

# SESLHD PROCEDURE COVER SHEET



**Health**  
South Eastern Sydney  
Local Health District

<b>NAME OF DOCUMENT</b>	Neonatal observations for subgaleal haemorrhage following vaginal application of vacuum or forceps
<b>TYPE OF DOCUMENT</b>	Procedure
<b>DOCUMENT NUMBER</b>	SESLHDPR/414
<b>DATE OF PUBLICATION</b>	February 2020
<b>RISK RATING</b>	Medium
<b>LEVEL OF EVIDENCE</b>	NSQHS Standard 8 – Recognising and Responding to Acute Deterioration
<b>REVIEW DATE</b>	May 2022
<b>FORMER REFERENCE(S)</b>	SESLHNPD/142
<b>EXECUTIVE SPONSOR or EXECUTIVE CLINICAL SPONSOR</b>	Director Women and Children's Clinical Stream
<b>PRIMARY AUTHOR OF THE CURRENT VERSION</b>	Dr Srinivas Bolisetty, Lead Clinician and Senior Neonatologist, Division of Newborn Services, Royal Hospital for Women Srinivas.bolisetty@health.nsw.gov.au
<b>CONTRIBUTORS</b>	Prof Kei Lui Dr Bob Fonseca Dr John Smyth Dr Trent Miller Dr Jeanette Taylor Dr Meredith Ward Ms Lillian Sreckovic Dr Andrew Zuschmann
<b>KEY TERMS</b>	Vacuum extraction, Forceps, subgaleal haemorrhage, cephalohaematoma, observations, hypovolaemia
<b>SUMMARY</b>	A guide to additional scalp observations and appropriate referral pathways for neonates at risk.

## **COMPLIANCE WITH THIS DOCUMENT IS MANDATORY**

**This Procedure is intellectual property of South Eastern Sydney Local Health District.  
Procedure content cannot be duplicated.**

Feedback about this document can be sent to [seslhexecutiveservices@sesiahs.health.nsw.gov.au](mailto:seslhexecutiveservices@sesiahs.health.nsw.gov.au)

# SESLHD PROCEDURE

## Neonatal observations for subgaleal haemorrhage following vaginal application of vacuum or forceps

**SESLHDPR/414**

### 1. POLICY STATEMENT

To ensure consistent and high quality observations and documentation for babies following an assisted vaginal birth procedure, with the exception of simple lift out forceps undertaken at Caesarean section.

### 2. BACKGROUND

The rate of vacuum delivery has increased over the past two decades. **Subgaleal haemorrhage** (SGH) most frequently occurs following assisted vaginal birth, particularly with vacuum assisted births. The vast majority can be detected within the first hour after delivery, with mean time to diagnosis of 1-6 hours after birth. SGH can progress rapidly and delay in diagnosis and delay in providing sufficiently aggressive management can lead to major morbidity and mortality in SGH.

In SGH, bleeding occurs into the subaponeurotic space. Visual inspection alone without palpation may miss a SGH because the blood loss moulds to the shape of the scalp leading to the potential for late detection.

### 3. RESPONSIBILITIES

#### 3.1 Employees and Medical Staff will:

- Ensure familiarity with the policy and the procedure and any related local business rules.

#### 3.2 Network Managers/Service Managers and Line Managers will:

- Ensure that staff are familiar with the Local Health District policies and procedures and the requirement for adherence.
- Periodic (9/12) review of compliance, and take appropriate action if policies are breached.

### 4. PROCEDURE

#### 4.1 Observations in the Delivery and Postnatal ward after assisted vaginal birth.

**All babies who have had an assisted vaginal birth should have: temperature, apex rate, respiration rate, colour and scalp observations at 1, 2, 4, 6, 8 and 12 hours of age**

- Take cord pH.
- Ensure that intramuscular vitamin K was given immediately following birth.
- If consent for IM vitamin K is declined, parents should be counselled about all risks, including the risk of SGH.
- Always inspect for a boggy swelling of the scalp, especially at the cup site.
- Always palpate the scalp for a ballotable mass or movement of fluid in scalp, noting colour and head shape including displacement of ears or pitting oedema. (refer to diagram on Page 3)
- Document all observations on the Standard Newborn Observation Chart (SNOC).
- Avoid hats and bonnets (or remove frequently) so that changing head shape or size is noted.
- Be especially vigilant for these situations of increased risk:
  1. Unsuccessful vacuum extraction
  2. Use of two instruments i.e. vacuum and forceps to expedite birth
  3. Extraction taking more than 3 contractions, 20 minutes extraction time, or more than 2 cup detachments.
  4. Placement of the vacuum cup over the sagittal suture near the anterior fontanelle.
  5. 5 Minute Apgar score <7.

# SESLHD PROCEDURE

## Neonatal observations for subgaleal haemorrhage following vaginal application of vacuum or forceps

**SESLHDPR/414**

- Babies should be transferred to postnatal ward if SGH is not suspected. Scalp observations and palpation will continue as per SNOC.

### 4.2 When SGH is suspected

- Inform medical staff immediately for review or initiate a Code Blue call if required. On-call consultant (for St George Hospital and Sutherland Hospital) or on-call fellow/consultant (at the Royal Hospital for Women) must be notified immediately of any suspected SGH.
- Transfer to SCN for monitoring and management when: local signs are confirmed or there are any signs suggestive of significant blood loss.

### 4.3 Recognition of subgaleal haemorrhage: Local signs

- The initial localised signs of a SGH are of vague, generalised scalp swelling with laxity of the scalp at the site of cup application. The chignon (caput) in contrast, is firm in consistency and usually resolves within one hour.
- If SGH haemorrhage progresses, the scalp feels fluctuant 'like a *leather pouch filled with fluid*' with free fluid between the scalp and skull and often irritability and pain on handling.
- Large blood loss can occur despite a small increase in head circumference.
- The haemorrhage is not contained by suture lines (see diagram below). In severe cases, ear lobes may be displaced or shifted downwards by mass effect and eyelids may appear puffy.

### 4.4 Recognition of hypovolaemia: Systemic signs

- Tachycardia (>160/min), poor peripheral perfusion (capillary refill > 3secs) and/or pallor (vasoconstriction and anaemia) are early signs of significant blood loss.
- Hypotension (mean BP <40 mmHg in a term infant) is a late sign of hypovolaemia and should not be relied upon for early recognition.
- Lethargy, tachypnoea, anaemia, acidosis and coagulopathy may ensue leading to circulatory collapse.
- Biochemical indicators of progressing shock and impending collapse are a rising lactate, a falling haemoglobin (Hb) and a prolonged international normalised ratio (INR). Threshold trigger points for treatment are Hb less than 140 g/L and INR greater than 1.5.

### 4.5 Treatment in NICU/SCN - Observations in SCN for the first 12 hours

- Place the infant on continuous pulse oximetry and cardiac monitoring. Record observations, initially half hourly for at least 1-4 hours.
- Record admission blood pressure and initiate strict fluid balance documentation.
- Palpate scalp and measure head circumference at 1, 2, 4, 6, 8 and 12 hours.
- Initiate blood pressure monitoring 1-4 hourly depending on the presence of other signs of hypovolaemia (see 4.3 above).

### 4.6 Immediate Investigation and Management

- Stabilisation should not be delayed by investigation or imaging.
- Obtain Full Blood Count (FBC), Blood Glucose level (BGL), blood gas including lactate, electrolytes, coagulation profile and Group and Cross match on admission.
- If any signs of shock (tachycardia, respiratory distress, oxygen requirement, pallor, poor capillary refill) - establish IV access and commence aggressive fluid resuscitation using normal saline (e.g. 20 mL/kg over 10-20 minutes) and blood products (packed red cells +/- Fresh Frozen Plasma (FFP), platelets). Prompt fluid resuscitation and correction of coagulopathy and acidosis are vital in the survival and outcome of SGH babies. It is important to assess the response to the fluid and blood product resuscitation.
- Head ultrasound may be performed in admitted neonates with suspected or confirmed **mild** SGH. However, head ultrasound may not confirm the size and extent of SGH accurately.

- CT scan or MRI provides the objective measurement of haematoma volume. CT scan will also identify any underlying skull fractures. However, these investigations are not necessary in **most** cases and the choice of CT or MRI depends if other intracranial haemorrhages or cerebral ischaemic insults are also suspected and following discussion with the radiologist.
- Invasive blood pressure monitoring and transfer to tertiary neonatal units may be required in severe cases.

#### **4.7 Continuing management in SCN**

- In suspected but subsequently unconfirmed cases or in asymptomatic and small SGH, the baby may be discharged from SCN after 12 to 24 hours of stable observations and only following review by a consultant paediatrician.
- Babies should be reviewed regularly for hyperbilirubinaemia during the first few days of life.

### **5. OTHER POSSIBLE FORMS OF HEAD TRAUMA**

Subdural and cerebral haemorrhage may occur after spontaneous delivery (0.4 per 1000) or caesarean section. The prevalence is increased equally with vacuum delivery or forceps (1 per 1000) but the highest (2 per 1000) following failed assisted vaginal delivery progressed to caesarean section or after combined vacuum and forceps delivery.

There are no other special observations after assisted vaginal delivery for subdural or other intracranial haemorrhages. These haemorrhages often present with neurological symptoms hours after delivery and not because of blood loss.

#### **5.1 Management**

- Apnoea and seizures are the common presentations.
- Clinical signs include unequal pupils, eye deviation, irritability, tense fontanelle and coma.
- Forceps associated local trauma may include skull fracture.
- Diagnosis is established by cranial CT or MRI. Small subdural haemorrhage (SDH) may be missed by routine cranial ultrasound because of limited peripheral views.
- Subdural hematomas have been associated with coagulation disorder.
- Management is usually conservative.
- Consider transfer to tertiary neonatal unit for evaluation and surgical consideration.

### **6. DOCUMENTATION**

- Standard Neonatal Observation Chart (SNOC) Neonatal care plan, clinical notes
- Refer deviations from the normal as per [Ministry of Health Policy Directive – PD2013\\_049 - Recognition and Management of Patients who are Clinically Deteriorating<sup>1</sup>](#)

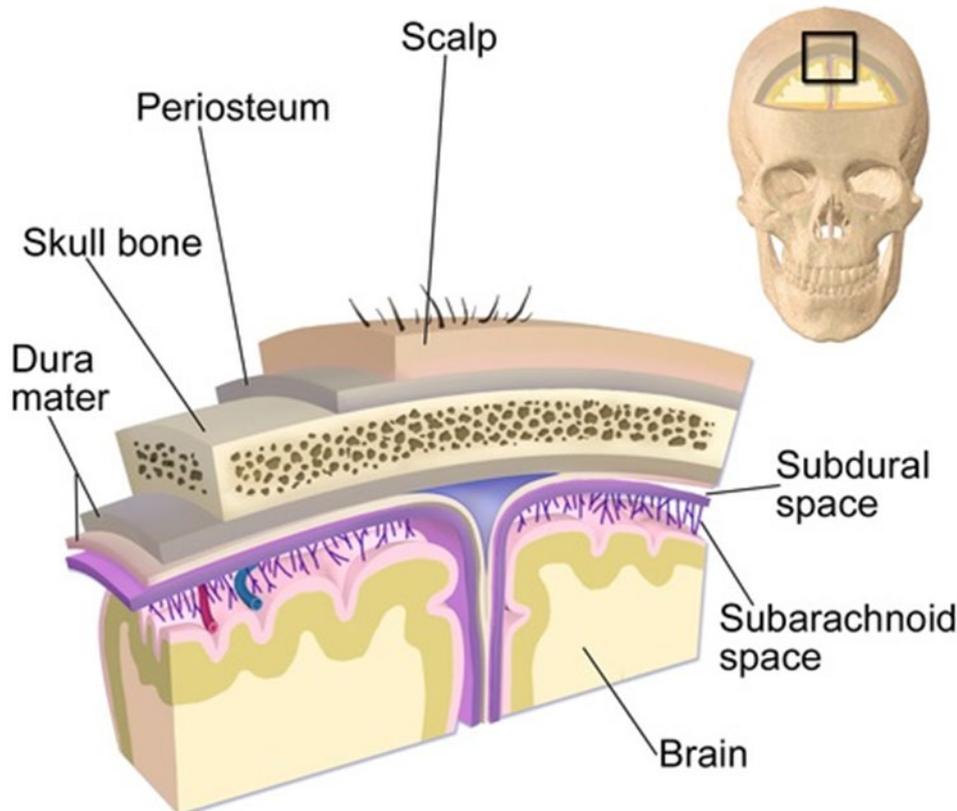
### **7. EDUCATIONAL NOTES**

- Scalp consists of 5 layers and can be remembered by the mnemonic: SCALP: S – Skin; C – Connective tissue; A – (epigaleal) aponeurosis; L – loose connective tissue; P – pericranium or periosteum.

## SESLHD PROCEDURE

### Neonatal observations for subgaleal haemorrhage following vaginal application of vacuum or forceps

SESLHDPR/414



### Layers covering the Brain

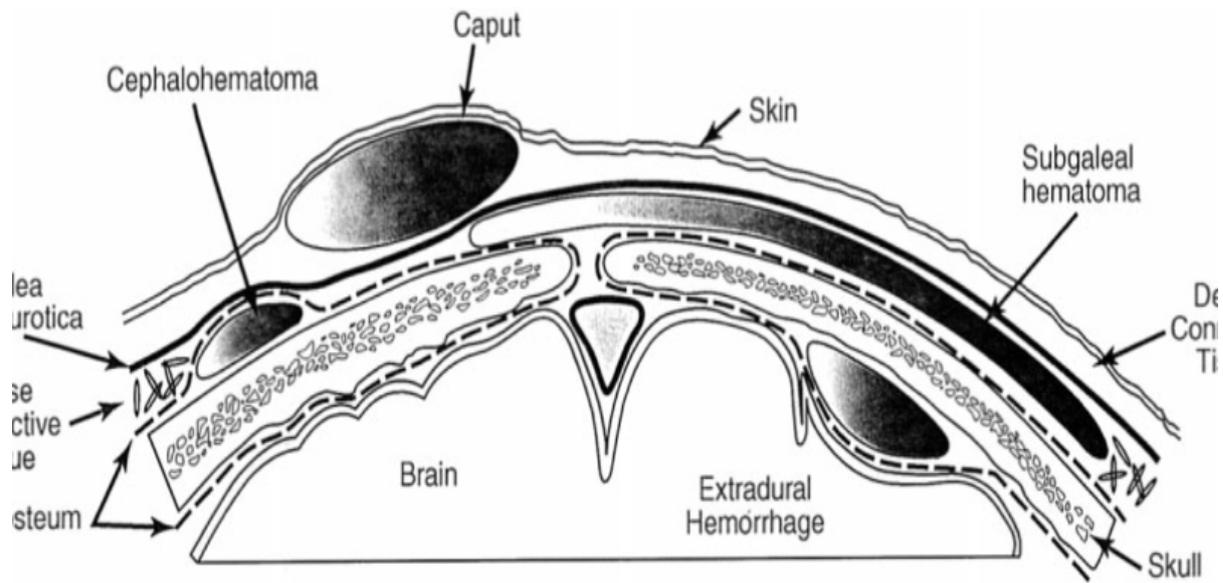
[Blausen.com staff \(2014\). "Medical gallery of Blausen Medical 2014". WikiJournal of Medicine 1 \(2\). DOI:10.15347/wjm/2014.010. ISSN 2002-4436. - Own work, CC BY 3.0](#)

- An association between vacuum extraction and SGH is well described. Over the past three decades, increasing use of vacuum extraction to assist births has resulted in an increase in the prevalence of SGH in Australia and the developed world.<sup>2</sup> The reported incidence is about 1 in 300 vacuum deliveries.<sup>3</sup> Among babies admitted to NICU with SGH, neonatal mortality ranges from 12% to 25%.<sup>4</sup>
- Tractional and rotational forces such as vacuum extraction can result in rupture of emissary veins resulting in haemorrhage into the subgaleal space. A 1-cm increase in the depth of subgaleal space may contain 40-260 mL of blood. Circulating blood volume of the neonate is about 90 mL/kg body weight. A serious 20% reduction in circulating blood volume occurs with a haemorrhage of only 54 mL in a 3 Kg baby.<sup>2,4</sup>
- The clinical picture of SGH is variable and often no signs at birth but can progress rapidly immediately after birth with a mean time to diagnosis of 1-6 hours after birth. Therefore, early close monitoring of the neonate as proposed in this policy is essential.<sup>2</sup>
- There are other haemorrhages that can occur and may raise diagnostic confusion with SGH:

# SESLHD PROCEDURE

## Neonatal observations for subgaleal haemorrhage following vaginal application of vacuum or forceps

**SESLHDPR/414**



*This image was originally published by Amar et al.<sup>5</sup> With permission from the publisher Neurosurgery, Oxford University Press obtained on 1 April 2019 (Licence Number: 4560541361566)*

- Since the introduction of the original policy in October 2015, audit performed on neonates born at the Royal Hospital for Women showed the following figures for the period of January 2016 to December 2018: There were 24 admissions to SCN/NICU with provisional diagnosis of SGH at a mean age of 0.95 hours of life. Two of them required red cell transfusions. All infants survived. No major long term adverse outcomes were noted in any of them.

### 8. REFERENCES

- [NSW Ministry of Health Policy Directive - PD2013\\_049 - Recognition and Management of Patients who are Clinically Deteriorating](#)
- Colditz MJ, Lai MM, Cartwright DW, Colditz PB. Subgaleal haemorrhage in the newborn: A call for early diagnosis and aggressive management. *Journal of paediatrics and child health.* 2015 Feb;51(2):140-6
- The Royal Australian and New Zealand College of Obstetricians and Gynaecologists. Instrumental vaginal birth. C-Obs 16. Review. March 2016
- The Royal Australian and New Zealand College of Obstetricians and Gynaecologists. Prevention, detection and management of subgaleal haemorrhage. C-Obs 28. November 2015
- Amar AP, Aryan HE, Meltzer HS, Levy ML. Neonatal subgaleal hematoma causing brain compression: report of two cases and review of the literature. *Neurosurgery.* 2003 Jun 1;52(6):1470-4

### 9. REVISION AND APPROVAL HISTORY

Date	Revision	Author and Approval
September 2011	Draft	SESLHD Clinical and Quality Council – August 2011 advised that the SESLHNP/134 Policy needed to be separated into a procedure Dee Sinclair drafted the procedure
September 2011	1	Approved by A/Prof Kei Lui
April 2015	2	Updated by A/ Prof Kei Lui and Dr B Fonseca in conjunction with The

# SESLHD PROCEDURE

## Neonatal observations for subgaleal haemorrhage following vaginal application of vacuum or forceps

**SESLHDPR/414**

		Women's and Babies Governance Committee
May 2015	2	Updates endorsed by Executive Sponsor
October 2015	3	Minor review endorsed by Executive Sponsor
April 2019	4	Updated by Dr Srinivas Bolisetty, Prof Kei Lui, Dr Bob Fonseca, Dr John Smyth, Dr Trent Miller, Dr Jeanette Taylor, Dr Meredith Ward, Dr Andrew Zuschmann Ms Lillian Sreckovic.
May 2019	4	Minor review approved by Executive Sponsor. Title of document changed. Updated evidence summary with contemporary articles and added educational summary. Creation of flow chart. Processed by Executive Services prior to publishing.
February 2020	5	Minor review approved by Executive Sponsor. Reference to 'PACE' in Section 4.2 updated to 'Code Blue' to align with Between the Flags terminology. Review date to remain. Processed by Executive Services prior to publishing.

**SGH MANAGEMENT FLOW CHART**

