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Member in the Spotlight: Brenda Lessen

Academy of Neonatal Nursing, *Academy of Neonatal Nursing*

Member in the Spotlight

ANN member Brenda Lessen, PhD, RN, is a researcher at Illinois Wesleyan University's School of Nursing. She is the developer of the Premature Infant Oral Motor Intervention (PIOMI). This is the only evidence-based, validated intervention that facilitates the development of oral-motor skills in preterm infants. It has been found to improve oral feeding, shorten hospital stays by 2–3 days, and lower costs.[1]

The tool evolved from Dr. Lessen's interest in premature infant feeding problems since her days as a NICU staff nurse. She was particularly concerned for those infants whose discharge was delayed because they could not progress to full feeds. Thus began a program of graduate study, exploring how infants could be helped before a bottle was ever placed in their mouth. Because there was nothing available in the nursing literature, Dr. Lessen turned to oral-motor therapy methods in the speech pathology literature. She coupled this with predictive neural networking literature to understand how the premature infant's "brain wiring" was disrupted by the premature birth and negative oral stimulation of the NICU environment. Debra Beckman's BOMI (Beckman Oral Motor Assessment and Intervention) tool was modified with permission to create an eight-step, five-minute intervention that premature infants could tolerate. The PIOMI is designed to provide muscle and sensory activation to oral structures and cheeks to increase functional strength and range of motion and control movement until the infant is old enough to breast or bottle feed. The original study evaluated the use of PIOMI once a day for 7 days in 29-week gestation infants before bottle feeding was initiated to establish safety in such small infants.[1] PIOMI infants attained full feedings 5 days earlier and were discharged 2.6 days sooner than those receiving conventional care. It was estimated that $2 billion would be saved annually if over half a million premature infants born each year were discharged 3 days early. This study has been replicated in Tehran, Iran, with twice the sample size, and produced the same results. The replicated study is being prepared for publication.

The PIOMI is becoming very popular since there is no cost and no equipment, and it is high-touch, easy to learn, well tolerated, does not require cognitive participation of the patient, and can be taught to parents. By request of the Illinois Easter Seal Chapter in Bloomington, Dr. Lessen has developed a parent version of the training materials that can be used in the home. These materials are being used to study the effects of the intervention done by parents and continuing after discharge.

Training materials can be obtained directly from Dr. Lessen or from her website (www.PIOMI.com). The packet includes a video DVD, eight-step guide, quick reference guide, and reliability rating tool. Dr. Lessen can train your facility or consult as needed after you have received training materials. Dr. Lessen is also available for consultation as the tool is implemented for graduate students or researchers wishing to use the tool. She can be reached via e-mail at blessen@iwu.edu or cell phone at 309-212-0544.

Since the publication of the original study in *Advances in Neonatal Care,* interest has taken off. Before disseminating training materials, Dr. Lessen completed a reliability study. The reliability study showed the tool had >97 percent for all reliabilities (between, among, and for repeated users). Dr. Lessen does recommend an annual competence review to maintain this reliability. Nationally, there are 15 centers in 10 states that have been trained. There are also 11 centers in eight countries that have received training. The tool has been requested by researchers, students, speech pathologists, and parents. It will be translated into many languages.

There are many opportunities for future research, particularly for those interested in translational research. Some topics already being considered include:

- Does the PIOMI benefit other populations of infants such as older infants, those with cardiac issues, or those labeled as "poor feeders"?

The Golden Hour

(from News of the Academy – January/February 2014 Issue)

Word Search Answer Key

H	B	F	S	Y	U	J	K	X	U	A	I	V	K	W	Q
N	C	Z	S	X	P	D	H	Y	P	E	R	O	X	I	A
I	N	T	U	B	A	T	I	O	N	R	Y	U	J	K	L
P	G	B	R	V	T	Q	L	P	E	I	N	L	V	X	R
Q	E	T	F	Y	E	V	A	P	O	R	A	T	I	O	N
U	O	P	A	A	D	G	J	L	P	Z	C	R	B	M	W
G	L	U	C	O	S	E	R	Y	U	I	P	A	S	F	G
J	L	X	T	V	N	Q	E	T	F	U	O	U	A	D	F
H	K	Z	A	C	B	M	V	X	F	L	J	M	G	D	A
D	A	P	N	O	U	T	E	Q	W	R	Y	A	I	T	P
V	E	N	T	I	L	A	T	I	O	N	G	J	L	E	K
H	F	S	A	Z	B	A	R	O	T	R	A	U	M	A	S
C	B	N	V	X	Q	E	T	U	O	P	I	Y	R	M	E
W	Q	L	J	G	D	A	S	F	H	K	Z	C	B	W	M
T	H	E	R	M	O	R	E	G	U	L	A	T	I	O	N
N	V	X	A	D	G	J	L	K	H	F	D	A	P	R	I
H	Y	P	O	T	H	E	R	M	I	A	Q	E	R	K	Y

- Does it have an effect on breastfeeding success?
- Would an increased frequency or duration be more effective?
- When do we achieve maximum benefit?
- Do the initial positive effects on feeding continue after discharge?
- What would the results be for feeding outcomes if parents were feeding as compared with nursing staff?
- What would be the effects of parents performing the PIOMI in the NICU?

There are certainly many opportunities for research and a very willing colleague to share her work and passion with our ANN members. Thank you, Dr. Lessen, for creating the PIOMI to enhance feeding success for our vulnerable population. (*LW*)

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Medication Highlight

Sildenafil—The First-Line Treatment for Persistent Pulmonary Hypertension of the Newborn?

Sildenafil citrate, a phosphodiesterase type 5 (PDE5) inhibitor, has been shown to selectively reduce pulmonary vascular resistance in animal and adult human models. It has been reported to be successful in the treatment of persistent pulmonary hypertension of the newborn (PPHN).[1–4] Sildenafil citrate enhances nitric oxide–mediated vasodilation and reduces pulmonary vascular resistance by increasing cyclic guanosine monophosphate (cGMP). This is achieved by inhibiting PDE5, which is responsible for degrading cGMP to guanosine monophosphate.[5–7] Sildenafil is a selective pulmonary vasodilator that has no effect on systemic arterial pressure. The effects of inhaled nitric oxide are also potentiated with oral administration of sildenafil.[6,8]

Sildenafil has been used in centers that do not have access to nitric oxide and high-frequency ventilation to improve oxygenation in infants with pulmonary arterial hypertension, primary pulmonary hypertension, and PPHN that is refractory to nitric oxide.[2,6] The cost and lack of availability of these therapies has driven the need to explore therapeutic alternatives for those in resource-constrained environments.[9] There is interest in understanding and targeting the biochemical pathways that regulate pulmonary vasoconstriction and remodeling in PPHN as nitric oxide is not universally effective in reversing PPHN.[10,11] The oral preparation of sildenafil was approved by the Food and Drug Administration in 2007 for the treatment of adults with pulmonary arterial hypertension (PAH), with no functional class restriction. The recommended adult dose was 20 mg three times daily. There is no recommended dosage for children or neonates with PAH;[8] however, current dosages for neonates have been extrapolated from the adult dosage range. Therapeutic ranges reported in the literature are 0.5–2 mg/kg/dose.[8,9] In a case study of sildenafil administration via nasogastric tube, 0.5 mg/kg/dose was given four times per day. When there was no response, the dose was doubled to a maximum of 2 mg/kg/dose.[13] It has been reported that a single dose of 0.4 mg/kg orally prevented rebound after withdrawal from inhaled nitric oxide.[14]

Sildenafil is rapidly absorbed after oral administration. Its bioavailability is 40 percent. Maximum serum concentration of the drug in children was reached within an hour of administration, depending on the dose.[12] There have been reports of nebulized sildenafil. The effects were similar to oral or parenteral administration with deposition of the drug varying depending on the nebulizer.[6] Parenteral administration has been evaluated in a number of studies. The drug is reported to be well tolerated even with higher dosages.[6]

Endotracheal administration has been considered to achieve a more rapid onset of action, but more needs to be learned about this route. Presently, oral administration appears to be the safest and most efficacious route.[6]

More studies are needed to assess the safety, efficacy, and optimal dosage of sildenafil when compared with nitric oxide and high-frequency ventilation for neonatal patients.[2,6,9,13] Pharmacokinetics need to be better defined, as does the side-effect profile. Hypotension is one of the most common side effects of sildenafil administration in neonates. Ocular complications are a significant side effect in adults, but it has not been determined what the risk is for neonates, who are otherwise not at risk of developing retinopathy of prematurity (ROP). Sildenafil is suspected of exacerbating ROP.[14] (*LW*)

1. Ahsman MJ, Witjes BC, Wildschut ED, et al. Sildenafil exposure in neonates with pulmonary hypertension after administration via a nasogastric tube. *Arch Dis Child Fetal Neonatal.* 2010;95(2):F109-F114.
2. Shah PS, Ohlsson A. Sildenafil for pulmonary hypertension in neonates. *Cochrane Database Syst Rev.* 2007; CD005494.
3. Vargas-Origel A, Gomez-Rodriguez G, Aldana-Valenzuela C, et al. The use of sildenafil in persistent pulmonary hypertension of the newborn. *Am J Perinatol.* 2010;27(3):225-230.
4. Nahada MC, Morosco RS, Brady MT. Extemporaneous sildenafil citrate oral suspensions for the treatment of pulmonary hypertension in children. *Am J Health Syst Pharm.* 2006;1(63):254-257.
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