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Management Guidelines

for Infants with Apnea and Bradycardia of Prematurity

DEFINITION

An apneic spell is usually defined as a cessation of breathing for 20 seconds or longer or a shorter pause accompanied by bradycardia (<100 beats per minute), cyanosis, or pallor.[1]

OVERVIEW

Apnea of prematurity (AOP) is commonly experienced by premature infants with an incidence negatively correlated with gestational age at birth. Nearly all babies less than 28 weeks of gestational age have this disorder, with 85% of those born at 30 weeks and 20% at 34 weeks also experiencing AOP.[1] Studies have shown that events may persist in many babies, at least until the completion of 43-44 weeks post-menstrual age. These events can persist despite an "apnea-free" period of observation while in the hospital prior to discharge. Underlying conditions, such as sepsis or anemia that may cause apnea should be considered and excluded prior to making the diagnosis of AOP. Infants born less than 35 weeks of gestation should be observed for clinically significant apnea and managed accordingly. In addition to chest wall impedance, heart rate and pulse oximeter monitoring should be performed on infants at risk for AOP.

MANAGEMENT/MEDICATIONS

Prolonged or frequent events (defined as apnea >20 seconds and/or bradycardia with a heart rate <80 for at least 5 seconds) warrant evaluation to exclude underlying conditions and, if none are identified, treatment for AOP may be initiated.[2] Non-pharmacologic measures may include the application of room air flow via nasal cannula and/or the addition of supplemental oxygen if hypoxemia exists. Thermoregulation, infant positioning and airway patency should be optimized. Nasal Continuous Positive Airway Pressure (NCPAP) or mechanical ventilation may be indicated if events are severe and persistent and are not responding to other interventions. Methylxanthine therapy, particularly caffeine citrate, is often added to the treatment regimen if significant events persist.

After the loading (20 mg/kg) and maintenance doses (5-10 mg/kg/day) of caffeine are ordered, additional boluses may be required if apnea persists.[1,3] A trial of discontinuation of caffeine should be considered at 32-34 weeks PMA or after a five to seven day period with minimal or no events, whichever comes first. Due to the long half-life of caffeine, the infant should continue to be monitored for five to seven days after treatment has been discontinued.[1]

Treatment benefits should be balanced with side effects, both short and long term. Procedure or care related events, or events that occur during feeding, must be distinguished from AOP and managed accordingly. Gastroesophageal reflux or suck/swallow incoordination are common conditions experienced by premature infants and are not associated with, nor contribute to, apnea of prematurity. Red blood cell transfusions are sometimes prescribed in the presence of significant anemia with persistent and/or severe apnea, despite therapeutic caffeine levels. Mechanical ventilation may also be necessary in some cases if all other measures have not been successful in managing an infant's AOP.

IN HOSPITAL MONITORING

Stable premature infants who have achieved complete nipple feedings, have stable temperatures in an open crib, and steady weight gain, often remain hospitalized due to persistence of apnea of prematurity. Although many practitioners advocate observation of these infants for a defined number of days without symptoms, the exact number of apnea-free days remains controversial.[1,4,9,12] Clinical judgment and physician uncertainty often influence the decision to prolong hospitalization of otherwise stable premature infants who are feeding and growing, despite the presence of immature control of respiration.

In a large retrospective study done in 2011 by S. Lorch et al, a five day observation time demonstrated that only between 2-3% of these infants had an event during this time period, except for those with a gestational age of 26 weeks or less, where a seven day observation time showed 2% of these infants had an additional event.[9]

It has been our experience in working with NICUs across the United States that the typical observation period for apnea practiced by most neonatologists is ≤ 5 days. It is recognized that a longer countdown period may be appropriate for infants born at ≤ 26 weeks.

DISCHARGE

The discharge of premature infants with a history of apnea can be challenging for the clinician, given the lack of clinical consensus. Infants requiring ongoing caffeine therapy, or those who have not had an adequate period of observation following the clearance of therapeutic serum concentrations, may be considered for discharge with a monitor. Infants who have been observed for an extended apnea-free or event-free period of time may be considered for discharge without a monitor. Brief, isolated bradycardic events that spontaneously resolve or events associated with feedings need not delay discharge. In addition, otherwise stable infants who meet criteria for discharge, except for an occasional mild self-resolved event or an event that requires minimal stimulation, or those infants who experience an "unusually prolonged course of recurrent, extreme apnea"[1] event during an observation "countdown," may be considered for discharge with a monitor with a re-evaluation in two to four weeks, or the monitor discontinued by 44 weeks PMA. Parents and caregivers should receive CPR training prior to discharge of their child.

HOME MONITORING

Although most physicians support discharge home without a monitor for babies who have had an appropriate apnea-free period, others propose safe discharge of infants with a monitor, if occasional breakthroughs occur during this countdown period. The use of home cardio-respiratory monitors may be used to facilitate the discharge of stable premature infants who manifest occasional mild or self-resolved "events," without cyanosis or respiratory distress.

Parents should understand that the use of a home monitor has not been demonstrated to reduce the rate of SIDS, even in premature infants.[1]

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