POSTPARTUM HAEMORRHAGE (PPH) – PREVENTION AND MANAGEMENT

This LOP is developed to guide clinical practice at the Royal Hospital for Women. Individual patient circumstances may mean that practice diverges from this LOP.

1. AIM

- Early recognition and prompt appropriate intervention to minimise the impact of postpartum haemorrhage (PPH)

2. PATIENT

- A woman whose blood loss at or after childbirth is measured or estimated at ≥500mls, or who experiences hemodynamic compromise as a result of postpartum bleeding

3. STAFF

- Medical, nursing and midwifery staff

4. EQUIPMENT

- Two large bore intravenous (IV) cannulae (14–16 gauge)
- Blood tubes (pink, purple +/- blue topped)
- IV Starter Kit
- Gloves
- Sphygmomanometer
- Personal protective equipment (PPE)
- Measuring equipment e.g. scales, jug, kidney dish
- Indwelling urinary catheter (IDC)
- PPH Box

5. CLINICAL PRACTICE

Prevention of PPH

- Recommend active management of third stage of labour to each woman antenatally
- Consider additional prophylaxis for prevention of PPH for high risk woman (Appendix 1)

Treatment of PPH immediate management

- Call for help
- Activate Rapid Response - call 2222 according to criteria
- Perform stepwise management of PPH as per flowchart (Appendix 2)
- Identify underlying cause of PPH and check placenta and membranes are complete
- Replace volume by infusing warm crystalloid solution at least three times the measured volume of blood lost. Consult the anaesthetic team if more than two litres crystalloid solution is required
- Consider treatment with uterotonic medications and/or intravenous (IV) tranexamic acid (Appendix 3)
- Keep the woman warm and administer high flow oxygen via facial mask
- Notify consultant obstetrician and consultant anesthetist to attend if PPH > 1.5L and ongoing bleeding
- Ensure early notification of major blood loss or likely major blood loss, as there will be a delay between activation of Critical Bleeding Protocol (CBP) and delivery of fresh frozen plasma (FFP) of approximately 30 minutes

…./2

POSTPARTUM HAEMORRHAGE (PPH) – PREVENTION AND MANAGEMENT cont'd

Management of ongoing bleeding

- Escalate further as required e.g. Rapid Response, Code Blue, consultant obstetrician and consultant anaesthetist attendance
- Communicate early with other colleagues when surgical assistance is anticipated, particularly where hysterectomy or internal iliac ligation is likely
- Transfer to theatre
- Utilise ROTEM (Appendix 4) to guide blood product replacement, led by the anaesthetic team
- Activate Critical Bleeding Protocol (CBP) if either of the following criteria met:
    - woman likely to need replacement of her entire blood volume in 24 hours
    - woman who is receiving or has received transfusion of 4 units red blood cells (RBC) < 4 hours (in addition to haemodynamic instability and/or ongoing blood loss)

  This should be led by the anaesthetic team and can be used with or without ROTEM
- Communicate directly with the Blood Bank technician (extension 29145) and state if ROTEM guided or non-ROTEM guided. See CBP: https://www.seslhd.health.nsw.gov.au/sites/default/files/documents/criticalbleedingpowhrhw18.pdf
- Notify the Access and Demand Manager (ADM)/After Hours Nursing Manager (AHNM) on pager 44020. If the porter (extension 26784 Mon-Fri or After Hours pager 44000) is unavailable for transport of blood products, the ADM/AHNM will make alternative arrangements for delivery
- Ensure staff send an 'Authority to Issue Blood Products' form (pink form) for all products requested, with the staff member collecting the products. This is important to ensure the correct products are delivered to the right patient, as there may be more than one CBP in progress on the Randwick Campus.

Postnatally

- Document estimated blood loss and treatments used for PPH
- Debrief woman and her family members/support people
- Debrief staff

6. DOCUMENTATION

- Medical Record
- Obstetric database
- CES Notification
- IV Fluid Chart
- Fluid Balance Chart

7. EDUCATIONAL NOTES

- Primary PPH is within 24 hours of birth
- Secondary PPH is 24 hours to six weeks postpartum
- Severe PPH is defined as blood loss of **1000 ml** or more after childbirth
- Blood loss of ≥2000mL carries a significant risk for coagulopathy, and additional escalation is recommended when blood loss is more than this or if there is hemodynamic compromise
- Primary Prophylaxis/Active management of third stage**.** Routine prophylactic oxytocin administered after delivery of the anterior shoulder reduces the risk of PPH by more than 40% and is the most effective means of preventing PPH from uterine atony and is not associated with an increased risk of retained placenta. Active management of third stage involves:
    - oxytocin
    - cord clamping and cutting
    - controlled cord traction (CCT)

POSTPARTUM HAEMORRHAGE (PPH) – PREVENTION AND MANAGEMENT cont'd

- Aetiology:
  - TONE 70% of PPHs are caused by abnormalities of uterine contraction (atony)
  - TRAUMA 20% of PPHs are genital tract trauma
  - TISSUE 10% of PPHs are caused because placental or membrane tissue is retained
  - THROMBIN <1% of PPHs are caused by coagulation abnormalities. Abnormalities of coagulation may be present prior to or during pregnancy or may reflect the severity of blood loss during PPH
- When blood loss continues or woman is haemodynamically unstable, other less common causes need to be considered:
  - uterine inversion
  - uterine rupture
  - broad ligament haematoma
- PPH boxes are located in Delivery Suite, Birth Centre, Operating Theatre and both Postnatal Wards
- ROTEM is a point of care whole blood haemostasis testing method
- CBP replaced Massive Transfusion Protocol (MTP) in April 2018
- Uterine/vaginal tamponade may be undertaken by the use of rolled gauze or intrauterine cavity balloon
- Misoprostol, a prostaglandin E1 analogue, is not currently recommended for routine prevention and control of PPH. Its use is unlicensed, however, it may be used as an adjunct to other medications in cases of severe PPH.
- Tranexamic acid has been used to treat PPH. In a meta-analysis (two trials (20,412 women)) it was found that IV tranexamic acid reduces the risk of maternal death due to bleeding (risk ratio (RR) 0.81, 95% confidence interval (CI) 0.65 to 1.00; two trials, 20,172 women; quality of evidence: moderate). The effect was more evident in women given treatment between one and three hours after giving birth with no apparent reduction when given after three hours.

8. RELATED POLICIES / PROCEDURES / CLINICAL PRACTICE LOP

- Critical Bleeding Protocol (CBP) Business Rule. POWH CLIN072
- Third Stage Management Following Vaginal Birth
- Blood Products - Management of Pregnant Woman Unable to Use Blood Products
- Patient with Acute Condition for Escalation (PACE): Management of the Deteriorating ADULT and MATERNITY Inpatient. SESLHDPR/283
- NSW Health Policy Directive. Maternity - Prevention, Early Recognition & Management of Postpartum Haemorrhage (PPH) 2017. GL 2017_018
- NSW Health Policy Directive PD2007_040 Open Disclosure
- NSW Health Policy Directive PD2007_061 Incident Management
- Balloon Placement for Uterine Tamponade
- Perineal/Genital Tract Repair
- Labelling of Injectable Medicines, Fluids, and Lines
- Maternal Collapse
- Escalation for Birthing Services

9. RISK RATING

- High

10. NATIONAL STANDARD

- Standard 8: Recognising and Responding to Acute Deterioration

POSTPARTUM HAEMORRHAGE (PPH) – PREVENTION AND MANAGEMENT cont'd

11. REFERENCES

1. RCOG 2016. Postpartum Haemorrhage Prevention and Management. Green-Top Guideline No. 52
2. Queensland Maternity and Neonatal Clinical Guidelines Program. 2018 Primary postpartum haemorrhage MN18.1-V7-R23
3. Pairman S, Tracy S, Thorgood C and Pincombe V. Midwifery Preparation for practice 2010
4. Mousa HA, Blum J, Abou El Senoun G, Shakur H, Alfirevic Z. Treatment for primary postpartum haemorrhage. Cochrane Database Systemic Reviews. 2014 Issue 2 Feb 13;(2):CD003249.
5. Shakur H, Beaumont D, Pavord S, Gayet-Ageron A, Ker K, Mousa HA. Antifibrinolytic drugs for treating primary postpartum haemorrhage. Cochrane Database Systemic Reviews 2018 Feb 20;2:CD012964.
6. Effect of early tranexamic acid administration on mortality, hysterectomy, and other morbidities in women with post-partum haemorrhage (WOMAN): an international, randomised, double-blind, placebo-controlled trial**.** Shakur, Haleema et al. The Lancet, Volume 389, Issue 10084, 2105-- 2116 May 2017

REVISION & APPROVAL HISTORY

Amended August 2019 – change to CERS
Reviewed and endorsed Maternity Services LOPs group 18/6/19 – replaced *Massive Transfusion in Obstetrics & Gynaecology (Code Pink)*
Reviewed and endorsed Maternity Services LOPs 19/6/18
Approved Quality & Patient Care Committee 4/2/16
Reviewed and endorsed Maternity Services LOPs group December 2015
Approved Quality & Patient Safety Committee December 2012
Amendment to dosages in appendix May 2014
Reviewed and endorsed Maternity Services LOPs group December 2012
Reviewed Obstetric Clinical Guidelines Group Sept 2010 – Approved Quality & Patient Safety Committee 21/10/10
Reviewed July 2007 – Approved Clinical Performance & Quality Committee August 2007
Endorsed Maternity Services Clinical Committee 10/12/02 – Approved Quality Council 16/12/02

FOR REVIEW: JUNE 2021

/Appendices

A P P E N D I X 1

RISK FACTORS FOR PPH REQUIRING ADDITIONAL PROPHYLAXIS:

- ***EITHER ERGOMETRINE (IF NO CONTRAINDICATIONS) 250mcg IM/IV***
- ***AND/OR OXYTOCIN INFUSION (40 UNITS OXYTOCIN (SYNTOCINON) IN 1000MLS SODIUM CHLORIDE 0.9% @ 250mLs/hr)***

SUSPECTED OR PROVEN PLACENTAL ABRUPTION ☐

MULTIPLE PREGNANCY ☐

RETAINED PLACENTA >30 MINUTES ☐

PRE ECLAMPSIA/GESTATIONAL HYPERTENSION ☐

BIRTH BY EMERGENCY CAESAREAN SECTION ☐

PREVIOUS PPH ☐

OPERATIVE VAGINAL BIRTH/SHOULDER DYSTOCIA ☐

PROLONGED LABOUR>12 HOURS ☐

SECOND STAGE OF LABOUR>2 HOURS ☐

VON WILLEBRAND'S DISEASE ☐

ANAEMIA (<9 g/L) ☐

GRAND MULTIPARITY ☐

OTHER RISK FACTORS (CONSIDER ADDITIONAL PROPHYLAXIS, PARTICULARLY IN THE CASE OF MULTIPLE RISK FACTORS)

ASIAN ETHNICITY ☐

OBESITY (BMI>30) ☐

INDUCTION/AUGMENTATION OF LABOUR ☐

BABY WEIGHT>4 KG ☐

PYREXIA IN LABOUR ☐

AGE >40 YEARS ☐

PRECIPITATE LABOUR ☐

MULTIPLE OR LARGE FIBROIDS ☐

POLYHYDRAMNIOS ☐

APPENDIX 2

FLOWCHART – PRIMARY POSTPARTUM HAEMORRHAGE ≥ 500ML

IMMEDIATE MANAGEMENT – STEPS MAY OCCUR CONCURRENTLY

- Call for help, initiate PACE according to criteria, ensure neonatal safety
- Lie woman flat, massage fundus (expel clots if indicated) and provide reassurance
- Commence oxygen by facial mask
- Ensure 10 units of oxytocin intramuscularly (IM) has been given
- Insert two large bore cannulae (14g or 16g), send blood for FBC, Group and hold +/- cross-match, coags, biochemistry
- Commence volume replacement, ideally with warm crystalloid
- Monitor blood pressure, pulse, respiration, SpO^2 every 5 minutes and temperature every 15 minutes
- Keep woman warm
- Insert IDC

Placenta delivered?

NO

TISSUE

- Commence oxytocin infusion (40 units in 1000ml NaCl) 250mL/hr
- Transfer to Operating Theatre (OT) for manual removal (MROP) if placenta undelivered or incomplete
- Consider MROP in Delivery Suite if adequate analgesia after discussion with anaesthetic team

YES

Uterus well contracted?

NO

TONE

- Massage fundus and expel clots
- If no contraindications, administer IM or slow IV Ergometrine 250 microgram (if no contraindications)
- Check placenta complete
- Commence oxytocin infusion (40 units in 1000ml NaCl) 250mL/hr
- Consider bimanual compression

YES

Genital tract trauma?

YES

TRAUMA

- Inspect for perineal, vaginal, cervical lacerations and repair immediately
- Inspect for haematoma
- Apply pressure or clamp vessels and repair
- Transfer to OT for appropriate analgesia or better visualisation

IF UTERUS REMAINS ATONIC

- Continue bimanual compression
- Consider rectal misoprostol 800 micrograms
- Consider tranexamic acid and/or
- Consider Carboprost® **OR** Prostaglandin F2 Alpha

THROMBIN

- Observe for signs of coagulopathy
- Activate CBP

ONGOING BLEEDING NOT RESPONDING TO THE ABOVE MEASURES

- Notify consultant obstetrician and consultant anaesthetist to attend if PPH > 1.5 L
- Further escalation as required e.g. Rapid Response, CODE BLUE
- Implement CBP
- Transfer to OT if not already there
- Utilise ROTEM
- Call in further surgical assistance
- Consider:
  - Intra-uterine balloon tamponade
  - Laparotomy +/- B lynch suture, uterine artery ligation, internal iliac artery ligation, hysterectomy
- Consider interventional radiology
- Continue ongoing management in consultation with anaesthetic team and haematology
- Plan transfer to Intensive Care or Acute Care Unit when stable

DEBRIEF AND DOCUMENTATION

- Debrief of woman, family members and staff
- Ensure clear documentation

Adapted from Queensland and NSW Maternity and Neonatal Clinical Guideline: Primary Postpartum Haemorrhage.

APPENDIX 3

MEDICATIONS TO USE WITH PPH		CONTRAINDICATIONS/CAUTIONS

1ST LINE TREATMENT	**Ergometrine**
	• Give 250 microgram either IM or slow IV infusion with antiemetic.
	• This can be repeated if required.
	• Onset of action:
	  ○ IM is 5-7 minutes, lasts 3 hours
	  ○ IV has rapid onset within 1 minute and lasts 45 minutes
		Contraindications:
		• ergot alkaloid hypersensitivity
		• retained placenta
		• pre-eclampsia/eclampsia
		• sepsis
		• peripheral vascular disease
		• heart disease
		• current or past history of hypertension
		• impaired hepatic/renal function

2ND LINE TREATMENT	**Oxytocin Infusion**
	• Add 40 units to 1 litre of Normal Saline (sodium chloride 0.9%) and run at 250 mLs/hour via infusion pump
	• Onset of action:
	  ○ IV < 1 minute, lasts <30 minutes.
	  ○ IM 2-4 minutes, lasts 30-60 minutes
		Contraindication – known hypersensitivity

3RD LINE TREATMENT	**Misoprostol**
	• Give 800 micrograms rectally
	• Onset of action per rectum has slow uptake (100 minutes) but prolonged duration (4 hours).
	• Off label use
		• Contraindication – known hypersensitivity
		• Caution - asthma.
		• Side effects:
		  ○ diarrhoea
		  ○ abdominal pain
		  ○ shivering/fever

4TH LINE TREATMENT	**Tranexamic acid**
	• Give as a slow IV push 1gm/10mLs over 10 minutes (1mL per minute)
	• If required, follow 30 minutes later with infusion of 1g diluted in sodium chloride or glucose solutions 500mls, at 250mLs/hour via infusion pump
		• Contraindications:
		  ○ Active thromboembolism including deep vein thromboses, pulmonary embolus, cerebral thrombosis
		  ○ thrombosis risk, including family history (unless anticoagulated)
		  ○ acquired colour vision disturbance
		  ○ subarachnoid haemorrhage
		• Caution in renal impairment
		• Side effects - dizziness and hypotension

5TH LINE TREATMENT	**Prostaglandin F2 Alpha**
	• Ensure an IV line, cardiac monitoring and O^2 therapy are in place before administration
	• An anaesthetist should be in attendance
	• Dilute 5mg (1mL) of Prostaglandin F2 Alpha with 9 ml of Normal Saline to equal 10mLs volume
	• Discard 4mL to leave 6mL = 3mg or 500 microgram/mL
	• Give 2 mL (or maximum 1 mg at a time) by a medical officer injecting into the uterine myometrium with the 22G Spinal Needle (BD®)
		• Caution:
		  ○ asthma
		  ○ hypertension
		  ○ active cardiac, renal or hepatic disease
		  ○ known hypersensitivity
		• Side effects:
		  ○ nausea
		  ○ bronchospasm
		  ○ vomiting/diarrhoea
		  ○ headache
		  ○ flushing/pyrexia
		  ○ uterine rupture
		  ○ cardiac arrest
		• Off label use

OR
5TH LINE TREATMENT
	Carboprost®
	• Ensure an IV line, cardiac monitoring and oxygen therapy are in place before administration
	• An anaesthetist should be in attendance
	• Give 250 microgram (1mL) via IM or intramyometrial injection. Intramyometrial injection is an 'off label' route of administration and therefore must be administered by a medical officer
	• Once in OT, the dose can be repeated as required every 15-90 minutes to a maximum of 2mg (8 doses).
	• This medication is imported from overseas via the Special Access Scheme (SAS). Please complete an SAS form and return to Pharmacy. Where possible, obtain consent from patient and document in clinical notes.
		• Contraindications:
		  ○ acute pelvic inflammatory disease
		  ○ cardiac/pulmonary/renal/hepatic disease
		  ○ known hypersensitivity to prostaglandin
		• Cautions:
		  ○ asthma
		  ○ anaemia
		  ○ diabetes
		  ○ epilepsy
		  ○ hyper/hypotension
		  ○ jaundice
		  ○ uterine surgery
		• Side effects:
		  ○ hypertensive crisis
		  ○ fever with rigors
		  ○ headache
		  ○ paraesthesia
		  ○ diarrhoea, nausea and vomiting
		  ○ breast tenderness
		  ○ dystonia
		  ○ pulmonary oedema

Appendix 4

GENERAL SURGICAL / OBSTETRIC HAEMORRHAGE ROTEM TRANSFUSION ALGORITHM (2017)

Maintain: **Temp >36 C, pH >7.2, iCalcium >1 mmol/L, Platelets >70, Hb >70 g/L**
Only consider APTT and INR in the presence of heparin and warfarin.

Adjust dose of blood products for patients <50kg after consulting senior clinician

Repeat ROTEM test 10 mins after EACH intervention

IS THERE CLINICALLY SIGNIFICANT BLEEDING?

YES

High risk of Fibrinolysis? Consider Tranexamic Acid now

ROTEM
Result in 6 min

NO

Observe

FIBRINOLYSIS

EARLY DIAGNOSIS:
IS EXTEM A5 < 35 mm?

OR LATE DIAGNOSIS:
Leave test running for up to 60 min
IS EXTEM ML ≥ 5%?
Clot should be stable for 1 hour, not tapering > 5 %

YES → Hyperfibrinolysis → **Tranexamic Acid 1 gram**
Consider repeat dose if patient has lost over 1 blood volume since initial dose
Adjust subsequent dose for renal dysfunction

NO → PROCEED WITH ALGORITHM

FIBRINOGEN

IS FIBTEM A5 < 10 mm?

YES → Low Fibrinogen → **Cryoprecipitate 5 Units Apheresis**
OR
IF FIBTEM A5 < 8 mm may need > 5U of Cryo See "Dosage Schedule"
Ensure platelets also available in case needed
RETEST

NO

PLATELETS

IS FIBTEM A5 ≥ 10 mm?
AND
IS EXTEM A5 < 35 mm?

YES → Poor Platelet Contribution → **1 Pool Platelets**
If chronic renal dysfunction also consider DDAVP 0.3 mcg/kg
Ensure FFP "ready to thaw" in case needed
RETEST

NO

FACTORS

IS FIBTEM A5 ≥ 10 mm?
AND
IS EXTEM CT >90 sec?

YES → Low Coagulation Factors → **FFP 2-4 units**
OR
Prothrombinex 10 U/kg
If volume overloaded
RETEST

NO

NORMAL

STILL BLEEDING? Make stronger clot:

- Give Cryo to FIBTEM A10 > 15 mm
- Give platelets to EXTEM A10 > 50mm or consider Platelet Function testing (in hours)
- Consider FFP to shorten clotting time to EXTEM CT < 80 sec

IF STILL BLEEDING:

- Consider SURGICAL/OBSTETRIC PROBLEM and discuss with surgeon/obstetrician and blood bank/haematologist (rFVIIa)
- Re check temperature, pH, iCalcium, platelets and haemoglobin
- Consider other contributors to bleeding
  - platelet inhibiters (do Multiplate Platelet Function test)
  - Consider VWD, warfarin (INR), clexane etc.

When clinically possible always complete the algorithm in a stepwise manner and check the ROTEM between steps as indicated. This reduces unnecessary transfusion especially of FFP.