In a multivariable model, patients colonized with ≥ one ARO were significantly older upon transfer (p=0.001) and more likely to be transferred from certain hospitals.

Yields of Surveillance Cultures According to Day of Life of Transfer to the NICU

<table>
<thead>
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<th>Day of Life at Transfer</th>
<th>MRSA (%)</th>
<th>VRE (%)</th>
<th>ESBL (%)</th>
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<tr>
<td>1</td>
<td>0.8</td>
<td>0.3</td>
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<td>2</td>
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77
11:30 AM
Gas Exchange in the First Minute of CPR Following Asphyxial Cardiac Arrest in Newborn Piglets
Bobby Mathew, Daniel D. Swartz, Melissa Carmen, Sylvia F. Gugino, Jayasree Nair, Rita M. Ryan, Satyan Lakshminrusinha.
Pediatrics (Neonatology), University at Buffalo, Buffalo, NY; Physiology, University at Buffalo, Buffalo, NY.
BACKGROUND: Asphyxia is a leading cause of death and neurodevelopmental disability in the term newborn. Current NRP guidelines recommend 30 sec of positive pressure ventilation (PPV) prior to initiating chest compressions (CC). We have previously shown that in newborn lambs asphyxiated by umbilical cord occlusion resulting in bradycardia (heart rate 46±7/min), PPV for 30 sec with 100%O2 decreased paCO2 from 113±14 to 75±15 mmHg and increased paO2 from 5±1 to 132±39 mmHg. The effectiveness of ventilation alone in improving gas exchange in a neonatal model of asphyxial cardiac arrest is not known.
OBJECTIVE: To study the effectiveness of PPV alone and CC+PPV for 30 sec each on gas exchange in a newborn asphyxial model of cardiac arrest.
DESIGN/METHODS: Seven newborn piglets (1-3d) were anesthetized and venous and arterial access was established. Asphyxial cardiac arrest was induced by clamping the ETT until asystole. Animals were resuscitated with PPV for 30sec followed by PPV and CC. Blood gases were obtained at the point of cardiac arrest, following 30sec of ventilation alone, and at 1min following ventilations and chest compressions for 30sec.
RESULTS: There were no differences between the ABGs obtained at cardiac arrest and following 30sec of PPV. ABGs were significantly better for PaCO2 and PaO2 following 30sec of PPV+CC.
CONCLUSIONS: In this neonatal model of cardiac arrest, ventilation alone provides no effective gas exchange. Cardiac compression pumps blood into the pulmonary circulation and is critical for gas exchange and successful resuscitation. We speculate that during resuscitation of an asphyxiated neonate in asystole, CC initiated simultaneously with PPV will provide better gas exchange than PPV alone and shorten the duration of cerebral hypoxemia.

11:45 AM
Maternal Microchimerism in the Fetus
Arlene E. Balabayan, Rakhi Mehrotra, Heber C. Nielsen, Christiane E.L. Damman.
Newborn Medicine, Floating Hospital for Children at Tufts Medical Center, Boston, MA.
BACKGROUND: Maternal cell microchimerism (MCM) is defined as the presence of maternally derived cells in fetuses. Maternal cells, which travel to the fetus through the placenta, are present in the human fetal blood beginning at 13 weeks gestation and persist into adulthood. Studies show that these maternally derived cells are associated with autoimmune disorders. It is unclear whether they cause disease or participate in the repair of injury. MCM has been studied in post-natal mice, in which organ-specific MCM was present in brain, heart, lung, kidney, liver, spleen, and small bowel. Heart and lung had the highest numbers of maternal cells. The development of organ-specific MCM in the fetus in utero has not been studied.
OBJECTIVE: To establish the frequency and quantity of organ-specific MCM in the fetus in utero.
DESIGN/METHODS: Maternal cell microchimerism using a green fluorescent protein (gfp) mouse model. Hemizygous gfp positive C57Bl/6 females were bred with wild-type males. Timed-pregnant females were sacrificed at E18. Fluorescent maternal cells in brain and lungs of wild-type pups were quantified using FACS (fluorescence-activated cell sorting) analysis.
RESULTS: The distribution of MCM showed that fetal brain contains 4 times as many maternally-derived gfp positive cells than fetal lungs at E18 of gestation.
CONCLUSIONS: More data is needed to further understand the distribution of MCM in the fetus in utero. Further, the function, and fate of maternally derived cells in the fetal and neonatal brain, specifically in the setting of injury, requires study. (Support: NIH HD 049341, and Ikaria’s Advancing Newborn Medicine Grant Program for Fellows in Neonatology).

Neonatology - Pulmonary II
Platform Session
Sunday, March 27, 2011
9:45 AM - 12:00 PM

9:45 AM
Effect of FiO2 and NO on Oxygenation and Pulmonary Vascular Resistance at Birth
Satyan Lakshminrusinha, Daniel D. Swartz, Bobby Mathew, Sylvia F. Gugino, Stephen Wedgewood, Robin H. Steinhorn.
University at Buffalo, Buffalo, NY; Northwestern University, Chicago, IL.
BACKGROUND: Ventilation at birth reduces PVR, an event that is mediated by NO and cGMP. The effect of varying FiO2 and NO on the pulmonary vascular transition in normal vs PPHN neonates is unknown.
OBJECTIVE: To study the effect of varying FiO2 and NO on PaO2, PVR and cGMP in control and PPHN lambs.
DESIGN/METHODS: PPHN was induced by antenatal ductal ligation. Control and PPHN lambs were ventilated with 21%, 50% and 100%O2, ± NO at 20ppm. 18 control and 11 PPHN lambs were instrumented and ventilated at birth to achieve a PaO2 of 45-50mmHg (control 21%, PPHN 50%± NO). PPHN PASMC from control and PPHN lambs were incubated in 1.5%, 21% and 50%O2, ± NO donor, and cGMP levels were measured.
RESULTS: NO had minimal effect in control lambs, but markedly improved PaO2 and decreased PVR in PPHN lambs. Increasing PO2 increased cGMP levels in control but not PPHN PASMC (fig.C). NO increased cGMP levels to a greater degree in PPHN cells, but the effect was blunted at high PO2.
CONCLUSIONS: This is the first study to compare the effects of NO at birth on oxygenation in normal and PPHN lambs. In normal lambs, 21%O2 is sufficient to increase vascular cGMP and decrease PVR from fetal levels, and NO has little effect. In PPHN lambs, increased PO2 does not increase PASMC cGMP. Addition of NO in PPHN markedly increases cGMP, significantly reduces PVR, and improves PaO2.

10:45 AM
Respiratory Support for the Newborn: The First 24 Hours
Michael B. Kelly, Ashley Palma, Roger M. Annino, Debra M. Remington, Barry R. Brown.
New York University School of Medicine, New York, NY.
BACKGROUND: Ventilation at birth reduces PVR, an event that is mediated by NO and cGMP. The effect of differing FiO2 and NO on the pulmonary vascular transition in normal vs PPHN neonates is unknown. The results from this study should be interpreted with caution as cardiac arrest in a postnatal piglet may not be representative of birth asphyxia.
OBJECTIVE: To study the effect of varying FiO2 and NO on PaO2, PVR and cGMP in control and PPHN lambs.
DESIGN/METHODS: PPHN was induced by antenatal ductal ligation. Control and PPHN lambs were ventilated with 21%, 50% and 100%O2, ± NO at 20ppm. 18 control and 11 PPHN lambs were instrumented and ventilated at birth to achieve a PaO2 of 45-50mmHg (control 21%, PPHN 50%± NO). PPHN PASMC from control and PPHN lambs were incubated in 1.5%, 21% and 50%O2, ± NO donor, and cGMP levels were measured.
RESULTS: NO had minimal effect in control lambs, but markedly improved PaO2 and decreased PVR in PPHN lambs. Increasing PO2 increased cGMP levels in control but not PPHN PASMC (fig.C). NO increased cGMP levels to a greater degree in PPHN cells, but the effect was blunted at high PO2.
CONCLUSIONS: This is the first study to compare the effects of NO at birth on oxygenation in normal and PPHN lambs. In normal lambs, 21%O2 is sufficient to increase vascular cGMP and decrease PVR from fetal levels, and NO has little effect. In PPHN lambs, increased PO2 does not increase PASMC cGMP. Addition of NO in PPHN markedly increases cGMP, significantly reduces PVR, and improves PaO2.

11:30 AM
PPHNN 100%+NO
Control 100%+NO
PPHN 21%+NO
Control 21%+NO
PPHN 50%
Control 50%
PPHN 100%+NO
Control 100%
PASMC PaO2 in the first 30min of life

Group O2% in Fetal 5min 15min 30min
Control 21% 42 20±1 38±13 45±3 48±3
Control 21%+NO 9 23±4 49±9 22±2 50±6
PHPN 21% 8 20±1 22±4 26±9 35±9
PHPN 21%+NO 1 18±5 24±2 12 38 50
Control 50% 12 18±1 11±2 149±21 142±16
Control 50%+NO 8 23±5 17±20 162±28 147±21
PHPN 50% 11 19±2 18±4 137±13 45±14
PHPN 50%+NO 5 16±3 40±9 75±28# 106±26*
Control 100%
PHPN 100% 17 17±1 17±2 74±21 138±22
PHPN 100%+NO 7 16±2 33±3 78±53 165±37
PHPN 100% 9 17±3 26±16 65±13* 202±29
PHPN 100%+NO 9 17±3 26±16 65±13* 202±29

PaO2 in the first 30min of life

CONCLUSIONS: More data is needed to further understand the distribution of MCM in the fetus in utero. Further, the function, and fate of maternally derived cells in the fetal and neonatal brain, specifically in the setting of injury, requires study. (Support: NIH HD 049341, and Ikaria’s Advancing Newborn Medicine Grant Program for Fellows in Neonatology).
10:00 AM

Medical Student

Age-Dependent In Vitro Mouse Lung Type II Cell Behavior
Newborn Medicine, Floating Hospital for Children, Boston, MA; Pediatric Pulmonology and Neonatology, Hannover Medical School, Hannover, Germany.

BACKGROUND: Responses to injury are known to be developmental-age and context-specific for multiple tissues. Chronic lung disease (CLD) develops in immature lungs after shorter injury exposure than in adult lungs. Both are associated with fibrosis. Fetal tissue is capable of injury repair without scarring and fibrosis. Fetal and adult type II (TII) cells are known to require different culture conditions to maintain their differentiated epithelial cell phenotype in vitro. An understanding of mechanisms causing differences in developmental-age related cell behavior might help discover treatment strategies for CLD. We showed that MLE12 cells, similar to primary adult TII cells, loose epithelial cell markers after Transforming Growth Factor beta (TGFβ) treatment. In contrast, TGFβ1 did not induce this response in fetal TII cells. ErbB receptors are important in lung development, injury, and cancer development and their expression pattern in TII cells is age-dependent.

OBJECTIVE: We hypothesize that TII cells behave in vitro in a developmental age-related fashion.

DESIGN/METHODS: MLE 12 cells and primary fetal and adult TII cells (>95% pure) were pretreated with cis-OH-proline to eliminate remaining fibroblasts. Epithelial and mesenchymal cell markers and ErbB receptor expression were studied in different culture conditions and following a 5-day treatment with 2.5 mg/ml TGFβ1.

RESULTS: TTF-1 expression peaked shortly before birth, and adult type II cells kept their epithelial cell phenotype in HITES medium, while DMEM containing FCS, the ideal culture condition for fetal TII cells, induced mesenchymal marker expression. The response to TGFβ1 was age-related. TGFβ1 treatment induced epithelial markers and ErbB4 expression in fetal TII cells. ErbB4 overexpression decreased TGFβ1-induced upregulation of mesenchymal marker expression in adult TII cells.

CONCLUSIONS: These data suggest that there are developmental-age related differences in cell behavior in TII cells. ErbB4 regulates this age-related behavior. Further analyses are required to fully understand the regulation of TII cell behavior and the role of ErbB receptors in this process.

Funding: NIH HL08548, Tufts Institutional Grant, Deutsche Forschungsgemeinschaft Da 375/3-2.

10:15 AM

How Accurate Are Measures of Tidal Volume, Compliance and Resistance on Neonatal Ventilator Displays?
Soraya Abbasi, Emidio Sivieri, Robin Roberts, Haresh Kirpalani.
Pediatrics, Division of Neonatology, Children’s Hospital of Philadelphia, Philadelphia, PA; OB/GYN, Pennsylvania Hospital, Philadelphia, PA; Pediatrics, Univ. of Pennsylvania School of Medicine, Philadelphia, PA; Clinical Epidemiology and Biostatistics, McMaster University, Hamilton, ON, Canada.

BACKGROUND: Microprocessor neonatal ventilators compute and display expired tidal volume (VTE), flow and pressure signals. The accuracy is unknown.

OBJECTIVE: To determine the accuracy of tidal volume and calculated compliance (Cdyn) and resistance (R) measures by four neonatal ventilators, as compared to a physical lung model of known fixed compliance and resistance.

DESIGN/METHODS: Three test lungs simulated 3 severities of neonatal lung disease, (Cdyn: 2.0, 1.0, 0.5 and R: 25, 100, 150). Each ventilator was calibrated using manufacturer’s specifications prior to measurements. Default time cycled pressure limited ventilator modes were used. Each ventilator was tested using 27 combinations of PIP (5, 20, 25cmH2O); PEEP (5, 6, 7 cmH2O), and rate settings (20, 40, 60 bpm). Comparisons of ventilators by simulated lung severity, used the ratio of ventilator read-out to test lung value.

RESULTS: The figure shows VTE, where the line of perfect agreement would be a horizontal line of unbiased value. Each ventilator read-out is shown by each lung severity. SLE and Dräger consistently underestimated VTE, more so at increasing lung severity. In contrast, the VIP Bird underestimated VTE for normal and overestimated for sick lungs. Aava had the least bias and tighter confidence limits across all 3 lung severities. In similar analyses for Cdyn and R, three of the four ventilators consistently underestimated Cdyn for all 3 lung severities. Dräger, overestimated Cdyn in normal lungs, was accurate in moderate disease, but underestimated in severe lung condition. All except Dräger showed much larger inaccuracies for R measurements. The Dräger R calculation improved with increased severity of lung condition. Aava, by manufacturer design, did not display resistances >100cmH2O/L/sec.

CONCLUSIONS: Biases were observed in all ventilators. This was not a uniform uni-directional bias according to lung severity. To use ventilator dynamic respiratory mechanics, clinicians need to understand machine differences.

10:30 AM

Intravenous Sildenafil Improves Oxygenation and Suppresses PDE5 Activity in Lambs with PPHN
University at Buffalo, Buffalo, NY; Northwestern University, Chicago, IL.

BACKGROUND: Persistent pulmonary hypertension of the newborn (PPHN) is a serious disorder associated with high morbidity and mortality. Inhaled NO does not always result in sustained improvement, and when used with 100%O2 can promote formation of oxidants such as peroxynitrite. IV sildenafil is a phosphodiesterase 5 (PDE5) inhibitor that may offer an alternative to NO in the management of PPHN.

OBJECTIVE: To measure the effects of IV sildenafil on hemodynamics and oxygenation in lambs with PPHN, and to determine the effects of sildenafil on enzymes in the NO pathway and markers of vascular oxidative stress.

DESIGN/METHODS: PPHN was induced by ligation of the ductus arteriosus 8d prior to delivery. Twenty PPHN lambs were ventilated with 100% O2 for 24h. In 11 lambs, at 2h of age, IV sildenafil was infused at 0.14mg/kg/h (load) for 3h followed by 0.067mg/kg/h maintenance, a dose based on published pharmacokinetic studies in neonates with PPHN. After sacrifice, lung sections were stained for superoxide anions and 3-NT, and 5th generation PA were analyzed for eNOS and PDE5 protein and activity.

RESULTS: Sildenafil significantly improved oxygenation in lambs with PPHN.

10:45 AM

Fellow in Training

Effect of Inspired Oxygen and Inhaled Nitric Oxide (INO) on Oxygen Uptake from the Lung and Arterial Oxygen Content in Newborn Lambs and Lambs with Persistent Pulmonary Hypertension of the Newborn (PPHN)
Melissa F. Carmen, Bobby Mathew, Sylvia Gugino, Javaseer Nair, Daniel D. Swartz, Satyan Lakshminrusimha.
Pediatrics, University at Buffalo, Buffalo, NY.

BACKGROUND: Clinicians often increase the FiO2 to improve oxygenation, which may increase formation of oxidants such as peroxynitrite. We hypothesized that sildenafil would decrease oxidative stress in PPHN lambs and that sildenafil and INO would complement each other in PPHN.

OBJECTIVE: To measure the relationship between FiO2, arterial oxygen content and O2 uptake from the lungs during management of PPHN. The effect of FiO2 and INO on O2 uptake in the lungs in PPHN is not known.

DESIGN/METHODS: Sildenafil was infused at 0.14mg/kg/h (load) for 3h followed by 0.067mg/kg-h maintenance, a dose based on published pharmacokinetic studies in neonates with PPHN. After sacrifice, lung sections were stained for superoxide anions and 3-NT, and 5th generation PA were analyzed for eNOS and PDE5 protein and activity.

RESULTS: Sildenafil significantly improved oxygenation in lambs with PPHN. Sildenafil also increases eNOS and reduces PDE5 expression in PA. Clinical trials are needed to evaluate this promising therapy in neonates with PPHN.

CONCLUSIONS: IV sildenafil improves oxygenation, and reduces formation of oxidants such as peroxynitrite in lambs with PPHN. Sildenafil also increases eNOS and reduces PDE5 expression in PA.

Four lambs in the O2-only group and 2 lambs in the sildenafil alone group died before 24h (shown by arrows in the figure). Hyperoxia requiring dopamine was observed in 2 lambs in the O2 group and 3 lambs in the sildenafil group. Sildenafil reduced vascular PDE5 activity by 66%, and also decreased PDE5 protein (0.7±0.1 vs. 1.7±0.3 fold fetal control) and increased PA eNOS levels (14±4 vs. 2.0±3.0 fold fetal control in sildenafil and O2 groups respectively). Sildenafil significantly reduced 3-NT in PA and tended to reduce superoxide levels.

CONCLUSIONS: IV sildenafil improves oxygenation, and reduces formation of oxidants such as superoxide anions in lambs with PPHN. Sildenafil also increases eNOS and reduces PDE5 expression in PA. Clinical trials are needed to evaluate this promising therapy in neonates with PPHN.
**CONCLUSIONS:** Inhaled NO is effective in improving systemic oxygenation and O$_2$ uptake from the lungs in PPHN lambs, but not in controls. Hyperoxic ventilation increases PaO$_2$ uptake from the lung.

**Design/Methods:** Macrophages cells (Raw 264.7) were incubated for 3, 6, 12 and 24h, to study the induction and release of proinflammatory cytokines.

**Objective:** We hypothesized that LPS and hyperoxia would have additive effects on iNOS activity and release of pro-inflammatory cytokines in the lung. Hyperoxia Lipopolysaccharide (LPS) in gram negative bacteria can cause respiratory distress as it induces nitric oxide synthase (iNOS) and release of pro-inflammatory cytokines in the lung. Hyperoxia can cause serious lung injury. Only a few reports have studied the combined effects of these two agents.

**Background:** Bacterial sepsis, a serious concern in very low birth weight infants, accounts for 5% of NICU admissions. Those with respiratory distress may require supplemental oxygen. Lipopolysaccharide (LPS) in gram negative bacteria can cause respiratory distress as it induces nitric oxide synthase (iNOS) and release of pro-inflammatory cytokines in the lung. Hyperoxia Lipopolysaccharide (LPS) in gram negative bacteria can cause respiratory distress as it induces nitric oxide synthase (iNOS) and release of pro-inflammatory cytokines in the lung. Hyperoxia can cause serious lung injury. Only a few reports have studied the combined effects of these two agents.

**Object:** We hypothesized that LPS and hyperoxia would have additive effects on iNOS activity and release of pro-inflammatory cytokines.

**Design/Methods:** Macrophages cells (Raw 264.7) were incubated for 3, 6, 12 and 24h, to study the induction and release of proinflammatory cytokines.

**Conclusions:** The results of the present study suggest that LPS and hyperoxia have additive effects on iNOS activity and release of pro-inflammatory cytokines in the lung, which may contribute to the development of lung injury in preterm infants.

**11:15 AM**

**Fellow in Training**

**Vascular Endothelial Growth Factor in Tracheal Aspirates from Preterm Infants: Effect of Surfactant Therapy**

Avinash Parohit, Rajeev Mehta, Anna Petrova, Pediatrics, Jersey Shore University Medical Center, Neptune, NJ; Pediatrics, UMDNJ/Robert Wood Johnson Medical School, New Brunswick, NJ.

**Background:** Vascular endothelial growth factor (VEGF) regulates vascular endothelial cell differentiation and angiogenesis, and maturation of epithelial cells of the developing lungs. Different reports have described the role of VEGF in lung cells proliferation, differentiation, growth, and permeability. It has been shown that reduced VEGF levels increase the risk for development of respiratory distress syndrome (RDS) in preterm infants, and recovery from RDS is associated with increased expression of VEGF in alveolar epithelial cells. Exogenously administered surfactant that affects lung cells biochemical and biophysical properties may also perhaps impact VEGF production by the lung cells.

**Objective:** To investigate the effects of exogenous surfactant administration on the level of vascular endothelial growth factor (VEGF) in tracheal aspiration fluid (TAF) of very preterm born infants.

**Design/Methods:** Preterm infants with clinically diagnosed RDS who were intubated on day 1 of life and received surfactant therapy were studied. We studied the change in TAF VEGF levels within 20-24 hours after administration of the first dose of exogenous surfactant. Multiple regression analysis was used to identify the independent effect of pulmonary VEGF concentration on the number of surfactant treatments, duration of ventilation, and development of bronchopulmonary dysplasia (BPD). To determine the levels of VEGF in the tracheal aspirate, samples were assayed in duplicate using a Human VEGF Flex Set and BD FACSArray Bioanalyzer. VEGF concentrations in the sample were determined from a standard curve ranging from 10 to 2500 pg/mL.

**Results:** VEGF levels prior to and after the surfactant administration were studied in 31 preterm infants with gestational age 23-35 week (29.5+/-3.3 weeks). TAF VEGF levels increased within 20-24 hours after surfactant administration as compared to the baseline in all infants (40.0+/-22.5 pg/ml vs. 55.0+/-43.8 pg/ml, P<0.001). TAF VEGF levels were indirectly associated with the gestational age (P<0.01), but did not independently impact the number of surfactant treatments, duration of ventilation, and development of BPD.

**Conclusions:** VEGF in tracheal aspirate increases in association with exogenous surfactant therapy. The mechanism of the identified association requires further explanation because to our knowledge no experimental model was designed to identify the role of exogenous surfactant in VEGF production.
null
82

DESIGN/METHODOGS: After an overnight fast, subjects with PPH after fundoplication underwent a mixed meal tolerance test (10 mL/kg Pediasure®) on 2 consecutive days. Using an open label randomized crossover design, subjects received either an IV infusion of vehicle (0.9%NS) or ex-9 (300 pg/ml/kg) for 4 hours before (1 hour 30 minutes before) and during the meal on the first day and the alternate treatment on the next day. After the first 3 subjects safely tolerated ex-9, the dose was increased to 500 pg/ml/kg. Samples were taken for glucose, insulin, glucagon, and GLP-1 levels. Acetaminophen (30 mg/kg) was mixed into the formula, and gastric emptying was estimated using the acetaminophen absorption method.

RESULTS: Five subjects with PPH after fundoplication (7-18 yrs) have been studied to date. Mean glucose area under the curve (AUC) was greater for ex-9 (29108 mg•min/dL) than vehicle (2689 mg•min/dL) with a dose effect for ex-9 (p<0.05 for 500-300 pg/ml/kg, respectively). Mean glucagon AUC was greater for ex-9 than vehicle (12878 vs. 11394 pg•min/mL). Mean acetaminophen AUC was greater for ex-9 than vehicle (3245 vs. 2948 mcg•min/L). Determinations of plasma insulin and GLP-1 levels are pending.

CONCLUSIONS: Antagonism of the GLP-1 receptor by ex-9 raises blood glucose levels in children with PPH after fundoplication. Our work to date provides further insights into the pathophysiology of GLP-1 in PPH after fundoplasting and shows promise for GLP-1 receptor antagonists as a possible therapy. Ongoing enrollment will further elucidate the metabolic response to antagonism of the GLP-1 receptor in PPH.

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RESULTS: The age range (mean±SD) yr of 31 pts (15F) was 5.0-13.5(10.4±2.4) in F and 9.7-16.0(12.4±1.9) in M. LH before HT was 0.53±3.3 mIU/mL in F and 0.87±3.3 mIU/mL in M. Bone ages (BA) prior to and after HT (5-13 years) were available in 24 pts.

RESULTS: The age range (mean±SD) yr of 31 pts(15F) was 5.0-13.5(10.4±2.4) in F and 9.7-16.0(12.4±1.9) in M. LH before HT was 0.53±3.3 mIU/mL in F and 0.87±3.3 mIU/mL in M. Bone ages (BA) prior to and after HT (5-13 years) were available in 24 pts.
tyrosine hydroxylase (TH) mRNA analysis (marker for cell capacity to synthesize Epi). Epi levels measured by ELISA and TH mRNA by Northern Blot.

RESULTS: Insulin-induced hypoglycemia increased Epi levels in S1, S2 & RH1 rats, & was also associated with corresponding increase in TH mRNA levels. In contrast, RH2 rats displayed a significant attenuation in Epi response when compared to the other groups. Corresponding TH mRNA levels in the RH2 group were also lower when compared to RH1 group.

CONCLUSIONS: Once daily hypoglycemia does not impair Epi release or the increased TH mRNA response to subsequent hypoglycemia or handling stress. Twice daily hypoglycemia attenuates both Epi release and the TH mRNA levels. This novel finding may represent the molecular explanation of the attenuated Epi response in HAAF. Our observation may enable future pharmacological modification of adrenal medulatory responses as adjunctive therapy in diabetic patients to modify the maladaptive response in HAAF.

11:15 AM
Fellow in Training

IGF-BP3 Is a Good Predictor of Response to GH and Increlex in Non-GHD Patients with Low IGF1
Pediatric Endocrinology, State University of New York Downstate Medical Center, Brooklyn, NY; Pediatric Endocrinology, Maimonides Medical Center, Brooklyn, NY. 
BACKGROUND: Currently there is no reliable prediction model of response to therapy in patients with growth hormone insensitivity (GHIIS). The new data showed that IGF1 receptor signaling is potentiated by IGBP3. In PREDICT study in GHD patients polymorphism of IGBP3 gene was associated with good response to GH therapy. Combination of low IGF1 and IGBP3 was recently recognized as a marker of more severe phenotype of GHIIS.

OBJECTIVE: To study relationship of baseline IGBP3 and IGF1 response to GH and GH1 therapy in patients with normal GH secretion and low IGF1 level.

DESIGN/METHODS: 43 children (age 9.0±2.75 y., Ht.-2.7±0.7 SD, baseline IGF1.-1.5±0.8 SD), who passed GHRH stimulation test (≥15ng/ml) were included in the study. IGF1 and IGBP3 levels were done at baseline and 6 months after GH initiation (0.46+0.1 mg/kg/wk). Patients with poor response to GH (growth velocity (GV) ≤1 SD for 6 months, or ≤6 cm/year), were switched to IGF1 therapy 0.2 mg/kg/d. According to GV patients were divided in 3 groups: Mild GHI responders to GH (n=23, 14 boys), Moderate GHI- non-responders to GH, responders to IGF1 (n=14, 10 boys), Severe GHI- non-responders to either GH/IGF1 (n=6, 5 boys).

RESULTS: There were no differences in age, BW, height SDS, IGF1 at baseline, IGBP3 on GH treatment and GH peaks after GHRH between groups. Mild GHI group had higher IGBP3, ΔIGF1, IGF1 after GH treatment, ΔHt SD comparing to others. There was no difference between moderate and severe GHI in IGF1 SD on GH and ΔIGF1 after 6 months of GH therapy, while IGBP3 and ΔHt SD were higher in moderate than severe. IGBP3 correlated with GV(r=0.47, p<0.01), and inversely correlated with GH peak(r=0.45, p=0.02). GHI correlated with ΔIGF1 SD (r=0.37, p=0.02).

CONCLUSIONS: This pilot data in GHD patients with IGF1<−2 SD revealed that IGBP3 is a good predictor of response to GH and Increlex therapy. ΔIGF1 after GH can identify who can benefit from GH or Increlex therapy. In case of low IGBP3 and low ΔIGF1 response to either therapy was poor.

11:30 AM
BP/Height Ratios: Simple and Accurate Method of Detecting Elevated Blood Pressure in Children
Minu M. George, Sudhakar Basetty, Iuliana Predescu, Anil Mongia, Svetlana Ten, Amrit Bhangoo.
Department of Pediatrics; Division of Pediatric Endocrinology, SUNY Downstate Medical Center, Brooklyn, NY; Department of Pediatrics; Division of Pediatric Endocrinology, Infant’s & Children’s Hospital of Brooklin at Maimonides, Brooklyn, NY; Department of Pediatrics; Division of Pediatric Nephrology, SUNY Downstate Medical Center, Brooklyn, NY.

BACKGROUND: Blood pressure (BP) percentiles in childhood are assessed according to age, gender and height. Interpretations of BP values in a busy pediatric office can sometimes be cumbersome.

OBJECTIVE: To study the simplified ratios of BP/height for an accurate detection of elevated BP and to study the correlation of BP/height ratios with BP percentiles.

DESIGN/METHODS: We analyzed data of approx. 375 children from the NHANES 2005-2006 (National Health and Nutrition Examination Survey). Data on height, weight, waist circumference, BMI, & BP was collected. BMI and BP percentiles were calculated.

Receiver-operating characteristic (ROC) curve analyses were performed to calculate sensitivity and specificity of SBP/Ht and DBP/Ht ratios as diagnostic tests for elevated (>90%) systolic blood pressure (SBP) and diastolic blood pressure (DBP), respectively. Correlation analysis was performed between ratios and percentiles.

RESULTS: The average age was 12.5±4.67, range 8-16 years. SBP/Ht and DBP/Ht ratios strongly correlated with SBP percentiles and DBP percentiles in both boys and girls (r=0.01,R<0.80). The cutoffs of SBP/Ht and DBP/Ht ratios in boys were ≥0.75 and ≥0.48; and in girls the ratios were ≥0.75 and ≥0.48.

Table 1: Shows the ROC analysis of SBP and DBP in boys and girls

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CONCLUSIONS: BP/Ht ratios are simple with high sensitivity and specificity to detect elevated BP. These ratios are age independent and can be easily used in everyday care of children.

11:45 AM
Fellow in Training

HNF1A Is a Frequent Reason of Insulin Dependant Diabetes in Children with and without Islet Cell Antibodies with Good Response to Sulfonylurea Therapy
Steven Ghanny, Lina Nic, Dujuan Tan, Sheila Perez, Sonal Bhanderi, Felicitas Lazareva, Amrit Bhangoo, Svetlana Ten.
Pediatric Endocrinology, Infants and Children’s Hospital of Brooklyn at Maimonides and SUNY Downstate, Brooklyn, NY; Molecular Pathology, SUNY Downstate, Brooklyn, NY.

BACKGROUND: Mutations in the HNF1A gene has been seen to cause 58% of monogenic diabetes. This is characterized by an autosomal-dominant inheritance and absence of islet cell antibody. Patients with mutations of HNF1A respond well to sulfonylurea therapy.

OBJECTIVE: To study mutations or deletions in the HNF1A gene in insulin dependent diabetes mellitus patients with 3 generations of DM.

DESIGN/METHODS: We evaluated 9 patients with insulin dependent diabetes and autosomal dominant inheritance in 3 generations. We evaluated 2 Hispanics, 1 Ashkenazi Jew and 5 Caribbean Americans. DNA was extracted and protein coding regions of HNF1A were amplified using PCR and sequence analysis was performed.

RESULTS: 7 patients had mutations in HNF1A. 4 of them also had (+) islet cell antibodies.

Table 1

<table>
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<tr>
<th>Pt/ethnicity</th>
<th>Fh of DM</th>
<th>Insulin Therapy</th>
<th>Sulfonylurea Therapy</th>
<th>Hba1c at Ds</th>
<th>Current Hba1c</th>
<th>HNF1A Mutation</th>
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FDR: first degree relative, SDR: Second Degree Relative

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On 2 patients HNF1A was negative. Other mutational analysis is pending. Out of these 7 patients, 5 patients were switched to sulfonylurea therapy (Glyburide). On this therapy, HgbA1C improved from 8.1% to 6.3% in these patients and a new diagnosis of H36D HFE mutation was made in 3 patients. The other 2 patients were stable on their current therapy.

RESULTS: Hypoxia induced mortality was higher in wild type mice compared to those homozygous for the H63D HFE mutation. The data may be consistent with increased caspase-9 activation during hypoxia. We also have shown that hypoxia in newborn piglets is mediated by NO derived from neuronal nitric oxide synthase (nNOS). Therefore, we hypothesized that increased caspase-9 activation during hyperoxia in newborn piglets is mediated by NO derived from neuronal nitric oxide synthase (nNOS).

DESIGN/METHODS: Sixteen newborn piglets were assigned to: normoxia (Nx, n=5), hyperoxia (Hyx, n=6), and hyperoxia pretreated with a selective inhibitor of nNOS, 7-nitroindazole (7-NINA, 1 mg/kg i.v., 30 min prior to hyperoxia, n=5). Piglets were exposed to an FiO₂ of 1.0 for 1.0 hours while maintaining PaO₂ > 400 mmHg. Normoxia piglets were exposed to an FiO₂ of 0.21 maintaining PaO₂, 80-100 mmHg. ATP and phosphocreatine (PCr) content were measured biochemically to document cerebral tissue energy status. The cytosolic fraction levels of ATP (µmoles/g brain) were 4.9±1.1 in Nx, 5.1±0.5 in Hyx, and 4.8±0.7 in Hyx+7-NINA (p<NS). PCR (µmoles/g brain) was 3.3±0.6 in Nx, 3.2±0.5 in Hyx and 3.1±0.4 in Hyx+7-NINA (p<NS). Levels of high-affinity Ca²⁺-ATPase activity were measured biochemically to document cerebral tissue energy status. The cytosolic fraction levels of ATP (µmoles/g brain) were 4.9±1.1 in Nx, 5.1±0.5 in Hyx, and 4.8±0.7 in Hyx+7-NINA (p<NS). PCR (µmoles/g brain) was 3.3±0.6 in Nx, 3.2±0.5 in Hyx and 3.1±0.4 in Hyx+7-NINA (p<NS). Caspase-9 activity (µmoles/mg protein/hr) was 2.80±0.27 in Nx, 3.51±0.27 in Hyx (p<0.05 vs Nx) and 2.70±0.61 in Hyx+7-NINA (p<0.05 vs Hyx) group. The data show that administration of nNOS inhibitor prevented the hypoxia-induced increase in caspase-9 activity.

CONCLUSIONS: The mechanism of caspase-9 activation during hyperoxia is mediated by NO derived from nNOS. NO-mediated modification of the cysteine residue at the active sites of protein tyrosine phosphatases PTP-SH1 and PTP-SH2 results in their inactivation. Tyrosine phosphorylation (negatively charged) of procaspase-9 is thus increased, leading to increased binding with the arginine residue (positively charged) of the caspase recruitment domain of Apaf-1 and subsequent increased activation of caspase-9.

Tract based spatial statistics diffusion tensor imaging shows anatomic differences in white matter tracts in subjects with ornithine transcarbamylase deficiency (OTCD)

Nathaniel Robbins, Kyle Shattuck, John vanMeter, Andrea L. Gropman, MD, FNP, for Functional and Molecular Imaging, Georgetown University, Washington, DC.

OBJECTIVE: To test for differences in white matter microstructure between patients and healthy controls. Diffusion tensor imaging (DTI) was used to access functional and anatomic connectivity.

The fractional anisotropy (FA) is the most common quantitative measure to report white matter microstructural alterations.

The fractional anisotropy (FA) is the most common quantitative measure to report white matter microstructural alterations.

SUMMARY: Subjects included 19 with OTCD and 21 age matched controls. Imaging analysis was performed on a 3.0T Siemens Tim system. Voxelwise statistical analysis of the FA data was carried out using TBSS (Tract-Based Spatial Statistics, part of FSL). First, FA images were created by fitting a tensor model to the raw diffusion data using FDT, and then brain-extracted using BET. All subjects’ FA data were then aligned into a common space using the nonlinear registration tool FNIRT, which uses a b-spline representation of the registration warp field. The mean FA image was created and thinned to create a mean FA skeleton which represents the centers of all tracts common to the group. Each subject’s aligned FA data was then projected onto this skeleton and the resulting data fed into voxelwise cross-subject statistics.

RESULTS: Several regions demonstrated differences in FA, between subjects with OTCD and controls including areas of the corticospinal tract, cingulum, callosal body and uncinate fasciculus.
10:45 AM 263
Necrostatin-1 Modulates BDNF Levels in Forebrain Following Neonatal Hypoxia-Ischemia
Raul Chavez-Valdez, Lee J. Martin, Devin Mack, Sheila Razdan, Debbie L. Flock, Estelle B. Gauda, Frances J. Northington, Pediatrics, Johns Hopkins Univ., Baltimore, MD; Pediatrics, Texas Tech Univ.-HSC, Odessa, TX; Pathology and Neuroscience, Johns Hopkins Univ., Baltimore, MD.
BACKGROUND: Necrostatin-1 (Nec-1) blocks progression of delayed neuronal death in the forebrain and thalamus in a mouse model of neonatal hypoxia-ischemia (HI) (Northington, Chavez-Valdez et al; JCBFM 2010). Although early decrease in protein oxidation and inflammation may account for attenuated neurodegeneration, a necrostatin modulation of neutrophil recruitment could support regeneration post-HI. In adult rodent models, BDNF levels increase following HI (Orlandini Pereira, Machado Nabinger et al; Brain Res 2009). However, BDNF has a dual effect, with early increase post-HI linked to necrosis (Kim, Hwang et al; Neurobiol Dis 2003) and late increase linked to improved outcomes.
OBJECTIVE: To determine if Nec-1 modulates BDNF levels at early of late stages post-neonatal HI in a mouse model.
DESIGN/METHODS: We used the Vannucci model to induce cerebral HI in C57B16 mice at p7 with unilateral carotid ligation and 45min of hypoxia (FiO2=0.08). 0.1μl of 80μM Nec-1 or vehicle was injected intracerebroventricularly 15 min after hypoxia. Forebrain tissue was obtained at 3h, 24h and p11 following HI to determine changes in BDNF and neutrophil receptor (p75 and TrkB) mRNAs (real time RT-PCR) and protein (ELISA and western blot) levels.
RESULTS: BDNF protein levels in forebrain were elevated by 3h post-HI (by ~75-fold vs. naive control, p<0.05) with no difference between vehicle- and Nec-1-treated animals. A ~50% decrease in BDNF levels was observed in both treatment groups by 24h post-HI (vs. 3h). While BDNF levels further decreased in forebrain from vehicle-treated animals by p11 to levels similar to naive controls, BDNF in Nec-1-treated mice were unchanged (p11 vs. 24h) with levels 2.5-fold higher than those of the vehicle group (p=0.05). TrkB and p75 mRNA and protein levels were unchanged at 3h, 24h and p11 post-HI (vs. control) in both treatment groups.
CONCLUSIONS: Nec-1 preserves elevated levels of BDNF in the forebrain during delayed recovery from brain injury post HI while TrkB and p75 expression remain unchanged. The findings are consistent with thalamic protection afforded by Nec-1 following HI (Northington, Chavez-Valdez et al; JCBFM 2010) suggesting preservation of thalamocortical neural networks. We speculate that this preservation of trophic support by Nec-1 could improve regeneration post-HI.

11:00 AM 264
House Officer
Effect of Hyperoxia on Increased Expression of Bax Protein in the Cerebral Cortex of Newborn Piglets
Erica W. Mandell, Qazi Ashraf, Simran Ahluwalia, Om P. Mishra, Maria Delivoria-Papadoyannis, Dept. of Pediatrics, Drexel University and St. Christopher’s Hospital for Children, Philadelphia, PA.
BACKGROUND: Previously we have shown hyperoxia results in increased generation of oxygen free radicals and increased expression of pro-apoptotic protein Bax in the cerebral cortex of newborn piglets. N-acetylcysteine (NAC), an antioxidant and oxygen free radical scavenger, increases neuronal survival and may act to protect against ischemia. The purpose of this study is to determine whether or not pre-exposure to hyperoxia (55%) would alter expression of Bax protein and BDNF in the cerebral cortex in newborn piglets. We also determined ATP (µmol/kg) and phosphocreatine (PCr) (µmol/kg) levels in CyB+Cortex.
METHODS: Newborn piglets were assigned to normoxia (Nx,n=3), hyperoxia (Hyx, n=3) and hyperoxia+NAC (Hyx+NAC, n=3). ATP and phosphocreatine (PCr) were measured biochemically to determine changes in BDNF and neurotrophin receptor (p75 and TrkB) mRNAs (real time RT-PCR) and protein (ELISA and western blot) levels.
RESULTS: ATP (µmol/kg brain) was 4.7±0.3 in Nx 4.9±0.4 in the Hyx group (p=NS) and 4.2±0.3 in the Hyx+NAC group. PCr (µmol/kg brain) was 4.1±0.3 in Nx and 4.0±0.4 in the Hyx group (p=NS) and 4.2±0.4 in the Hyx+NAC group. Density of Bax protein (ODxmm2) was unchanged at 3h, 24h and p11 following HI as well as p11 following HI vs. Hyx). However, there was no significant difference in the density of Bcl-2 protein between the three groups. The data show that N-acetylcysteine administration prior to hyperoxia prevents the hyperoxia-induced increase in the proapoptotic Bax protein.
CONCLUSIONS: Since N-acetylcysteine inhibits hyperoxia-induced increase in Bax protein expression, we conclude that the mechanism of hyperxia-induced increased in Bax protein is oxygen free radical mediated. Free radicals generated during hyperoxia modify nuclear membrane high affinity Ca++-ATPase leading to increased nuclear Ca++-influx and subsquent activation of Ca++-dependent enzymes. We speculate that this phosphorylation and transcrption of the pro-apoptotic protein Bax. (NIH-HD 20337)

11:15 AM 265
Fellow in Training
Head Growth and Neurodevelopmental Outcome (ND) in Infants Treated with Head Cooling (SCH)
Raquel Gomez, Marcy Gringlas, Susan Adeniyi-Jones, Pediatrics, Thomas Jefferson Univ Hosp/AidHC, Philadelphia, PA.
BACKGROUND: SCH improves ND in infants after hypoxic-ischemic encephalopathy (HIE). Microcephaly (MC) has been associated with poor ND after HIE (Mercuri Peds 2000). Little is known about head growth after SCH and ND.
OBJECTIVE: The objective is to evaluate postnatal head growth in infants after SCH and compare to ND at ≥ 1 yr of age.
DESIGN/METHODS: A retrospective analysis of 87 surviving infants with HIE who were treated with SCH at TJUH from 1/2005 to 12/2009 and were followed to 21 yr of age. Included infants were > 36 wks, >1800 g with head circumference (HC) >10% ± 5% at birth. 9 infants were excluded: no recorded HC (n=6), GA> 36 wks (n=2), and BW<1800 g (n=1). HC was measured at birth, at discharge, and serially at 4-6, 9-12, and 24 mo and plotted on the CDC growth chart (2000). MC was defined as HC <10% ±5% for age. Bayley Scales of Infant Development III (BSID III) were performed at 12 to 24 mo. Demographic and clinical data were obtained. ND includes the BSID III, diagnosis of cerebral palsy (CP), seizures (Sz), feeding disorder (need for gastrostomy tube), cortical visual impairment (CVI) and sensorineural hearing loss (SNHL).
Statistical analysis included Fisher’s exact test.
RESULTS: 78 babies comprised the cohort with a GA of 39 ± 1.6 wks, BW of 3244 ± 521 g, male sex 40 (51%) median Apgar score at 5 min = 3, 10 min = 4 (range 0-9), pH 6.97 ± 0.2 and base deficit -19 ± 6.5. Data are mean ± SD. The HC at birth was 34.1 ± 1.8 cm, at discharge (median age 17.5, 6-175 days): 35.2 ± 1.7 cm, at 4-6 mo of life; 41 ± 2.4 cm and at 9-12 mo of life: 44.5 ± 2.2 cm. 32/78 (41%) infants were found to have a HC <10% ± 5%. MC was present by 6 mo of age in 20/32 (62.5%). Comparison of ND in infants with normal HC and MC is shown in the table.

<table>
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<tr>
<th>HC and ND</th>
<th>Normal HC (n=46), %</th>
<th>MC (n=32), %</th>
<th>p</th>
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<tr>
<td>BSID III = &lt;70</td>
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<td>Cognitive</td>
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<td>Motor</td>
<td>8.7</td>
<td>59</td>
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<tr>
<td>Motor</td>
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<td>Sx</td>
<td>4.7</td>
<td>28</td>
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<td>SNHL</td>
<td>2.5</td>
<td>22</td>
<td>&gt;0.0001</td>
</tr>
<tr>
<td>CVI</td>
<td>2.5</td>
<td>22</td>
<td>&gt;0.0001</td>
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<tr>
<td>Feeding</td>
<td>10.9</td>
<td>37.5</td>
<td>&gt;0.0105</td>
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<td>&gt;3 areas of impairment</td>
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<td>50</td>
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Global developmental delay was present in 50% of infants with MC with PPV 72%, NPV 76%, sensitivity 89% and specificity of 48%. CONCLUSIONS: In our cohort of 78 infants, poor head growth and MC after SCH were associated with poor ND. Close monitoring of HC may allow for early detection of at risk infants.

11:30 AM 266
Fellow in Training
Interleukin-6 Reduces the Expression of the Tight Junction Protein Occludin in Isolated Cerebral Microvessels from Young and Adult Sheep
Susan S. Cohen, May Min, Erin E. Cummings, Xiaochi Chen, Grażyna Sadowska, Surendra Sharma, Barbara S. Stonestreet, Department of Pediatrics, Women & Infants Hospital, Providence, RI.
BACKGROUND: The cerebral blood barrier (BBB) is a selective diffusion barrier that maintains central nervous system homeostasis and is composed of endothelial cells connected by intercellular tight junctions (TJ) that limit the entry of substances that could alter neuronal function. TJ's are composed of transmembrane and associated cytoplasmic proteins. Occludin is one of the major transmembrane protein constituents of the TJs. Pro-inflammatory cytokines have been implicated in the genesis of neonatal brain injury and may alter the protein constituents of TJ. OBJECTIVE: To examine the effect of the pro-inflammatory cytokine interleukin-6 (IL-6) on TJ protein expression using an in vitro ovine model of the BBB. We hypothesize that IL-6 downregulates key protein constituents of the endothelial TJ.
DESIGN/METHODS: Microvessels (MV) from young (n = 5) and adult (n = 5) ovine cerebral cortex were isolated after dissection, homogenization, and filtration. MV were placed into culture, incubated with IL-6 at doses of 0 (control, phosphate buffered saline), 1 (low), 10 (middle) and 100 (high) ng/mL for 24h, harvested and preserved for protein analysis by Western immunoblot for occludin. Densitometry was performed and results are expressed as a ratio to control values. RESULTS: IL-6 treatment reduced occludin expression in cerebral MV from both young (ANOVA: IL-6 dose, F = 4.09, P < 0.05) and adult sheep (F = 5.33, P < 0.01). (Fig. Data presented as ratio to control PBS treated. Open bar is control; Closed bars are IL-6 treated. *P<0.05 vs control).
CONCLUSIONS: We conclude that IL-6 decreases occludin expression in cerebral cortical MV from young and adult sheep. We speculate that pro-inflammatory cytokines predispose to brain damage in part by down regulating the TJ proteins of the BBB, impairing BBB integrity and, thereby rendering the BBB more permeable to circulating substances that damage the brain.

Effect of Epidermal Growth Factor Receptor (EGFR) Kinase Inhibition during Hypoxia on Phosphorylation of Ca\(^{++}\)/Calmodulin-Dependent Protein Kinase IV (CaM Kinase IV) in Neuronal Nuclei of Newborn Piglets

Mark Michael, R. Kirkland Sallas, David Fralinger, Om P. Mishra, Maria Delivoria-Papadopoulos.

Dept. of Pediatrics, Drexel University and St. Christopher’s Hospital for Children, Philadelphia, PA.

BACKGROUND: We have shown that cerebral hypoxia results in increased neuronal nuclear high affinity Ca\(^{++}\)-ATPase activity and increased Ca\(^{++}\)-influx in neuronal nuclei of the cortex of newborn piglets. We have also shown that hypoxia results in increased activity of CaM kinase IV. CaM kinase IV is a Ca\(^{++}\)/calmodulin-dependent enzyme, localized to the nucleus, that phosphorylates cyclic-AMP response element binding (CREB) protein and regulates the transcription of a number of genes leading to either cell survival or cell death.

OBJECTIVE: The present study tests the hypothesis that the hypoxia-induced phosphorylation of CaM kinase IV is mediated by epidermal growth factor receptor (EGFR) kinase-dependent phosphorylation.

DESIGN/METHODS: Fourteen newborn piglets were divided into three groups: normoxic (Nx, n=5), hypoxic (Hx, n=5) and hypoxic pretreated with a selective EGFR kinase inhibitor (PD 168393, 1 mg/kg i.v., 30 min prior to hypoxia, Hx+EGFRKi, n=4). Tissue levels of ATP and phosphocreatine (PCr) were determined biochemically to document cerebral tissue hypoxia. Neuronal nuclei were isolated from the cerebral cortical tissue and nuclear proteins were separated. These were probed with anti-tyrosine phosphorylated CaM kinase IV antibody using Western blot analysis. The bands were detected by chemiluminescence, analyzed by imaging densitometry and expressed as absorbance.

RESULTS: Brain tissue ATP (µmoles/g brain) was 4.40±0.4 in Nx, 1.51±0.3 in Hx and 1.68±0.4 in Hx+EGFRKi. PCR (µmoles/g brain) was 3.5±0.2 in Nx, 1.3±0.3 in Hx and 1.24±0.3 in Hx+EGFRKi. Density of phosphorylated CaM kinase IV protein [ODxmm\(^2\)] was 72.1±7.6 in Nx, 134.17±6.0 in Hx (p<0.05 vs Nx), and 80.04±2.7 in Hx+EGFRKi (p<0.05 vs Hx). The data show that administration of a selective inhibitor of EGFR kinase prevents the hypoxia-induced increased tyrosine phosphorylation of CaM kinase IV.

CONCLUSIONS: Hypoxia results in increased phosphorylation of CaM kinase IV and the activation of CaM kinase IV is EGFR kinase-dependent. The tyrosine phosphorylation of CaM kinase IV during hypoxia will lead to increased interaction between phosphorylated CaM kinase IV and Arg and Lysine residues of its substrate, CREB protein. Phosphorylated CREB protein will subsequently lead to transcription of pro-apoptotic proteins. (NIH-HD 20337)
Abstract Author Index

Index numerals refer to the Abstract number, not the page number. Only Presenting Abstract Authors are included in the Index.
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<td>(Tulane Faculty Liaison)</td>
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<tr>
<td>Andriss, Hans</td>
<td>Consultant: Genzyme Corporation, Biomann &amp; Shire Therapeutics</td>
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<tr>
<td>Cairo, Mitchell</td>
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<tr>
<td>Gelb, Bruce</td>
<td>Patents: Patent 1 - PTPN11 Mutations for genetic testing of Noonan syndrome; Patent 2 - SOST and RAP1 mutations for genetic testing of Noonan syndrome; Patent 3 - SHOC2 mutations for genetic testing of Noonan-like with loose anagen hair syndrome; Royalties: GeneDx, royalties for gene testing as described in the patent section; Prevention Genetics, royalties for gene testing as described in the patent section; Baylor College of Medicine, royalties for gene testing as described in the patent section; Corrigan, royalties for gene testing as described in the patent section; Employee: Medimmune</td>
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<td>(Tulane Chair, CME Advisory Committee)</td>
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<td>Kleinpeter, Myra</td>
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<td>Grant, Consultant &amp; Speakers Bureau: Ikaria LLC</td>
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<tr>
<td>Sen, Sarbattama</td>
<td>Husband is employed by Putnam Associates, a Healthcare Consulting Company</td>
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The following staff have documented that they have nothing to disclose or Conflicts of Interest (COI) to resolve:

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Unapproved or Off Label Disclosure

The following presenters have disclosed that their presentations will involve comments or discussion concerning unapproved or off-label uses of a medical device or pharmaceuticals.

Dietz, Hal - Angiotension receptor blockers
Lakshminrusimha, Satyana - Inhaled nitric oxide for use at birth in controls
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