Guideline

Management of neonates referred with a Subgaleal Haemorrhage.

1 Scope

For use within the Paediatric and Neonatal Decision Support and Retrieval Service (PaNDR) for the East of England.

2 Purpose

To guide clinicians in advising local units on initial management at referral and to support the PaNDR team in the stabilisation of infants with suspected subgaleal haemorrhage with particular focus on the recognition and management of haemorrhagic shock.

3 Definitions and abbreviations

BP	Blood pressure
CRT	Capillary Refill Time
ECG	Electrocardiogram
FBC	Full Blood Count
FFP	Fresh Frozen Plasma
FVIIIa	Factor VIIIa
HR	Heart Rate
IV	Intravenous
LFT	Liver Function Test
OFC	Occipital Frontal Circumference
PaNDR	Paediatric and Neonatal Decision Support Retrieval Service
SGH	Subgaleal Haemorrhage
U+E	Urea and Electrolytes
UVC	Umbilical venous catheter

4 Introduction

Subgaleal haemorrhage (SGH) is a rare but potentially life threatening medical emergency. Prompt recognition and intervention reduces the associated mortality and morbidity [2].

Subgaleal haemorrhage occurs when blood accumulates in the loose connective tissue space between the periosteum of the skull and the galea aponeurotica in neonates.often as a result of shearing of veins in the scalp during delivery

As the subgaleal compartment extends across the entire cranial vault, tamponade does not occur and haemorrhage can be extensive.
Estimates vary, but between 20-60% of the circulating blood volume can be lost into this space causing hypovolaemic shock and anaemia.

SGH is rare, with an incidence of approximately 1.5 per 10,000 live births. It is occurs more commonly after vacuum-assisted delivery[3] but can also occur after normal vaginal delivery and Caesarean section.

5 Presentation

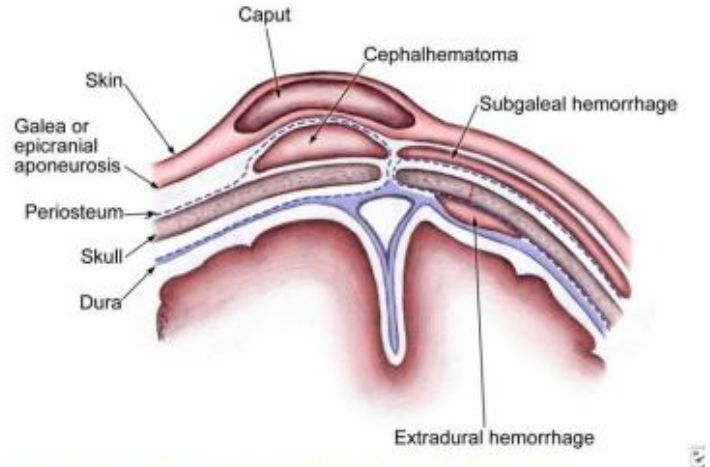
Subgaleal haemorrhage presents with a diffuse, fluctuant scalp swelling which shifts with movement and may cross the midline and suture lines.

It may continue to expand for hours to days after delivery. The baby's head circumference (OFC) may increase rapidly and this can lead to anterior displacement of the ears and swelling of the eyelids. A 1cm increase in OFC may represent 40ml-260ml blood loss into this space[2].

General signs and symptoms may include relative irritability or lethargy and mild respiratory distress, tachypnoea and grunting. Babies may be pale and may become tachycardic with a prolonged capillary refill time and ultimately hypotensive due to anaemia. However, these are late signs. There may also be an associated consumptive coagulopathy and a metabolic acidosis.

Differential diagnosis includes caput succedaneum and cephalhaematoma. Caput succedaneum is caused by accumulation of serosanguinous fluid in the subcutaneous tissue of the scalp. It usually resolves within 12-18 hours. Cephalhaematoma is caused by haemorrhage below the periosteum and as such cannot cross the suture lines. (see Figure 1.)

Figure 1.



https://nursingcrib.com/wp-content/uploads/caput-and-cephal.jpg

6 Clinical Monitoring

In the infant with scalp swelling but is clinically well, a cord pH, lactate, and haematocrit should be taken. A Full Blood Count (FBC) should also be taken ideally from cord bloods or alternatively from the baby soon after birth to obtain the baseline platelet count and haemoglobin.

There should be close monitoring of infant and a low threshold for admission to the neonatal unit if there are concerns with the observations or signs of evolving significant haemorrhage.

The following observations should be taken at least at birth then hourly for the first 2 hours then 2 hourly for a further 6 hours:

- Heart rate
- Respiratory rate
- Capillary refill time
- Blood pressure
- Head circumference

Early indicators of shock may include tachycardia, decreased spontaneous activity, pallor, poor capillary refill time, and mild respiratory distress.

The absence of tachycardia does not rule out a diagnosis of haemorrhagic shock in newborns. Poor end-organ perfusion can lead to low urine output, hypotonia, lethargy, cyanosis, and seizures. Rising lactate levels and worsening base deficit may be associated with abnormal liver function tests (LFTs) and renal function.

Significant and persistent haemorrhage increases the risk of disseminated intravascular coagulopathy.

7 Management Principles

Please refer to Quick Reference Guide below (section 7.3) for the fluid resuscitation pathway for babies with suspected subgaleal haemorrhage.
If a baby with a suspected subgaleal haemorrhage deteriorates with haemorrhagic shock, request emergency O Negative blood immediately. If severely compromised, FFP can be administered without doing any investigations.

7.1 Initial Actions

- Apply monitoring – pulse oximetry, ECG leads, BP cuff
- Check BP
- Secure IV access – Will need 2 points of access, consider UVC if anticipating that peripheral cannulation will be difficult or delay treatment.
- Send bloods for blood gas (including lactate and glucose), FBC, crossmatch (Most laboratories will require 2 samples to issue a crossmatch, 1 can be from cord blood if available), U+E, LFT, clotting (PT, APTT and fibrinogen) and day 1 blood spot
- Measure head circumference
- Refer to PaNDR consultant early

7.2 Resuscitation

- Assess perfusion for signs of hypovolaemic shock – tachycardia (HR >160), poor peripheral perfusion (CRT >3s), hypotension (mean BP <40 in a term baby) or metabolic acidosis
- If shocked, give 10ml/kg 0.9% saline as a push if blood is not available within 5 mins
- If severely compromised, immediately request O Negative blood from emergency blood fridge.
- **Activate local neonatal major haemorrhage protocol (use local protocol).**
- Ensure Vitamin K has been given. If in doubt, give a repeat dose of Vitamin K IV.
- Give Tranexamic acid 15mg/kg IV.
- Aim to give 10ml/kg O negative (-ve) blood as soon as possible, after the recognition of shock followed by 10 ml/kg of FFP in addition to initial 10ml/kg saline.
- Consider elective intubation once initial volume resuscitation given
- Order cross-matched blood and group appropriate FFP once acute emergency under control

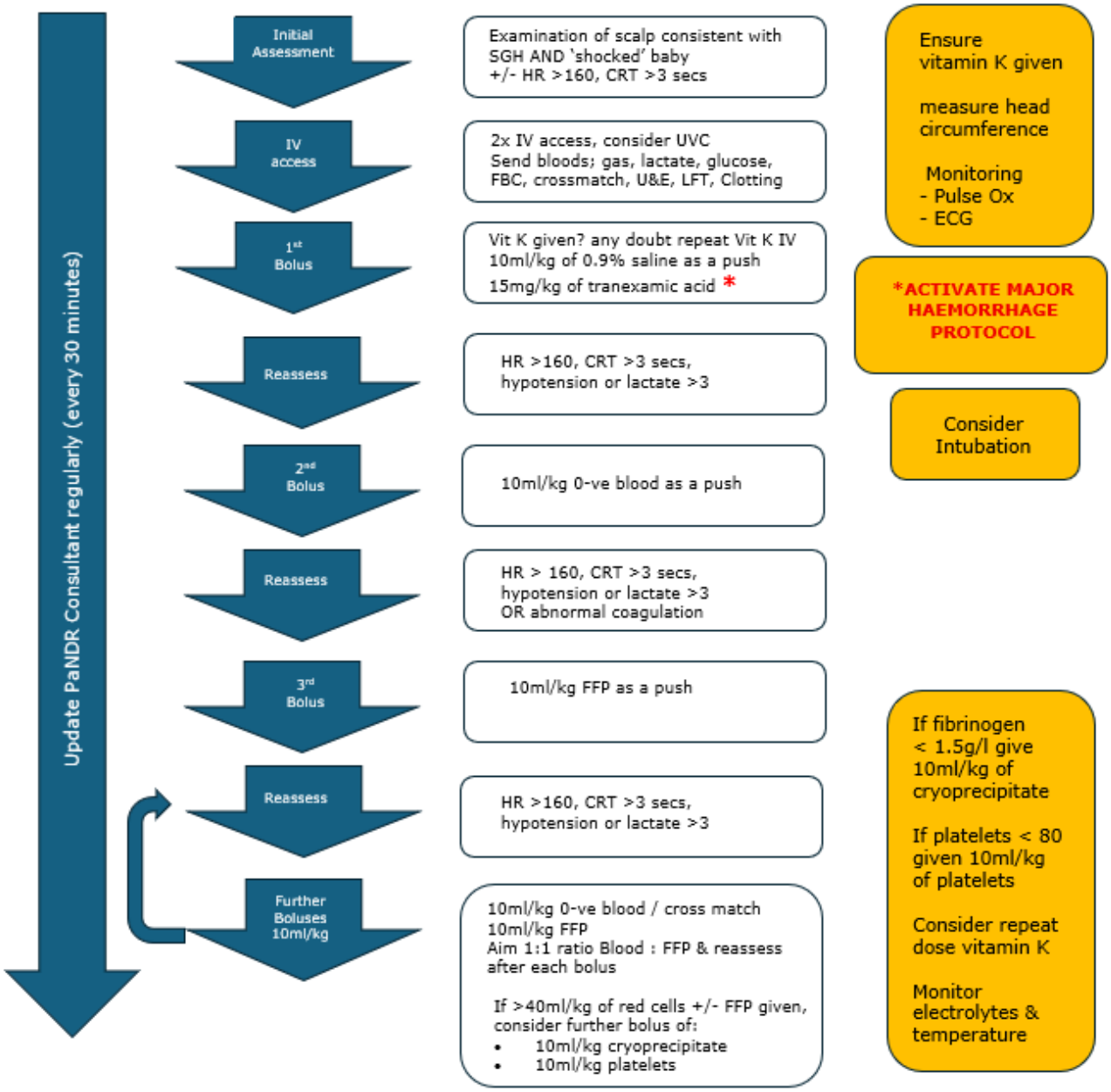
- Continue fluid resuscitation as required with O-ve blood and FFP (or 0.9% saline until these are available)
- Repeat clotting studies (PT, APTT and fibrinogen) after giving FFP and continue to monitor after every second dose of FFP.
- If fibrinogen is <1.5g/l, or if have given >40mL/kg of red cells (and FFP) consider giving cryoprecipitate
- If >40mL/kg red cells (and FFP) given or if platelet count <80 $x10^9$/l, consider giving platelet transfusion
- Update PaNDR consultant every 30 mins to discuss response to treatments already given and ongoing management plan.
    - The PaNDR consultant will continually review the overall situation to decide whether to prioritise expediting the transfer or further stabilisation at the referring unit.
- If necessary, e.g. if bleeding ongoing, PaNDR consultant will liaise with receiving hospital paediatric haematology team
- Monitor electrolytes and correct as needed
- Monitor temperature and keep normothermic

Other points to note:

- Avoid covering head with hats to note head shape and any increase in head circumference.
- Imaging should await stabilisation of the infant and NOT be used to diagnose SGH.
- Imaging by USS, skull X-ray, CT or MRI can be helpful to diagnose complications and co-morbidities, such as HIE, dural tears, sagittal sinus rupture or skull fracture [5]
- Discuss with neurosurgeons if there is any suspected intracranial involvement.
- Infants with a subgalelal heamorrhage do not usually need to be transferred to a neurosurgical NICU.

Quick Reference Guide for Fluid Resuscitation pathway for Infants with Suspected Subgaleal Haemorrhage

The pathway below is adapted from the PIPER (Paediatric Infant Perinatal Emergency Retrieval) guideline for the resuscitation of shocked infants with a suspected subgaleal haemorrhage[4]



8 References

1) Neonatal subgaleal haemorrhage: diagnosis and management. DJ Davis. CMAJ 2001;164(10):1452-3
2) Subgaleal haemorrhage in the newborn: A call for early diagnosis and aggressive management. M Colditz et al. J Paediatr Child Health. 2015;51(2):140-6
3) Neonatal subgaleal haemorrhage: clinical presentation, treatment, and predictors of poor prognosis. HY Chang et al. Pediatr Int. 2007;49(6):903-7
4) Management of Subgaleal Haemorrhage in Neonatal Transport. Paediatric Infant Perinatal Emergenncy Retrieval (PIPER). https://www.rch.org.au/uploadedFiles/Main/Content/piper/PIPER%20Neonatal%20-%20Management%20of%20Subgaleal%20Haemorrhage%20in%20Neonatal%20Transport.pdf
5) New Zealand Newborn Clinical Network, Neonatal Subgaleal Haemorrhage Practice Recommendation. March 2024.

9 Monitoring compliance with and the effectiveness of this document

The PaNDR team will monitor compliance with this document by undertaking regular audits, which will be reported back to the PaNDR consultants and lead nurse. The effectiveness of the document will be monitored by review of any reported incidents via the lead nurse for risk.

Equality and diversity statement

This document complies with the Cambridge University Hospitals NHS Foundation Trust service equality and diversity statement.

Disclaimer

It is the responsibility of all staff to ensure they are using the latest version of a document.

Document management

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