Apnoea of Prematurity

Definition
Apnoea is defined as cessation of breathing for ≥ 20 seconds, or briefer episodes associated with bradycardia or hypoxia.

Action

Prevention
- Gestation <28 weeks or birth weight <1,250g (or both): give loading dose of caffeine anytime from birth within 48 hours followed by maintenance dose (see Caffeine for Apnoea of Prematurity guideline)

Treatment

Immediate action
Many apnoeas are self-correcting and respond to:
- Positioning - ensure the neonate's head and neck are positioned correctly (head and neck in neutral position) to maintain a patent airway.
- Tactile stimulation - gentle rubbing of soles of feet or chest wall is usually all that is required for episodes that are mild and intermittent.
- Clear airway - suction mouth and nostrils.

If they do not respond to first line measures, then ensure that the airway is patent and administer intermittent positive pressure ventilation (IPPV) via mask.

Do not increase inspired oxygen concentration when doing so, as this increases the risk of retinopathy

Further evaluation
- Review history, description and timing of attacks.
- Review feeding volume and route - a nasogastric tube can contribute to airway obstruction.
- Examine the baby, particularly cardiovascular system, neurological behaviour and look for evidence of infection

Apnoea of prematurity is a diagnosis of exclusion. While it may present in the first few days, apnoea on day 1 should be considered pathological.

Investigations to consider
- Full blood count
- Blood glucose
- Blood gases
- Renal function, electrolytes, bone profile
- Infection screen
- Chest X-ray
- Cranial ultrasound
- Abdominal X-ray if concern regarding NEC

Monitor - Heart rate, breathing, oxygen saturation, temperature
Treat underlying cause if any
- Stabilise environmental temperature (aim for lower end of neutral thermal environment)
Transfuse if concern regarding symptomatic anaemia (see Blood Transfusion guidelines)
In chronic lung disease, consider slight increase in ambient oxygen, taking care to avoid hyperoxia
Consider temporary reduction in volume of enteral feeds
Nurse prone, head tilted up 15° if significant reflux is a concern

Caffeine
Treatment of apnoea of prematurity is instituted if they are frequent, prolonged or associated with bradycardia, frequent low oxygen saturations or require IPPV. See Caffeine for Apnoea of Prematurity guideline for dose and administration advice.

- **Gestation <28 weeks or birth weight <1,250g (or both)**: give loading dose of caffeine anytime from birth within 48 hours followed by maintenance dose
- **Gestational age 28-34 weeks**: give loading dose to treat apnoea of prematurity or facilitate extubation followed by maintenance dose
- **Gestation > 34 weeks**: Not recommended as routine

Ventilation
- **Non invasive** - In severe or frequent apnoea not responding to the above commence non invasive ventilation (CPAP) at 4-5cm of water with oxygen as required
- **Mechanical ventilation** if no better on the above (see Mechanical Ventilation guideline) – guideline currently being written

### Auditable Standards
| 1. | Increased frequency of apnoeas, persistent prolonged apnoeas, increasing oxygen requirement or apnoeas requiring IPPV need to be reviewed by the medical team – target 100% |

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Background
The incidence of apnoea is inversely proportional to gestational age, and almost all extremely low birth weight infants are affected. Apnoea occurs in most infants < 30 weeks, about 50% of infants at 30-32 weeks and about 10% of infants at 34 weeks. It usually resolves by the time the infant is 36 weeks postmenstrual age.

Causes
- Anatomical - choanal atresia, microglossia, macroglossia, tracheomalacia
- Iatrogenic - neck flexion/head positioning, NG tubes – increased airway resistance, nasal/laryngeal oedema, OG tubes – vagal stimulation
- Infections - sepsis
- Temperature instability
- Cardiovascular - anaemia, patent ductus arteriosus, hypo/hypertension and hypovolemic, cardiac failure, arrhythmias
- Neurological - intracranial/intraventricular haemorrhage, hypoxic ischaemic encephalopathy, seizures, pain, vagal stimulation by suctioning, cerebral malformations/neuromuscular disorders
- Respiratory - respiratory distress syndrome, pneumothorax, pulmonary haemorrhage, aspiration
- Gastrointestinal - gastro-oesophageal reflux, delayed gastric emptying, abdominal distension reducing lung volumes, necrotising enterocolitis
- Metabolic - hypoglycaemia, hypocalcaemia, hyponatraemia, acidosis
- Maternal analgesia or magnesium sulphate
- Postnatal - sedatives, narcotics, muscle relaxants, prostaglandins
- 'Apnoea of prematurity'

Types of apnoea
- Central apnoea (40%) - This is caused by decreased central nervous system stimuli to respiratory muscles. Both the respiratory effort and airflow cease simultaneously.
- Obstructive apnoea (10%) - This is caused by pharyngeal instability / collapse, neck flexion or nasal obstruction leading to absence of airflow in presence of inspiratory efforts.
- Mixed apnoea (50%) - This has a mixed aetiology. Central apnoea is either preceded (usually) or followed by obstructed respiratory effort.

Differential diagnosis
- Periodic breathing: not associated with changes in colour or bradycardia
- Seizure: subtle seizures may present with apnoea

Prognosis (apnoea of prematurity)
- Generally disappear by 36-40 weeks gestation
- Extreme premature infants at risk of apnoeas beyond 38 weeks

Consequences (apnoea of prematurity)
- Short term - tissue hypoperfusion, especially of brain and gut
- Long term - sudden infant death syndrome, higher risk in premature infant, however strongly associated with maternal age, smoking, and genetic factors and not apnoea of prematurity
References