

PULMONARY HAEMORRHAGE

RECOGNITION AND ASSESSMENT

Definition

- Acute onset of bleeding from oropharynx or ETT associated with cardiorespiratory deterioration and changes on chest X-ray
- Significant pulmonary haemorrhage is most likely to represent haemorrhagic pulmonary oedema. Differentiate from minor traumatic haemorrhage following endotracheal suction

Risk factors

- Prematurity
- Respiratory distress syndrome (RDS)
- Large patent ductus arteriosus (PDA)
- Excessive use of volume (>20 mL/kg) in first 24–48 hr in babies ≤28 weeks' gestation
- Coagulopathy
- Sepsis
- IUGR
- Grade 3 hypoxic ischaemic encephalopathy (HIE)

Symptoms and signs

- Apnoeas, gasping respirations, desaturations
- Tachycardia >160 bpm, bradycardia, hypotension, shock, PDA, signs of heart failure
- Widespread crepitations, reduced air entry
- Pink/red frothy expectorate, or frank blood from oropharynx or ETT if intubated

Investigations

- Blood gas (expect hypoxia and hypercapnia with mixed acidosis)
- FBC, clotting
- Chest X-ray (usually shows classic white-out with only air bronchogram visible but may be less striking and resemble RDS)

IMMEDIATE TREATMENT

- Basic resuscitation, ABC

Respiratory

- Intubate and ventilate
 - if already intubated be cautious removing ETT – may be very difficult to reintubate
- Sedate and give muscle relaxant
- PEEP 6–8 cm, even higher PEEP of 10–12 cm H₂O sometimes required to control haemorrhage
- PIP to be guided by chest expansion and blood gases
- Long inspiratory times (0.5 sec may be needed)
- Endotracheal suction (try to avoid but consider in extreme cases to reduce risk of ETT blockage)
- Ensure adequate humidification
- Chest physiotherapy contraindicated until active bleeding stopped and platelets >50 (see **Chest physiotherapy** guideline)
- Establish arterial access

Fluid management

- If hypovolaemic, restore circulating volume over 30 min with 10 mL/kg sodium chloride 0.9% or Group O RhD negative packed cells if crystalloid bolus already given. Beware of overloading (added volume can be detrimental to LV failure)

- If not hypovolaemic and evidence of LV failure, give furosemide 1 mg/kg IV
- Correct acidosis (see **Neonatal Formulary**)
- If PDA present, restrict fluids to 60–80 mL/kg/day in acute phase
- Further blood transfusion, vitamin K administration and FFP to be guided by Hb concentration, PT and APTT (see **Transfusion of red blood cells** and **Coagulopathy** guidelines)

Hypotension/cardiac dysfunction

- If still hypotensive or evidence of cardiac dysfunction after fluid resuscitation, treat hypotension with inotropes (see **Hypotension** guideline)

Infection

- If infection suspected, request septic screen and start antibiotics

SUBSEQUENT MANAGEMENT

Once baby stable

- Inform on-call consultant
- Speak to parents
- Document event in case notes
- Consider single extra dose of surfactant in babies with severe hypoxaemia or oxygenation index >20
- If PDA suspected, arrange echocardiogram (see **Patent ductus arteriosus** guideline)
- Perform cranial ultrasound scan to exclude intracranial haemorrhage as this may influence management (see **Cranial ultrasound scans** guideline)