POSTPARTUM HAEMORRHAGE (PPH)

Postpartum haemorrhage (PPH) is one of the main causes of maternal death worldwide. It is an obstetric emergency that needs to be managed promptly and effectively to reduce the risk of morbidity and mortality.

DEFINITION AND INCIDENCE

PPH is defined as blood loss greater than 500 mLs and continuing. This definition is used as a marker for audit and to mobilise extra resources. However, clinically significant PPH is more usefully defined as any excessive bleeding that causes the woman to become symptomatic.

Primary PPH occurs in the first 24 hours postpartum and secondary PPH occurs 24 hours to 6 weeks after birth.

PPH is reported to occur after 1 to 5% of births dependent on the criteria used to define PPH.

PREDISPOSING FACTORS

Although risk factors are a prompt to remain vigilant for PPH, in reality only a small proportion of women with risk factors experience PPH. Possible predisposing factors include, but are not limited to:

Antenatal
- History of previous PPH
- Large for gestational age newborn (> 4 kg)
- Placenta praevia/ accreta
- Hypertensive disorders
- Obesity
- High Parity
- Bleeding disorders

Intrapartum
- Induction and/or augmentation
- First stage labour > 24 hours
- Delay in progress of second stage
- Precipitate labour
- Instrumental delivery
- Caesarean section
- Retained placenta
- Lacerations

(based on UptoDate.com, 2010)

DIAGNOSIS

Blood loss tends to be underestimated which may delay active steps being taken to resuscitate the woman and stop the bleeding. Women may lose up to a third of their blood volume (1500-1800mls) without showing signs of shock.

Assessment of signs and symptoms is more clinically useful than blood estimation alone. These include:
- feeling unwell, lightheaded and/or fainting
- pallor, cold peripheries and/or goosebumps
- hypotension and/or tachycardia (occasionally bradycardia)
- agitation and/or confusion
MANAGEMENT

POSTPARTUM HAEMORRHAGE ALGORITHM: PRIMARY UNIT

PPH > 500 mL ongoing
• PPH box

• Deliver placenta
• Fundal massage (E) *
• Expel clots
• Baby to breast
• Give uterotonic
• Empty bladder

Bleeding continues and/or woman symptomatic
• Call 777 and ask for midwifery coordinator
• Call 111 for ambulance
• State location
• State nearest crossroad
• State “Code One” (lights and siren)

Check uterus is empty
• Fundal massage (E)*
• Expel clots
• Catheterise bladder
• Check placenta complete

Give Uterotonic
Oxytocin (Oxytocin®) 10 units IM
or Oxytocin 5 units IV
or Syntometrine®** 1 mL IM

Start oxytocin infusion
40 units Oxytocin® in 500 mLs of 0.9% sodium chloride at 125 mLs/hr

Other measures
• Indwelling Foleys catheter
• Perform bimanual compression (*A)

Transfer to tertiary unit

• IV line
• FBC
• G & S

• Give oxygen
• Lie flat and/or head down

• Give 1 litre 0.9% sodium chloride (normal saline) STAT
• Assess blood loss
• Continue IV fluids
• Insert second IV line if possible to increase rate of IV fluids

Causes of bleeding
• Tone
• Tissue
• Trauma
• Thrombin

Estimate blood loss
• Pulse
• BP

* Refer to Appendices
** Avoid Syntometrine® in women with hypertension or cardiac disease. (Syntometrine® contains oxytocin 5 units and ergometrine 0.5 mg in 1 mL)
**POSTPARTUM HAEMORRHAGE ALGORITHM – TERTIARY UNIT**

**PPH > 500 mL ongoing**
- **Deliver placenta**
- **Fundal massage (E)**
- **Expel clots**
- **Baby to breast**
- **Give uterotonic**
- **Empty bladder**

**Bleeding continues and/or woman symptomatic**

**ASSESS**
- **Estimate blood loss**
- Document running total

**Vital Observations**
- **ABC**
- **Pulse**
- **BP**
- **O2 sats/perfusion/RR**
  - If cardiac/respiratory arrest is imminent call a ‘Clinical Emergency’ immediately

**Investigations**
- **Check FBC, G&S sent**
- **Arrange cross match**
- **Coag screen**

**Causes of bleeding**
- **Tone**
- **Tissue**
- **Trauma**
- **Thrombin**

**CALL FOR HELP**
- Red Emergency Bell
- Get PPH box

**STOP BLEEDING**
- **Check uterus is empty**
- **Fundal massage (E)**
- **Expel clots**
- **Catheterise bladder**
- **Check placenta complete**

**Give Uterotonic**
- Oxytocin (Oxytocin*) 10 units IM or Oxytocin 5 units IV or Syntometrine** 1 ml IM

**Start oxytocin infusion**
- 40 units Oxytocin* in 500 mLs of 0.9% sodium chloride at 125 mLs/hr

**Other measure (see Appendix F)**
- Tranexamic Acid – 1 gram (10 mLs tranexamic acid in 100 mL 0.9% normal saline @ 600 mL/hr via pump)
  - to be administered by anaesthetist prior to transfer

**CONTROL BLEEDING from lower genital tract trauma**

- **If bleeding continues**
  - Bimanual compression (A)
  - Call obstetric and anaesthetic consultants
  - Transfer to theatre for definitive measures

- **IF uterine atony continues consider**
  - Carboprost (Prostin/15M) 250 micrograms IM or intramymetricaly max 8 doses 15 min apart
  - Misoprostol 800 micrograms PR once only

**RESUSCITATE**
- **Insert second IV line**
- **Give oxygen**
- **Lie flat and/or head down**

- **Rapid Crystalloid Infusion**
  - 0.9% sodium chloride or compound sodium lactate (Hartmanns) ≤ 3 L

- **Transfuse RBC**
  - Transfuse RBC when available
  - After 3 litres crystalloid or if cross matched RBC not available consider O Neg
  - Consider Patient Specific Emergency Blood Box

- **If haemorrhage exceeds 2000 mL and/or patient shock activate Massive Transfusion Protocol**
  - Ring Blood Bank (ext. 80310) and say “I am activating the Massive Transfusion Protocol”
  - Call for additional assistance
  - Obstetric Consultant
  - Anaesthetic Consultant

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* Refer to Appendices
** Avoid Syntometrine* in women with hypertension or cardiac disease. (Syntometrine* contains oxytocin 5 units and ergometrine 0.5 mg in 1 mL)
Transfer to OT
Assessment and resuscitation measures continue as in the tertiary unit algorithm above

- Declare the emergency
- Update team members
- Identify leader
- Use ISBAR

Examination under anaesthet
- Lower genital tract including cervix for trauma (suture)
- Manual removal of clots/placental tissue from uterus
- Broad Spectrum IV antibiotics
- Correct coagulopathy
- Keep the patient warm

Uterotonic as required
- Continue Oxytocin® infusion
- Carboprost
- Misoprostil

Other measure as required (see Appendix F)
- Tranexamic acid

Uterine Tamponade Balloon* (see Appendix B)

Laparotomy in (modified lithotomy) (see Appendix C,D)
- B-Lynch suture*
- Other uterine compression sutures

Call Gynae Oncologist

Arterial ligation (see Appendix E)
- Uterine
- Internal iliac

HYSTERECTOMY
Consider subtotal as has less morbidity

* NB B-Lynch and tamponade balloon can be used together. If using this option place the balloon first, perform B Lynch suture, close uterus and then inflate balloon.
POSTNATAL CONSIDERATIONS

The frequency of observations will be guided by Obstetric team. Observations include:

- Pulse
- Blood pressure
- Vaginal loss
- Palpation of fundal tone and height

Blood loss 500-1500 mL

- 2 sets of observations 15 minutes apart
- 2 sets of observations 30 minutes apart
- Hourly observations until transferred out of birthing suite
- Women who have experienced blood loss in excess of 1000 mL will usually stay on birthing suite until 2 hours post Oxytocin® infusion

Blood loss that necessitates admission into Acute Observation Unit (AOU):

- Frequency of observations as directed by the Obstetric team
- Fluid balance – hourly urine output
- Oxygen saturations
- Further investigations as directed by Obstetric team

On arrival to maternity postnatal ward fill in an Allied Health CWH Inpatient Referral Form C240029 (Ref.7304) to Dietitian for postpartum haemorrhage if Hb < 100g/L. Dietitian to provide advice on iron rich diet, iron supplements, and healthy eating for breastfeeding women.

Refer to Appendix B for directions on removal of uterine tamponade balloon.

Refer to Obstetric Intravenous Iron Infusion Prescription (C260133 Ref.233597).

REFERENCES

3. Jacobs A, 2010, Causes and Treatment of Postpartum Haemorrhage, Downloaded from UpToDate.com on 8/6/10
APPENDIX A  TEMPORARY MEASURES TO CONTROL HAEMORRHAGE

UTERINE FUNDAL MASSAGE

The left hand is cupped over the uterus and massages it with a firm circular motion in a clockwise direction.

INTERNAL COMPRESSION BIMANUAL

COMPRESSSION OF THE AORTA

Remember the bifurcation of the aorta is at the level of the sacral, promontory so press above this.

Above diagrams from; Boyle M. Emergencies Around childbirth. Chapter 10
**APPENDIX B  INTRAUTERINE (BAKRI) TAMPONADE BALLOON INSERTION METHOD**

**POST VAGINAL BIRTH**

- Place woman in lithotomy (Lloyd Davis legs/yellow fins) and insert indwelling urinary catheter into bladder.
- Attach a urine collection bag to the tamponade balloon silicone catheter (to collect the draining blood).
- Attach a 3 way tap to the balloon inflation port.
- Feed the balloon up through the cervix (proximal end).
- Blow the balloon up with 250 to 500 mL normal saline, until tamponade is achieved (place fluid to be used in a separate container do not rely on syringe count).
- Check balloon is correctly sited completely through internal os by digital palpation and/or ultrasound scan. See diagram below (from Cook/ Obex product info).

![Diagram of tamponade balloon](image)

- Use a firm vaginal pack to stop the balloon falling out when it is put under tension (see below). This may require 2-3 packs tied together after a vaginal birth.
- Attach a weight (500 mL normal saline) to the distal end of the balloon catheter shaft or alternatively tape it to patient’s legs to provide counter traction and put pressure on the lower segment.
- Check for success. Move to other surgical options if unsuccessful. Discuss with team.
POST CAESAREAN BIRTH

This technique is most useful for bleeding from the lower segment, i.e. placenta praevia.

- Place in frog leg position or lithotomy with Lloyd Davis legs (yellow fins).
- Feed the distal end of the balloon catheter down through the cervix to an assistant who pulls it through from below. Assistant attaches urine collection bag to balloon catheter and 3 way tap to inflation port.
- If using in conjunction with a B-Lynch suture. Place the B Lynch suture at this point.
- Close the uterus (Bakri recommends to complete the Caesarean Section then you would need to reopen if not successful).
- Place a vaginal pack using a speculum.
- Blow the balloon up with 250 to 500 mL normal saline.
- Attach a weight (500 mL normal saline) to the distal end of the balloon catheter shaft or alternatively tape it to patient’s legs to provide counter traction to put pressure on the lower segment.
- Check for success. Move to other surgical options if unsuccessful. Discuss with team.

REMOVAL

- Deflate balloon. In majority of cases 4-6hrs of tamponade should be adequate to achieve haemostasis. Maximum recommended treatment time is 24 hours.
- Ideally remove during the day hours in the presence of appropriate senior staff. Before removal balloon should be deflated but left place for 1-2 hours ensure bleeding does not reoccur.

Appendix B References

2. SOS Bakri Tamponade Balloon. Cook/ Obex. Product information
APPENDIX C  METHOD FOR B LYNCH UTERINE COMPRESSION/BRACE SUTURE

- Use the suture from the box labelled ‘B – Lynch/ PPH’ available from store room between CS theatres (large blunt curved round bodied hand held needle with extra-long vicryl suture. (Johnson and Johnson W9391)

- Please refer to diagrams and note the following points:
  1. Start 3 cm below and medial to the right incision angle.
  2. Get your assistant to compress the uterus as much as possible during the procedure.
  3. Tighten the suture as you go, ie. when the first half of the pair of braces is placed tighten at this point and get your assistant to hold it tight.
  4. The suture goes through the full thickness of the myometrium posteriorly.
  5. Compress the uterus further by tightening the suture more when you tie it.

METHOD FOR BRACE SUTURE POST VAGINAL BIRTH:

B- Lynch recommends opening and evacuating the uterus as for Caesarean, however an alternative is shown below without opening the uterus which may be appropriate if a thorough EUA has been performed from below.

As the uterus has not been opened modification of technique is required as shown in diagram below; the brace sutures are placed separately through the full thickness of the uterus and tied at the fundus on each side. Further compression sutures can be placed in the lower segment.

APPENDIX D  OTHER UTERINE COMPRESSION SUTURES

Other surgical techniques to appose the uterine walls are shown below.

LOWER SEGMENT VERTICAL COMPRESSION SUTURES

Fig. 2. The suture is pulled from back to front through the uterine cavity and anterior wall of the lower segment.

Fig. 3. Front view of the anterior lower segment after the knots (white arrows) are tied.


MULTIPLE SQUARE SUTURE METHOD

APPENDIX E  METHODS OF ARTERY LIGATION

UTERINE ARTERY LIGATION

This technique can be used by an Obstetrician familiar with uterine artery ligation during total abdominal hysterectomy, location as shown below. In view of the large collateral supply this procedure preserves the uterus. Ligation of the Utero ovarian anastamoses can also be attempted.


Figure 4. Uterine artery ligation.
INTERNAL ILIAC ARTERY LIGATION

NB; this should only be attempted by a surgeon skilled in this technique, eg. Gynae Oncologist, Vascular Surgeon. See diagram

![Diagram of Internal Iliac Artery Ligation]

*Figure 6. Internal iliac vessel ligation.*

APPENDIX F  TRANEXAMIC ACID FOR THE MANAGEMENT OF PPH

Tranexamic acid is an antifibrinolytic drug that reduces bleeding by inhibiting the enzymatic breakdown of fibrinogen and fibrin by plasmin. Early activation of fibrinolysis is common after trauma and is associated with increased mortality. Trauma triggers the release of tissue plasminogen activator, the enzyme that converts plasminogen to the fibrinolytic enzyme plasmin.

Findings of a systematic review of clinical trials of tranexamic acid in surgery showed that the drug reduces blood loss by about 30%. The CRASH-2 trial, which studied the use of tranexamic acid in management of haemorrhage in trauma patients showed that tranexamic acid reduced death due to bleeding, with no apparent increase in vascular occlusive events. In addition, planned subgroup analysis of the effect of tranexamic acid in relation to time from injury to the start of treatment showed that early treatment is essential. In patients given treatment within 3 hours of injury, tranexamic acid reduced death due to bleeding by nearly one third. However, when given after 3 hours there was no benefit. Early activation of fibrinolysis is also recorded after childbirth. Within 1 hour of giving birth, the serum concentration of tissue plasminogen activator doubles, possibly because of tissue damage during childbirth; thereafter, the concentration falls. Since 2012, on the basis of clinical trials of tranexamic acid in surgery and trauma, WHO guidelines have recommended the use of tranexamic acid in post-partum haemorrhage if uterotonics fail to stop the bleeding or if it is thought that the bleeding may be due to trauma.

The results of the WOMAN trial published in April 2017 further support this recommendation. This large (n = 20060), multi-national, randomised, controlled trial studied the effect of giving a 1 g infusion of tranexamic acid in addition to usual care to women aged > 16 years who experienced postpartum haemorrhage. Results of this trial suggest that tranexamic acid significantly reduces the risk of death or need for laparotomy due to bleeding with no evidence in any increase in risk of thromboembolic events. Trial results also suggested that if tranexamic acid is used in the treatment of postpartum haemorrhage it should be given as soon as possible after the onset of post-partum haemorrhage alongside uterotonics. A significant proportion of mothers die within hours of postpartum haemorrhage onset. In such circumstances, waiting to see if uterotonics fail to stop the bleeding before commencing tranexamic acid could put some mothers’ lives at risk.

Appendix F References


