

11th International Conference on Brain Monitoring and Neuroprotection in the Newborn February 7-9, 2019

Bob White, MD

Scientists and clinicians from 18 countries gathered at the 11th International Newborn Brain Conference recently to discuss the latest research on care of the newborn brain.

After several workshops opened the meeting, the first plenary session addressed "Environment of the Developing Brain". Session Chair Dr. Terrie Inder presented the current evidence on the sensory development of the preterm infant and implications for care. Dr. Ruth Grunau further discussed noxious influences in the NICU environment, especially pain, then Dr. Joan Smith described how positive sensory input could be organized into a multimodal protocol, with extensive family involvement. Dr. Martha Welch expanded on the value of the family's role, then Dr. Renee Shellhaas reviewed the importance of sleep in preterm infants. Finally, Dr. Bob White presented evidence to support the continued emergence of couplet care and single-family rooms in the NICU as a way to reduce noxious stimuli and improve the likelihood that families will be present and interactive with their baby. Take-away messages from this session included 1) there are profound differences between optimal and actual brain growth of preterm infants in the NICU; 2) to some extent this is due to the adverse sensory environment to which these infants are exposed. In particular, both frequent pain and its treatment with morphine or fentanyl have been shown to cause long-term complications including hormonal, behavioral, and epigenetic; and 3) It is possible to enhance the sensory environment of the premature infant and thereby improve outcomes; the family is the most important agent in this effort, but there are also valuable roles for staff and volunteers.

The second plenary session reviewed current evidence and

practice for the treatment of hypoxic-ischemic encephalopathy (HIE), especially "mild" HIE. While the definition of this category is not uniform it is now apparent that outcomes in these infants are not universally optimal, so the potential for beneficial interventions was considered. Dr. Alistair Gunn presented animal models of mild HIE, typically produced by 10-20 minutes of severe ischemia, which caused selective but significant neuronal loss in untreated controls. Therapeutic hypothermia was successful in this model in reducing long-term brain damage, especially if started within the first hour of life. Dr. Hannah Glass reviewed the current state of clinical practice; the most recent reviews show that 20-40% of babies with mild HIE have abnormal MRIs, especially in the watershed areas of the brain, and a similar percentage have long-term disability. 50-75% of these infants are now being cooled, with a trend in studies suggesting there is a benefit to this care. The primary challenge continues to be creating a rigorous definition so that appropriate studies can be performed; this is hampered by the fact that clinical and laboratory signs often change over the first few hours, creating a broad spectrum of findings even in this sub- category of HIE. The theme that a baby's findings can change considerably over a matter of hours during a time when a decision on starting therapeutic hypothermia needs to be made was reinforced by Dr. Lina Chalak with respect to physical exam, EEG, MRI, and NIRS, and by Dr. Deidre Murray in her review of potentially useful biomarkers. Session chair Dr. Geraldine Boylan described the EEG in a series of normal newborns; her finding that all normal newborns had a continuous background with some evidence of cycling by 2-3 hours of age could be used to identify those infants who had sustained some brain injury and for whom intervention might be considered. The session was completed with an audience response session, in which it was revealed that feedings are being safely given to some infants during therapeutic hypothermia at some centers.

"Frequent administration of morphine can reduce electrical activity in the cerebellum, which correlates closely with reduced brain growth, even after correcting for severity of illness."

A general science session followed, chaired by Dr. Frank van Bel. Dr. Michael Cotton provided preliminary evidence that stem cell administration may improve outcome after HIE or ischemic stroke, and may also reduce the risk for BPD and severe IVH in very preterm infants; a number of early phase clinical trials are being planned. Dr. Gabriel Variante described the development of an extensive telemedicine network for training, collaboration, and standardization in Brazil, with improved outcomes providing validation to extend this throughout Latin America. Dr. Manon Benders elucidated the many roles of the cerebellum in brain development and function; it has the most rapid growth of any brain segment, and can both cause and be adversely affected by injuries to other parts of the brain. Frequent administration of



morphine can reduce electrical activity in the cerebellum, which correlates closely with reduced brain growth, even after correcting for severity of illness. Dr. Christopher Rhee reviewed the cerebral autoregulation and its tenuous status in preterm infants, where increases or decreases in perfusion can cause damage in the form of IVH and PVL. Dr. Dan Licht completed this session with a description of the challenges facing infants with congenital heart disease before, during, and after cardiac surgery, especially related to optimizing O2 delivery to the brain.

The final session, entitled “Prognosis After Early Brain Injury” was chaired by Dr. Hannah Glass and explored several aspects of this challenge. Dr. Lena Hellstrom-Westas described the value of EEG in the first days of life; when multiple components of the EEG are considered, including background activity, synchrony, cyclicity, and seizures, the prognostic value is high. Dr. Terrie Inder detailed the many components of an MRI exam that should be interrogated to maximize accuracy. Timing of the MRI was another important component to consider; the false negative rate at 12 hours of age is up to 30%, with a maximal prognostic value of conventional MRI after 7 days of age, though lactate levels by MRI spectroscopy can provide useful information on day one. Even so, MRI is better at predicting motor outcomes based

on white matter changes than it is for cognitive outcomes. Dr. Monica Lemmon then gave a humbling overview of the challenges in discussing potential outcomes with parents. There is rarely concordance in understanding after family conferences to convey prognosis, so she identified several strategies and resources for providers to improve their skill in giving families what they want and need in this regard. Finally, Dr. Sonia Bonifacio presented a case that illustrated many of the topics discussed throughout the meeting, reinforcing both what we have learned and how much remains to be determined in order to provide optimal care for high-risk infants.

The next meeting of the International Newborn Brain Conference will be in Ireland in the second half of 2020, then the conference will return to Clearwater Beach, FL in mid-February 2022. In the meantime, Dr. Mohamed El-Dib has begun a Special Interest Group on Neonatal Neurocritical Care, with a website at www.NNCC-SIG.org and plans to meet at PAS in Baltimore in April. All who have an interest in this field are welcome to join via the web site.

The author has indicated no relevant disclosures.

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AGENDA
February 7-9, 2019

Rev. 01-29-19

Thursday, February 7, 2019		
TIME	SESSION / EVENT	
7:00 AM	REGISTRATION OPENS	
7:30 – 8:30 AM	CONTINENTAL BREAKFAST IN EXHIBIT HALL (PALM/BAY)	
WORKSHOPS (separate registration)		
WORKSHOP A (ISLAND II)	WORKSHOP B (SAND KEY)	WORKSHOP C (ISLAND I)
8:30 AM – 10:00 AM	8:30 AM – 10:00 AM	8:30 AM – 10:00 AM
Neurologic Examination of the Neonate (Robert R. Clancy, MD)	Early Diagnosis of Cerebral Palsy (Nathalie Maitre, MD, PhD; Betsy Ostrander, MD)	aEEG/EEG workshop (Lena Hellstrom-Westas, MD, PhD; Geraldine Boylan, PhD)
10:00 AM – 10:30 AM: BREAK		
WORKSHOP D (ISLAND II)	WORKSHOP E (ISLAND I)	12:15 – 1:15 PM PRIVATE LUNCH EVENT (SAND KEY)
10:30 AM – 12:00 PM	10:30 AM – 12:00 PM	
EEG Seizures (Robert R. Clancy, MD)	Utility of NIRS to Avoid Suboptimal Cerebral Oxygenation in the Preterm: Case Presentations (Frank van Bel, MD; Petra Lemmers, MD, PhD)	
12:00 PM – 1:25 PM: LUNCH ON OWN		
MAIN CONFERENCE BEGINS (ISLAND II-I)		
1:25 – 1:30 PM	Welcome <i>Environment of the Developing Brain</i> (moderator: <i>Terrie Inder, MBCHB</i>)	
1:30 – 2:00 PM	Development of the Immature Brain and Implications for the NICU Environment (Terrie Inder, MBCHB)	
2:00 – 2:30 PM	Experiential Influences in the NICU on Brain Development: Noxious (Ruth Grunau, PhD)	
2:30 – 3:00 PM	Experiential Influences in the NICU on Brain Development: Nurturing (Joan Smith, PhD, RN, NNP-BC)	
3:00 – 3:30 PM	BREAK IN EXHIBIT HALL (PALM/BAY)	
3:30 - 4:00 PM	Family Based Interventions in the NICU: Impact on Outcomes (Martha Welch, MD)	
4:00 – 4:30 PM	Causes and Consequences of Abnormal Sleep in the NICU (Renee Shellhaas, MD)	
4:30 – 5:00 PM	The NICU of the Future: Will we even recognize it? (Robert White, MD)	
5:00 – 5:45 PM	<ul style="list-style-type: none"> ➤ Individual Variability in the Infant's Pain Response: Can We Predict an Infant's Response to Noxious Events from Spontaneous Brain Activity? (Luke Baxter, PhD student) ➤ Characterizing Infant Brain Activity During Retinopathy of Prematurity Screening (Miranda Buckle, MBBC, FRCO) 	
5:45 – 7:15 PM	RECEPTION IN EXHIBIT HALL (AND POSTER WALK 6:30 – 7:15)	

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Friday, February 8, 2019

TIME	SESSION / EVENT
7:00 – 5:30 PM	REGISTRATION DESK OPEN
7:00 – 8:00 AM	CONTINENTAL BREAKFAST IN EXHIBIT HALL (PALM/BAY)
7:55 – 8:00 AM	Welcome <i>HIE (moderator: Geraldine Boylan, PhD)</i>
8:00 – 8:30 AM	Animal Models of Mild/Moderate HIE (Alistair Gunn, MBCHB, PhD)
8:30 – 8:45 AM	“Mild” HIE: What’s in a Name? (Hannah Glass, MD)
8:45 – 9:15 AM	NIRS in Mild and Moderate HIE (Lina Chalak, MD)
9:15 – 9:45 AM	Can Blood Biomarkers Distinguish Between Mild and Moderate HIE? (Deirdre Murray, MB BAO, PhD)
9:45 - 10:15 AM	BREAK IN EXHIBIT HALL (PALM/BAY)
10:15 – 10:45 AM	What are the EEG Features of Mild and Moderate HIE, and Can Machine Learning Help? (Geraldine Boylan, PhD)
10:45 – 11:45 AM	<ul style="list-style-type: none"> ➤ Early Exit from Neonatal Therapeutic Hypothermia: A single institution experience using MRI to guide decision-making (Yasmine White, MD) ➤ Abnormal Electroencephalographic Findings in Infants with Mild Neonatal Hypoxic Ischemic Encephalopathy (Rafaela Pietrobom, MD) ➤ Brain Injury following Hypoxic-Ischemia is Associated with Worsening Trend of Cerebral Autoregulation During Therapeutic Hypothermia (Zachary A. Vesoulis, MD) ➤ Low Blood Pressure Variability is an Early Predictor of Abnormal EEG Infants with Hypoxic Ischemic Encephalopathy (Abigail Flower, PhD)
11:45 – 12:00 PM	ARS: What are People doing in Their Practices? (John Barks, MD; John Hartline, MD)
12:00 – 1:25 PM	LUNCH ON OWN
12: 15 – 1:15 PM	PRIVATE LUNCH EVENT (ISLAND II)
1:25 – 1:30 PM	Welcome <i>General Science (moderator: Frank van Bel, MD, PhD)</i>
1:30 – 2:00 PM	Stem Cell Therapy for Brain Injury in the Newborn (Michael Cotten, MD)
2:00 – 2:30 PM	Protecting Brains in the Developing World (Gabriel Variane, MD)
2:30 – 3:00 PM	The Cerebellum: How do We Diagnose, Monitor and Treat Injuries to Newborns? (Manon Benders, MD, PhD)
3:00 – 3:30 PM	BREAK IN EXHIBIT HALL (PALM/BAY)
3:30 PM	POSTERS NEED TO BE DOWN
3:30 – 4:00 PM	New Developments in Understanding Cerebrovascular Autoregulation (Christopher Rhee, MD)
4:00 – 4:30 PM	Protecting the Brain, Before, During, and After, Cardiac Surgery (Daniel Licht, MD)

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4:30 – 5:30 PM	<ul style="list-style-type: none"> ➤ Validation of Global Brain Injury Scoring Applied by a Novel 1T Neonatal MRI System in Comparison to a Conventional 1.5T MRI System in Very Preterm Infants at Term Equivalent Age (Alona Bin-nun, MD) ➤ Nonlinear Transfer Entropy to Assess the Neurometabolic Coupling in Premature Neonates (Dries Hendrikx) ➤ Therapeutically Reducing Neuronal and White Matter Impairment in the Growth Restricted Newborn Brain (Julie Wixey, PhD) ➤ Using Cerebral NIRS Measures for an Individualized Approach to RBC Transfusions in Premature Infants (Halana V. Whitehead, MD)
5:30 – 5:45 PM	OPTIONAL: SPECIAL INTEREST GROUP (Mohamed El-Dib, MD)

Saturday, February 9, 2019

TIME	SESSION / EVENT
7:15 – 12:30 PM	REGISTRATION DESK OPEN
7:15 – 8:00 AM	BREAKFAST
7:55 – 8:00 AM	Welcome <i>Prognosis After Early Brain Injury (moderator: Hannah Glass, MD)</i>
8:00 – 8:45 AM	Utility of the EEG in Establishing the Prognosis (Lena Hellstrom-Westas, MD, PhD)
8:45 – 9:30 AM	Utility of the MRI in Establishing Prognosis (Terrie Inder, MBCHB)
9:30 – 10:15 AM	Communicating Neurologic Prognosis to Families (Monica Lemmon, MD)
10:15 – 10:45 AM	BREAK (CHECK OUT OF HOTEL)
10:45 – 11:30 AM	Cases, Questions and Panel Discussion (Sonia Bonifacio, MD)
11:30 – 12:00 PM	<ul style="list-style-type: none"> ➤ A Web-Based Calculator for Prediction of Severe Neurodevelopmental Impairment in Preterm Infants Using Clinical and Imaging Characteristics (Zachary A. Vesoulis, MD) ➤ aEEG and NIRS Monitoring in Term Neonates Diagnosed with Perinatal Arterial Ischemic Stroke and the Association with Neurodevelopmental Outcome (Daphne van den Berk, MD)
12:00 – 12:30 PM	ARS (John Barks, MD; John Hartline, MD)
12:30 PM	CONFERENCE ADJOURNS

NEONATOLOGY TODAY is interested in publishing manuscripts from Neonatologists, Fellows, NNPs and those involved in caring for neonates on case studies, research results, hospital news, meeting announcements, and other pertinent topics.

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The National Perinatal Association (NPA) is an interdisciplinary organization that gives voice to the needs of parents, babies and families and all those interested in their health and wellbeing. Within NPA, parents and professionals work together to create positive change in perinatal care through education, parent programs, professional guidelines and events.

www.nationalperinatal.org



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