SUBGALEAL HAEMORRHAGE (SGH)

RECOGNITION AND ASSESSMENT

Definition

- Accumulation of blood in the loose connective tissue of subgaleal space
- Damaged emissary veins connecting subgaleal space to the intracranial venous sinuses can lead to significant blood loss of up to two-thirds of circulating volume with significant morbidity and mortality (≥50% in severely affected cases)

Risk factors

Vacuum extraction

- Incorrect positioning of cup
- cup marks on sagittal suture
- leading edge of cup <3 cm from anterior fontanelle
- Prolonged extraction time (>20 min)
- >3 pulls or >2 cup detachments
- Failed vacuum extraction

Maternal factors

- Primiparous
- PROM >12 hr
- Maternal exhaustion
- Prolonged second stage
- High or mid cavity forceps delivery

Neonatal factors

- Macrosomia
- Coagulopathy (vitamin K deficiency, Factor VIII or Factor IX deficiency)
- Low-birth-weight
- Male sex
- Low Apgar scores
- Resuscitation at birth
- Cord blood acidosis
- Fetal malpresentation
- Can occur in unassisted deliveries – especially if difficult delivery

Signs

- Local signs
- generalised swelling or boggy consistency of scalp
  - not limited by sutures
  - especially at the cup site
  - fluctuant leather-like pouch filled with fluid
- elevation and displacement of ear lobes and periorbital oedema
- irritability and pain on handling
- Systemic signs
- hypovolemic shock
  - tachycardia
  - tachypnoea
  - dropping haematocrit
  - increasing lactate or worsening acidosis
  - poor activity
  - pallor
  - hypotension
  - acidosis
- neurological dysfunction and seizures (late sign)
- ischaemic end organ damage to liver or kidneys
  - can manifest as worsening liver and renal function (poor prognostic indicator)

Profound shock can occur rapidly with blood loss into subgaleal space – the blood loss may not be apparent

Investigations
- FBC and coagulation on admission
- repeat at clinical team's discretion
- Group and blood crossmatch (notify blood bank). See **Massive haemorrhage** guideline
- Venous/capillary gas including lactate and base excess, electrolytes (2–4 hrly)
- Blood glucose

DIFFERENTIAL DIAGNOSIS
- SGH: crosses suture lines
- Cephalohematoma: subperiosteal bleeding limited by suture lines
- Caput succedaneum: oedematous collection of serosanguinous fluid in the subcutaneous layer of the scalp
- has distinct borders
- does not enlarge
- not fluctuant
- Chignon: artificial caput succedaneum limited to suction cap application site

IMMEDIATE TREATMENT
Initial management
- Follow local guidelines for monitoring of newborns following vaginal operative delivery
- If SGH suspected, urgent review by tier 2 staff/consultant
- If SGH confirmed, admit to NNU immediately
- inform consultant (if not involved in assessment)
- Discuss use of pressure bandage with neurosurgeons
- Peripheral IV access
- leave indwelling for 12 hr
- Continuously monitor:
- heart rate
- respiration
- oxygen saturation
- blood pressure (non-invasively if no arterial line) ≥24 hr
- Continue to assess capillary refill and peripheral perfusion
- Regularly observe and palpate scalp swelling to assess for:
- continuing blood loss
- change in head shape or circumference
  - measure head circumference hourly for the first 6–8 hr after birth
  - take several measurements each time and record the highest
  - 1 cm increase in circumference = 40 mL blood loss
  - if pressure bandage in place, measure over the bandage
  - **interpret head circumference changes in conjunction with all other clinical parameters and not in isolation**
- change in colour
- displacement of ears
- Volume replacement:
- see **Massive haemorrhage** guideline, and **Recognition of hypovolaemia** below
- Group O RhD negative blood is immediately available on labour suite/obstetric theatres
- Monitor urine output
- Maintain blood glucose >2.6 mmol
- Repeat FBC and coagulation studies (4–6 hr after initial assessment)
- Inotropes, vasopressors, multiple packed red cell transfusions and clotting products may be required for severe cases of shock [using packs 1 and 2 (see **Massive haemorrhage** guideline)]
- Ongoing assessment for jaundice
- Discuss use of tranexamic acid with consultant

RECOGNITION OF HYPOVOLAEMIA

Signs of significant volume loss

- High/increasing heart rate (>160 bpm)
- Low/falling Hb or haematocrit
- Poor peripheral perfusion with slow central capillary refill (>3 sec)
- Low/falling blood pressure (mean arterial blood pressure <40 mmHg in term baby)
- Presence of, or worsening of, metabolic acidosis
- If available, use echocardiography to assess volume status
- small systemic veins and low ventricular filling volumes can indicate hypovolaemia
- If any of above present, or concern of ongoing haemorrhage from scalp assessment/neurological dysfunction/evidence of renal or hepatic impairment – follow **Massive haemorrhage** guideline

Consider elective intubation and ventilation for worsening shock – but blood is the priority over airway and breathing

CONCOMITANT INJURIES

- Hypoxic ischaemic encephalopathy [see **Hypoxic ischaemic encephalopathy (HIE)** guideline]
- Brain trauma resulting in cerebral oedema and/or intracranial haemorrhage
- Subdural haematoma
- Dural tear with herniation
- Superior sagittal sinus rupture
- Pseudomeningocele and encephalocele
- Subconjunctival and retinal haemorrhage
- Elevated intracranial pressure from SGH mass effect
- Skull fractures

SUBSEQUENT MANAGEMENT

- If any of the intracranial concomitant injuries above suspected, neuroimaging to be undertaken once baby stabilised following discussion with radiologist to establish best modality
- Monitor on NNU for ≥24 hr
- Discuss with neurosurgical team