Postpartum Haemorrhage (PPH)

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Definition

- A blood loss at birth of up to 500 mL is considered to be normal
- A primary postpartum haemorrhage is a blood loss of 600 mL or more in the first 24 hours
- A widely accepted definition of postpartum haemorrhage (PPH) in many institutions is a blood loss of 600 mL for a normal birth and 750 mL for a caesarean birth
- The classification of PPH in relation to the amount of blood loss is problematic, largely due to a well-documented underestimation of blood loss
- A clinically relevant alternative is a substantial fall in the haematocrit e.g. 10 % (normal range 0.32 to 0.47 L/L), or the requirement for a blood transfusion (Mousa and Alfirevic 2003)

Aetiology

- In 2006, PPH affected 7.1 % (1,316) of birthing women in South Australia (Chan et al. 2007). PPH may be associated with:
  - Abnormalities of uterine contraction (Tone) 70 %
  - Retained products of conception or invasive placenta (Tissue) 10 %
  - Genital tract trauma (Trauma) 20 %
  - Abnormalities of coagulation (Thrombin) < 1 %

Antenatal and intrapartum risk factors for PPH

- The assessment of risk of PPH is dynamic and is an ongoing process that continues even after the end of the third stage
- Some risk factors should be identified in the antenatal period and at admission in labour, such as:
  - Antepartum haemorrhage (especially placental abruption and placenta praevia)
  - Postpartum haemorrhage with a previous pregnancy
  - Known placenta accreta
  - Multiple pregnancy
  - Coagulopathies
- Others that can be identified at that time, but with a smaller increase in risk, are:
  - Anaemia
  - Nulliparity
  - Pre-eclampsia
  - Large baby
  - Obesity
  - Elective or previous LSCS
- Some characteristics of labour and birth also increase the risk. They include:
  - Need for and use of oxytocics in labour
  - Prolonged labour (second stage in particular)
  - Pyrexia in labour
  - Operative delivery
  - Episiotomy
  - Placental retention

- It should be noted, however, that two thirds of women who experience postpartum haemorrhage have no identifiable risk factors.

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>For further information see Table 11.1 Antenatal and Intrapartum risk factors for PPH

Preventive antenatal management

>Detect and treat anaemia antenatally
>Women with suspected abnormally adherent placenta have a high risk of PPH and should have a management plan documented in their case notes
    > Arrange antenatal consultation as appropriate e.g. physician, radiologist and anaesthetist
    > Consult with a radiologist to determine if magnetic resonance imaging (MRI) is indicated to assess the degree of placental penetration into the myometrium

Intrapartum management of women at risk for PPH

>All women with known significant risk of PPH should be managed at a hospital equipped with high dependency / intensive care facilities and access to specialist services

Planned vaginal birth in women at risk for PPH

>Confirm labour management plan with medical officer when the woman arrives in labour
>Establish intravenous access (16 gauge cannula)
>Group and save. In some cases it may be necessary to group and match units of blood
>Active management of the third stage (follow link to active management of third stage)
>This may include having a 40 IU Syntocinon® infusion available to commence when needed (follow link to Syntocinon®: prophylaxis for third stage management and infusion regimens)

Planned caesarean section in women at risk of PPH

>May be associated with placenta praevia or other cases with a high risk of haemorrhage
>An experienced obstetrician should be physically present in theatre
>An experienced consultant anaesthetist should provide anaesthesia
>At least four units of red blood cells should be cross-matched and immediately available
>Insert two large bore cannulae (at least 16 gauge)
>Intravenous fluids should be warmed (use temperature controlled fluid warming device e.g. blood warmer) to avoid hypothermia
>Ensure that devices to infuse fluid under pressure are in theatre
>Consider warming of the woman e.g. using a forced air warmer

Suspected abnormal adherence of placenta

>Arrange the back-up of another experienced obstetrician, gynaecologist, urologist or vascular surgeon

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- Serious consideration should be given to having the caesarean section done in a hospital with adult intensive care facilities
- Preoperative consultation with an interventional radiologist to determine the availability and feasibility of embolisation should the need arise

Placenta undelivered (not associated with PPH)

- Palpate uterus to confirm if contracted (avoid indiscriminate handling)
- Ensure Syntocinon® was given at the time of birth
- Upright position (provided there is no haemodynamic instability)
- Encourage skin to skin contact between mother and baby and early suckling
- Wait 30 minutes for signs of placental separation (follow link to active management of the third stage)

In the next 30 minutes:

- Confirm uterus is contracted
- Repeat controlled cord traction (avoid forceful cord traction and fundal pressure as they may cause uterine inversion)
- Perform a vaginal examination to establish if placenta is trapped or adherent
- Remove placenta if in the vagina

Clinical tips

- Portable ultrasound scan can show if the placenta is still in the upper segment or whether it has separated and is in the lower segment of the uterus

Do not use ergometrine or Syntometrine or infuse large volumes of fluid if the woman has preeclampsia or an elevated blood pressure in labour

If placenta is not expelled (associated with PPH)

- Perform uterine massage to expel clots and repeat oxytocin e.g. Syntocinon® 10 IU intravenous, or 10 IU intramuscular (avoid ergometrine / Syntometrine for retained placenta because it causes tonic uterine contraction, which may delay expulsion)
- Empty the bladder / catheterise
- Repeat controlled cord traction
- Insert IV access (16 gauge cannula)

Perform portable ultrasound (if not already done) +/- vaginal examination to confirm if placenta has separated (trapped) or still adhered. Remove placenta if trapped and remove any clots present

Placental retention

Condition stable

- Determine if placenta adherent or trapped
- Assess for clinical signs of blood loss (remove any clots present)

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- Group and cross match 2 units and complete blood picture to laboratory
- Commence resuscitation as appropriate e.g. oxygen treatment, lower head of bed, establish IV access using 16 gauge cannula and infuse intravenous fluids
- Arrange for manual removal of the placenta in theatre with anaesthesia
- Continue to monitor maternal observations (e.g. continuous pulse oximeter, blood pressure, respiration, pulse, capillary refill and maternal condition)
- Maintain fluid balance chart
- In case of significant blood loss consider if the placenta has separated and repeat controlled cord traction. If not separated and there is a delay in theatre access, consider manual removal with appropriate analgesia in the delivery room

NB: A retained placenta may develop into a PPH if management / transfer to theatre is delayed

With rapid PPH >1500 mL

- Call for help – midwifery, obstetric and anaesthetic
- Stop the bleeding – e.g. vaginal examination to exclude causes other than atony, remove any clots present, apply pressure to minimise bleeding
- Administer oxygen at 8-12 litres via re-breathing mask
- Intravenous access x 2 using 16 gauge cannula
- Group and cross match 6 units and complete blood picture, coagulation studies and D-dimer to laboratory
- If ongoing massive blood loss, the medical officer should notify transfusion laboratory and request suitable emergency red blood cells (see PPG, Massive blood transfusion)
- In the case of massive blood loss, the senior obstetrician / anaesthetist should liaise with the haematologist to arrange further appropriate resuscitation priorities e.g. fresh frozen plasma, platelets, cryoprecipitate, recombinant factor VIIa (FVIIa) (see PPG, Massive blood transfusion)
- Lower head of bed, position woman flat (may remain with legs bent or in lithotomy)
- Resuscitate with appropriate intravenous fluid, e.g. sodium chloride 0.9 %, Hartmann's solution (crystalloids) or Gelafusine® (gelatin – based colloid). When using crystalloid, the ratio of resuscitative intravenous fluid required to blood lost is 3:1
- To resuscitate more quickly, administer intravenous fluids using a pressure infusion device
- Hypothermia increases the risk of disseminated intravascular coagulation and other complications. This may be prevented by pre-warming resuscitation fluids, e.g. use temperature controlled blood warmers and warm air blankets
- Avoid hypotension by adequate fluid replacement in relation to ongoing measured blood loss
- Administer second bolus dose of Syntocinon® 10 IU intravenously
- Prepare woman for manual removal of the placenta in theatre with anaesthesia after adequate pre-operative resuscitation
- Monitor maternal observations for clinical signs of shock (e.g. tachycardia, tachypnoea, decreased blood pressure, weakness, sweating, restless, nausea) and resuscitate if present
- Monitor oxygen saturation with pulse oximeter
- Consider prophylactic antibiotics in theatre
- Consider the possibility of an abnormally adherent placenta

If at any time bleeding is rapid or the woman is haemodynamically unstable:

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- Delegate two people (e.g. anaesthetist plus midwife or theatre nurse) to continue with resuscitative measures
- Bimanually compress the uterus by placing a fist in the anterior fornix of the vagina and the other hand rubbing up the uterine fundus
- If unsuccessful, perform aorto-caval compression

Retention of abnormally adherent placenta

- In abnormal adherence of placenta there is no dividing line between the decidua compacta and decidua spongiosa (Poggi and Kapernick 2003)

Types:

Placenta Accreta

- Abnormal adherence of placenta with no plane of separation

Placenta Increta

- Placenta penetrates into the myometrium

Placenta Percreta

- Whole thickness of myometrium is invaded up to the serosal surface or beyond

Causes:

- Implantation over previous caesarean section scar
- Manual removal of placenta after a previous pregnancy
- Placenta praevia
- Previous vigorous or repeated curettage (particularly postpartum)
- Previously treated intrauterine synechiae (adhesions)
- Presence of submucous myomata
- Pregnancy in uterine diverticulum

Management

- If densely adherent placenta, do not try to remove
- Remove any non-adherent portions of the placenta
- Trim cord
- Observe closely – antibiotics if indicated
- The woman may need uterine artery embolisation, a hysterectomy or ligation of internal iliac arteries
- In the woman who is stable, hysterectomy may be avoided by the use of methotrexate [see references] (Gupta, Sinha 1998; Flam et al. 1999; Nijman et al. 2002)

PPH after delivery of the placenta

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- Treatment of PPH includes early detection followed by prompt attention to the resuscitation and a simultaneous search for the cause/s of bleeding (e.g. atony, retained tissue, trauma, or coagulopathy) to stop the bleeding
- Call for assistance - obstetric, midwifery and anaesthetic

Resuscitation measures

- Administer oxygen at 8-12 litres via re-breathing face mask
- Lower the head of the bed and position the woman flat (may remain with legs bent or in lithotomy)
- Intravenous access x 2 using 16 gauge cannulas and open IV infusion
- Group and cross match at least 2 units of blood and order complete blood picture
- Resuscitate with appropriate intravenous fluid, e.g. sodium chloride 0.9 %, Hartmann's solution (crystalloid) or Gelafusine® (gelatin – based colloid). When using crystalloid, the ratio of resuscitative intravenous fluid required to blood lost is 3:1
- Hypothermia increases the risk of disseminated intravascular coagulation and other complications. This may be prevented by pre-warming resuscitation fluids, e.g. use temperature controlled blood warmers and warm air blankets
- To resuscitate more quickly, administer intravenous fluids using a pressure infusion device
- Ensure the uterus is contracted

If the uterus is not contracted, management is:

- Continue uterine massage to stimulate a contraction and expel any clots present. If the uterine fundus feels bulky and uterine massage does not expel clots, put on sterile gloves and perform vaginal examination to remove clots
- Insert indwelling catheter
- Repeat bolus Syntocinon® 10 IU intravenous and / or 10 IU intramuscular. Alternatively repeat bolus ergometrine 25 to 50 micrograms intravenous (draw up 250 micrograms [0.5 mL] ergometrine and dilute to 5 mL with sodium chloride 0.9 % [1 mL = 50 micrograms], may repeat after 2 to 3 minutes) or 250 micrograms intramuscular
- Prepare and commence an oxytocin infusion (40 IU Syntocinon® in 1000 mL Hartmann's solution or sodium chloride 0.9 %) (refer to PPG, Syntocinon® infusion regimen for PPH)
- Check that the placenta is complete

- If no response to Syntocinon® and no contraindication to the use of ergometrine, repeat ergometrine 25 to 50 micrograms intravenous or 250 micrograms intramuscular after 2 to 3 minutes
- Consider Cytotec® (misoprostol) 800 to 1,000 micrograms per rectum OR Cervagem® (gemeprost) 1 mg per rectum OR intramyometrial Prostaglandin F2α

If bleeding continues despite a well contracted uterus look for other causes:

- Position the woman in lithotomy with adequate anaesthesia / analgesia
- Ensure adequate lighting, assistance and instruments to provide adequate exposure
- It may be necessary to take the woman to theatre to examine under anaesthesia
- Inspect vulva, vagina, cervix and perineum for trauma. Consider uterine rupture
- Suture and repair as indicated
- Consider coagulation abnormalities

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- In addition to complete blood picture, check D-dimer, coagulation studies including INR, APTT, fibrinogen, FDPs
- Treat coagulation abnormalities with fresh frozen plasma (FFP) +/- platelets, cryoprecipitate
- Consider underlying cause if disseminated intravascular coagulation (DIC) present. Consult with haematologist regarding appropriate blood products including recombinant activated factor VII and physician
- If DIC is secondary to sepsis, also consult with microbiologist
- Consider transfer of the woman to a hospital with appropriate intensive care facilities

If bleeding persists:

- Contact the theatre and anaesthetist if not already done
- Ensure adequate consultant obstetric / specialist support available
- Consider repeating ergometrine
- Transfer woman to theatre

In theatre management

- Consider intramyometrial injection of 2.5 mg of prostaglandin F2α (follow link to Prostaglandin F2α regimen)
- Consider exploration of uterine cavity under anaesthesia
- Consider uterine tamponade with the 'Bakri SOS' balloon (follow link to Balloon tamponade and uterine packing for major PPH)
- Consider packing the uterus and vagina
- Bimanually compress the uterus by placing a fist in the anterior fornix of the vagina and the other hand rubbing up the uterine fundus
- If this controls the bleeding, maintain this compression for at least 30 minutes
- If uterotonics and mechanical compression techniques are unsuccessful, decide whether to perform
    - B-lynch brace suture
    - Hysterectomy
    - Angiography and embolisation
    - Ligation of the internal iliac vessels

Figure : B-Lynch brace suture

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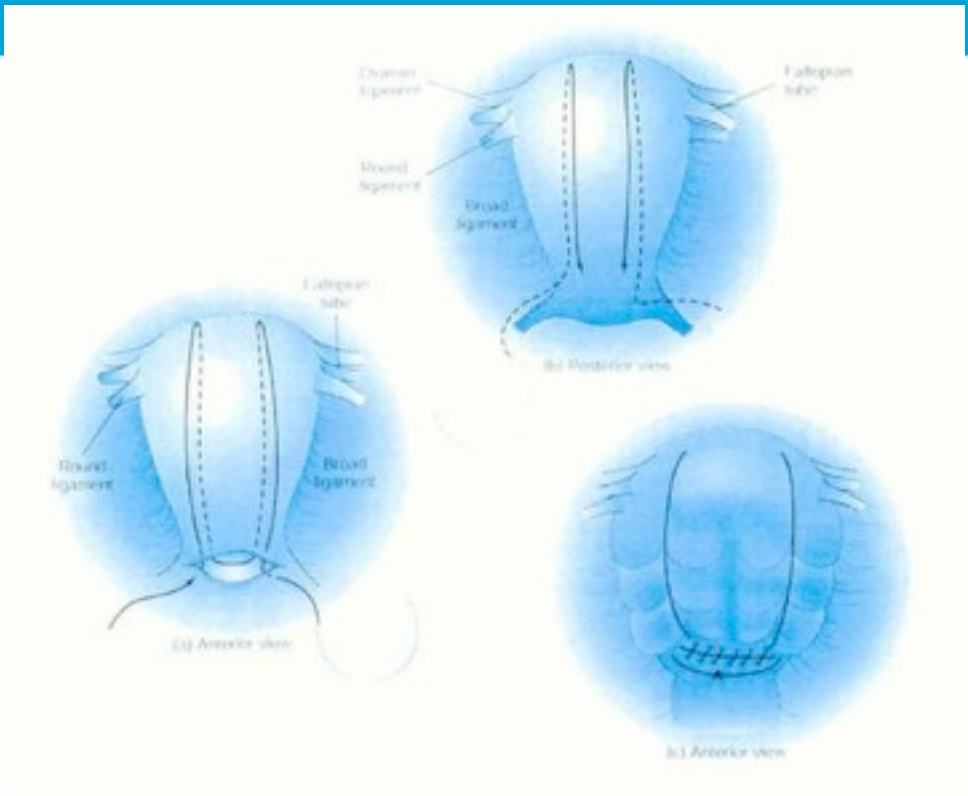

Adapted from: Poggi and Kapernick. Chapter 28. Postpartum Hemorrhage & the Abnormal Puerperium. Current Obstet & Gynecol Diagnosis & Treatment; 2003

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Antenatal and intrapartum risk factors for PPH

	Aetiological /Process	Clinical Risk Factors
Abnormalities of Uterine Contraction (Tone) 70 %	> atonic uterus	> physiological management of 3rd stage > prolonged 3rd stage (> 30 min)
	> over-distended uterus	> polyhydramnios > multiple gestation > macrosomia
	> uterine muscle exhaustion	> rapid labour > prolonged labour > high parity > labour augmented with Syntocinon®
	> intra-amniotic infection	> pyrexia > PROM (> 24 hours)
	> drug induced hypotonia	> Magnesium sulphate, nifedipine, salbutamol > General anaesthetic
	> functional / anatomical distortion of the uterus	> fibroid uterus > placenta praevia > uterine abnormalities
Retained Products of Conception (Tissue) 10 %	> retained products > abnormal or adherent placenta > retained cotyledon or succenturiate lobe	> incomplete placenta at delivery > placenta accreta or percreta > previous uterine surgery > high parity > abnormal placenta on USS
Genital Tract Trauma (Trauma) 20 %	> lacerations of the cervix, vagina or perineum	> precipitous labour > operative delivery
	> extensions, lacerations at caesarean section	> malposition > deep engagement
	> uterine rupture	> high parity > fundal placenta
Abnormalities of Coagulation (Thrombin) 1%	> retained blood clots > pre-existing states: > haemophilia A > von Willebrand's Disease	> history of hereditary coagulopathies > history of liver disease
	Acquired in pregnancy > ITP > thrombocytopenia with pre-eclampsia > DIC > pre-eclampsia > intrauterine fetal death > severe infection > abruption > amniotic fluid embolism	> atonic uterus > bruising > elevated BP > fetal demise > fever, WCC > sudden collapse
	> therapeutic anti-coagulation	> history of DVT or PE

Risk Factors for PPH (Adapted from SOGC Clinical Practice Guidelines Prevention and Management of Postpartum Haemorrhage, 2000)

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Postpartum haemorrhage box contents

The introduction of a PPH box (containing required equipment, medications and documentation) is recommended for all units managing postpartum haemorrhage.

The list below provides an example of contents that may be considered for the PPH box:

Hartmann's solution 1 litre x 2, Gelafusine 500 mL x 2
IV giving set x 2
IV pressure bag x 1

Pulse oximeter

x 4 sponge holders
x 1 Sims speculum

Set up for Syntocinon® infusion (keep in plastic bag)
Medication added labels x 2
10 mL syringe x 1
2 mL syringe x 1
Needles 18 g x 1 / 21 g x 1 / 23 g x 1
Alcohol wipes

Pathology specimen tubes and equipment (keep in plastic bag)
Blue top (coagulation studies) x1 / small purple top x 1 (complete blood picture) / large purple top x 1 (group and cross match) / green top (electrolytes)
20 mL syringe x 2
10 mL syringe x 2
Needles 21 g x 4
Tourniquet x 1
Alcohol wipes

Misoprostol 200 micrograms tablets x 1 sachet
Box from fridge containing:
Syntocinon® x 5
Syntometrine x 5

Indwelling urinary catheter equipment or catheter pack
Indwelling urinary catheter, 10 mL syringe x 1, water for injections 10 mL x 1, catheter bag (hourly measure), sodium chloride 0.9 % 30 mL sachet x 1

Documentation folder containing:
Flashcard 'Haemorrhagic shock'
Emergency blood card (detailing process for obtaining emergency blood)
List of blood tests required
Specimen bags
Documentation records: pathology forms / blood record / transfusion request / preoperative checklist / progress sheets / High Dependency chart / fluid balance chart / Special observations chart

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PDS reference: OCE use only

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1.0	21 July 04	25 Jan 05	Original version
2.0	25 Jan 05	12 May 08	Reviewed
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