

Management Guidelines *for* Infants with Apnea and Bradycardia of Prematurity



Definition:

Apnea of prematurity (AOP) is defined as a sudden cessation of breathing that lasts for at least 20 seconds or is accompanied by bradycardia or oxygen desaturation (cyanosis) in an infant younger than 37 weeks' gestational age.¹

to discharge. Underlying conditions 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, the heart rate should be monitored and pulse oximetry as well if pulmonary disease is present.

I. Introduction:

Apnea of prematurity (AOP) is commonly experienced by premature infants with an incidence inversely proportional to gestational age. Nearly all babies less than 28 weeks of gestation have this disorder as do more than one-half of all premature infants. Studies have shown that events may persist in many babies at least until the completion of 43-44 weeks PMA despite an "apnea-free" period of observation while in the hospital prior

II. Management/ Medications:

Prolonged or frequent events warrant evaluation to exclude underlying conditions and once completed, treatment should be initiated. Non-pharmacologic measures may include the application of room air flow via nasal cannula and/or the addition of increasing fractions of inspired oxygen to maintain appropriate oxygen

saturation if hypoxemia exists. Thermoregulation, infant positioning and airway patency should be optimized. Nasal-Pharyngeal 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 with maintenance of therapeutic plasma concentrations given the drug's pharmacologic characteristics. Theophylline is rarely used as it has a more narrow therapeutic index than caffeine and requires more frequent monitoring. After the loading and maintenance doses are ordered, additional boluses may be required if apnea persists. Dividing the total daily dose twice or thrice daily may be effective even though steady state concentrations are achieved 5-7 days after starting therapy. A trial of discontinuation of caffeine should be considered at ≥ 32 weeks PMA or after a 5-7 day period with minimal or no events. Due to the long half-life of caffeine, the infant should continue to be monitored for events after treatment has been discontinued.

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. 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.

III. 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 should 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. 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 event during an observation "countdown" may be considered for



discharge with a monitor with a download in two to four weeks. Parents and caregivers should receive CPR training prior to discharge of the infant. The need for a home monitor with training may be anticipated during the “countdown” period in order to facilitate discharge should durable medical equipment be required.

Many neonatal intensive care units (NICUs) offer an overnight stay for parents of babies being sent home on a monitor so they can feel comfortable with their infant’s care prior to discharge. A car seat challenge is recommended before preterm infants are discharged from the hospital.

IV. Home Cardiorespiratory Monitoring

Stable premature infants who have achieved complete nipple feedings, thermoregulation in a 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. Furthermore, although the percentage

of periodic breathing and/or distinction between different types of apnea may be determined by a polysomnogram in certain cases, clinically significant events may still occur despite a “normal” study.

Therefore, clinical judgment and physician comfort 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.

The use of home cardiorespiratory 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.

Although some physicians support the discharge of babies without a monitor who have had a five, seven or ten day apnea-free period, others propose safe discharge of infants with a monitor if occasional breakthroughs occur during this countdown period.

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. Usage of a prescribed monitor should be encouraged if apnea persists beyond this observation



period. Parental adherence with monitor usage can be determined with the event recorder if there are concerns about noncompliance. Home cardiorespiratory monitoring with event recorders of premature infants may be considered under certain circumstances. Some physicians will order a home monitor if there have been one or two occurrences of SIDS among siblings even though this practice has not been associated with a reductions in SIDS.

The following conditions are also reasonable reasons to prescribe a monitor for home:

- Technology-dependent infants that require supplemental oxygen for BPD, have a tracheostomy, require NPCPAP and/or ventilators or infants with significant airway anomalies.
- Infants discharged with methylxanthine therapy for the management of AOP.
- Premature infants who remain at risk for recurrent events in which case it should be used until the latter of either the completion of 43 weeks PMA or after events have ceased.

It is important that safe sleep practices are discussed with parents and preventive measures emphasized as outlined by the American Academy of Pediatrics (AAP). These include supine sleeping position in most cases, use of a pacifier, sleep location in the parent's room, breastfeeding and avoidance of the following: soft bedding, cigarette smoke, overheating and co-bedding with a parent. Parents should understand that the use of a monitor does not prevent SIDS.

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