MASSIVE HAEMORRHAGE

RECOGNITION AND ASSESSMENT

- Rare but potentially fatal neonatal event

DEFINITION

- Actual/suspected blood loss with haemodynamic instability or
- Blood loss >2 mL/kg/hr

CAUSES

- Occult haemorrhage
  - fetal to maternal transfusion
  - twin-to-twin transfusion
- Placenta
  - placenta praevia/abruption
  - vasa praevia
  - umbilical cord injury/damage
- Baby
  - intracranial haemorrhage
  - cephalohaematoma, subgaleal haemorrhage
  - GI bleed
  - Pulmonary haemorrhage
- Factors predisposing to haemorrhage: coagulopathy secondary to sepsis/DIC/acute liver failure, vitamin K deficiency

SIGNS

Hypovolaemia

- High/increasing heart rate (>160 bpm)
- Low/falling Hb or haematocrit
- Poor peripheral perfusion with slow central capillary refill (>3 sec)
- Low or falling blood pressure [mean blood pressure (MBP) <40 mmHg in a term baby]
- Presence of, or worsening, metabolic acidosis
- Echocardiography (if available) to assess volume status
  - small systemic veins and low ventricular filling volumes can indicate hypovolaemia

INVESTIGATIONS

- Crossmatch
- FBC
- PT
- APTT
- Fibrinogen
- U&E
- Ionised calcium
- Blood gases
- If feto-maternal haemorrhage suspected, request maternal Kleihauer test

Hb can be normal due to lack of dilutional effect – do not view as reassuring

IMMEDIATE TREATMENT

Key principles of management

- Timely recognition of major haemorrhage
- Control of haemorrhage and active resuscitation
- Emergency vascular access
- Early escalation to major haemorrhage pathway and to consultant
- Immediate transfusion of packed red cells, platelets and FFP

- Avoid hypothermia, hypocalcaemia, acidosis and hyperkalaemia
- Follow **Major haemorrhage pathway (MHP)** – see below

Group O RhD negative blood can be used whilst awaiting massive haemorrhage protocol blood products –
ALWAYS available on labour suite/obstetric theatres

Table 1: Products

Product	Unit
RBC (20 mL/kg)	Paediatric (<100 mL)
Plasma (20 mL/kg)	Neonatal fresh frozen plasma (100 mL)
Platelets (20 mL/kg)	Paediatric platelets (50 mL)
Cryoprecipitate (10 mL/kg)	Single donor (40 mL)

Table 2: Paediatric major haemorrhage pack contents

	Pack 1	Pack 2
Packed red cells	✓	✓
FFP	✓	✓
Platelets		✓
Cryoprecipitate		✓

- **Note: Pack contents –** these are not packs that actually exist, but provide a way of thinking through what should be needed in suitable ratios. Many centres will need to design and implement a local protocol between haematology and neonatal teams to plan for this eventuality, based on this structure and flowchart

SUBSEQUENT MANAGEMENT

- The following may be necessary, discuss with neonatologist:
- elective intubation and ventilation (following resuscitative blood and blood product replacement)
- inotropic support
- thermoregulation
- monitor and correct electrolyte and metabolic imbalance (hypocalcaemia, hyperkalaemia)

DISCHARGE AND FOLLOW-UP

- Neurodevelopment follow-up for long-term neurological outcome

Flowchart: Major haemorrhage pathway (MHP)