VOL XXI, NO 3 **SEPTEMBER 2005**

NEONATAL APNEA:
DETECTING AND MANAGING APNEA/BRADYCARDIA SPELLS

The A/B spell…those of us who care for premature babies have seen it, said it, and dealt with it more times than we could possibly count. How we define and manage this very prevalent complication of prematurity can have a big impact on these little lives and their families, especially as it pertains to the length of hospital stay. With that said…

WHAT IS APNEA?

Apnea is defined as "cessation of respiratory airflow and/or respiratory movements for 20 seconds or longer"-Core Curriculum for Neonatal Intensive Care Nursing. It can be associated with pallor, bradycardia, cyanosis, oxygen desaturation, or change in level of consciousness. As many as 25% of all infants weighing less than 2500 grams will experience apnea in the neonatal period.

WHY IS THIS A PROBLEM?

Apnea in premature infants can lead to decreased cerebral blood flow, resulting in ischemia and eventually leukomalacia. During apneic episodes, blood is shunted away from the mesenteric arteries, resulting in intestinal ischemia and possibly necrotizing enterocolitis (NEC). The potential for these severe complications should convince us that A/B spells are a serious matter.

DEFINING "APNEA OF PREMATURITY"

Central Apnea

- Absence of airflow *and* respiratory effort
- No signal being transmitted from CNS to respiratory muscles
- Immature response to signal at peripheral vagal receptors resulting in "reflex apnea"

Obstructive Apnea

- Absence of airflow *with* continued respiratory effort
- Associated with airway obstruction, usually in upper airway (pharynx)
- May be due to neck flexion or excessive secretions in nasopharynx or hypopharynx

Mixed Apnea

- Combination of central apnea and obstructive apnea
- 50% of all apnea episodes are mixed

MONITORING FOR APNEA/BRADYCARDIA

All newborns less than 34 weeks gestational age should be on an apnea/bradycardia monitor. The apnea alarm should be set to sound if respiration ceases for more than 20 seconds. The bradycardia alarm should be set to alarm if the heart rate drops below 100 bpm.

INTERPRETING YOUR ALARMS

Apnea first, then bradycardia

- Typical A/B spell

Bradycardia alone

- May be *obstructive apnea*
- Breathing movements are detected, but there is no airflow, so heart rate drops

Bradycardia first, then apnea

- Reflex apnea can lead to bradycardia within 2 seconds of onset, so heart rate alarm sounds 10-15 seconds before apnea alarm

INTERVENING FOR A/B SPELLS

When the alarm sounds, observe the infant for signs of breathing and skin color. If the baby is apneic, pale, cyanotic, or bradycardic provide some tactile stimulation. If there is no response, provide positive pressure ventilation with a bag and mask. It may be necessary to reposition the airway and/or suction.

DOCUMENTATION OF A/B SPELLS SHOULD INCLUDE…

- Time of apneic episode and any relation to feeding, sleeping, activity, nursing cares, or stooling
- Length of apneic episode
- Bradycardia and heart rate noted upon alarm
- Color change
- Infant's position: prone, supine, HOB↑, HOB flat
- Type of stimulation needed: self-resolved, gentle or vigorous stimulation, oxygen, bag and mask ventilation

CHRONIC MANAGEMENT FOR APNEA OF PREMATURITY

Pharmacologic Therapy

- Most common medications used to treat apnea of prematurity are methylxanthines: Caffeine and Theophylline
- They block receptors for adenosine, which inhibits respiratory drive

Continuous Positive Airway Pressure (CPAP)

- Delivered by nasal prongs or single nasopharyngeal tube
- CPAP "splints" upper airway with positive pressure during both inspiration and expiration, preventing pharyngeal collapse

Nasal Intermittent Positive Pressure Ventilation (NIPPV)

- Synchronized positive pressure breaths given via nasal CPAP device: range 10-25 bpm
- Used for babies with severe and/or persistent A/B spells

Intermittent Mandatory Ventilation (IMV)

- If significant apnea persists despite use of medications and CPAP, infant should be intubated and ventilated with settings that will minimize barotrauma

(References available upon request)

FOR QUESTIONS OR COMMENTS: Contact Kathy Papke, R.N. or Penny Smith, R.N., Statewide Perinatal Care Program, Department of Pediatrics, 200 Hawkins Dr., Iowa City, Iowa 52242-1083 Call (319) 356-2637 or FAX 319-353-8861.