Disclaimer

These guidelines have been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach.

Information in this guideline is current at time of publication.

Queensland Health does not accept liability to any person for loss or damage incurred as a result of reliance upon the material contained in this guideline.

Clinical material offered in this guideline does not replace or remove clinical judgement or the professional care and duty necessary for each specific patient case.

Clinical care carried out in accordance with this guideline should be provided within the context of locally available resources and expertise.

This Guideline does not address all elements of standard practice and assumes that individual clinicians are responsible to:

- Discuss care with consumers in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes the use of interpreter services where necessary
- Advise consumers of their choice and ensure informed consent is obtained.
- Provide care within scope of practice, meet all legislative requirements and maintain standards of professional conduct
- Apply standard precautions and additional precautions as necessary, when delivering care
- Document all care in accordance with mandatory and local requirements
Flowchart: Primary postpartum haemorrhage

Immediate management
- Call for HELP
- Ensure standard precautions
- Lie woman flat and reassure
- Massage the fundus
- Administer oxygen via mask
- Insert bilateral IV access (14 or 18g)
- Obtain blood for FBC, coag, O&H, X-ray
- Commence volume replacement
- Obtain vital signs
- Keep woman warm

Placenta delivered

NO

TONE

- Message fundus
- Ensure active management of third stage has occurred
- Administer IV Ergometrine 250 mcg OR IV Oxytocin 5-10 units
- Check placenta complete
- Commence Oxytocin infusion as a side line
- Insert urinary catheter

If uterine tone not improving:
- PE Misooprostol 800-1000 mcg
  And/or
- Intramyometrial Prostaglandin F2a 500 mcg
- Bimanual compression

NO

UTERUS WELL CONTRACTED

YES

GENTAL TRAUMA

- Lithotomy position
- Inspect for vaginal / cervical lacerations
- Apply pressure or clamp vessels and repair
- Transfer to theatre if necessary

THROMBIN

Blood component therapy if coagulopathy present
Observe for signs of blood not clotting
a) 4 units PRBC’s
b) coagulation correction:
  - 4 units PRBC’s
  - 4 units FFP
  - 1 adult dose platelets
d) repeat PRBC’s, FFP, platelets
c) calcium as appropriate
  - Repeat b) and c) as necessary

Ongoing haemorrhage not responding to above treatments then consider the following options:
- Transfer to theatre if not already done OR transfer to major hospital if appropriate
- Intra-uterine balloon tamponade
- Angiographic embolisation
- At laparotomy:
  - B-Lynch compression suture
  - Bilateral stapling ligation of uterine arteries
  - Bilateral ligation of internal iliac arteries
- Recombinant Factor VIIa **(see below)
- Hysterectomy (consider early)
- Admit to intensive Care Unit or High Dependency Unit

** Use of Recombinant Factor VIIa (rFVIIa)
Can be used for Jehovah’s Witness
- 90 mcg/kg (rounded to nearest vial) as a single bolus over 3-5 minutes
- At 20 min if no response:
  - Check / optimise: temp, acid-base, serum calcium, platelets, fibrinogen
  - Administer a second dose of 90 mcg/kg
- If bleeding persists after 2 doses of rFVIIa, then consider hysterectomy

Consider:
- Social work involvement
- Family communication
- Early notification of CRS / QAS
- Embryo-cell dictating
- Adverse event recording

These techniques should be performed by suitably qualified personnel in the operating theatre

TISSUE

NO

**
### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP</td>
<td>Blood pressure</td>
</tr>
<tr>
<td>coag</td>
<td>Coagulation profile</td>
</tr>
<tr>
<td>DIC</td>
<td>Disseminated intravascular coagulation</td>
</tr>
<tr>
<td>FBC</td>
<td>Full blood count</td>
</tr>
<tr>
<td>FFP</td>
<td>Fresh frozen plasma</td>
</tr>
<tr>
<td>g</td>
<td>Gauge</td>
</tr>
<tr>
<td>G &amp; H</td>
<td>Group and hold</td>
</tr>
<tr>
<td>IM</td>
<td>Intra-muscular</td>
</tr>
<tr>
<td>IU</td>
<td>International units</td>
</tr>
<tr>
<td>IV</td>
<td>Intravenous</td>
</tr>
<tr>
<td>kg</td>
<td>Kilograms</td>
</tr>
<tr>
<td>mcg</td>
<td>Micrograms</td>
</tr>
<tr>
<td>mg</td>
<td>Milligrams</td>
</tr>
<tr>
<td>min</td>
<td>Minutes</td>
</tr>
<tr>
<td>ml</td>
<td>Millilitres</td>
</tr>
<tr>
<td>MTP</td>
<td>Massive transfusion protocol</td>
</tr>
<tr>
<td>N/Saline</td>
<td>Normal saline (0.9% Sodium Chloride)</td>
</tr>
<tr>
<td>PPH</td>
<td>Postpartum haemorrhage</td>
</tr>
<tr>
<td>PRBC</td>
<td>Packed red blood cells</td>
</tr>
<tr>
<td>QAS</td>
<td>Queensland ambulance service</td>
</tr>
<tr>
<td>rFVIIa</td>
<td>Recombinant activated factor VII</td>
</tr>
<tr>
<td>RSQ</td>
<td>Retrieval services Queensland</td>
</tr>
<tr>
<td>X-Match</td>
<td>Crossmatch</td>
</tr>
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</table>
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1 Introduction

1.1 Definition
Postpartum haemorrhage (PPH) can be defined clinically as any amount of blood loss that results in haemodynamic instability\(^1\). Traditional definitions state that PPH is a blood loss of 500 ml or more during puerperium, with severe PPH occurring with a blood loss of 1000 ml or more\(^1,2\).

PPH is classified as primary PPH, occurring within the first 24 hours postpartum and secondary PPH occurring between 24 hours and up to six weeks postpartum\(^3\).

1.2 Risk factors for PPH
- Increased maternal age
- History of previous PPH
- Antepartum/intrapartum haemorrhage
- Anaemia
- Over-distended uterus (e.g. Multiple pregnancy, polyhydramnios)
- Grand multi-parity
- Prolonged labour
- Precipitate labour
- Placenta praevia
- Placental abruption
- Fibroids
- Von Willebrand disease.

1.3 Common causes of PPH
The main causes of PPH can be categorised under the following headings\(^4\):
- tone:
  - atonic uterus (the most common cause).
- trauma:
  - genital tract trauma
  - ruptured uterus
  - uterine inversion.
- tissue:
  - retained products of conception
  - adherent placenta.
- thrombin:
  - coagulation abnormalities.

1.4 Active management of the third stage of labour
Actively managing the third stage of labour has been shown to help prevent postpartum haemorrhage\(^5,6\). Active management entails:
- oxytocic administration:
  - syntocinon
  - syntometrine (contra-indicated with severe hypertension and cardiac disease).
- cord clamping
- controlled cord traction and fundal support with signs of placental separation.
2 Assessment and management

2.1 Resuscitation

If resuscitation is required\(^7,8\):

- call for help
- lie woman flat and provide ongoing reassurance
- massage the fundus to stimulate a contraction
- administer oxygen via oxygen mask
- insert 14 or 16 g intravenous cannulae bilaterally and obtain blood sample:
  - send blood sample for full blood count, electrolytes, liver function, coagulation profile and cross match.
- commence intravenous volume replacement, warmed if possible:
  - do not wait for signs of shock before commencing
  - give 2–3 litres of Hartmann’s solution for each litre of estimated blood loss
  - use rapid infusion sets, pump sets or pressure bags
  - reassess.
- record pulse, respirations and blood pressure, and check every five minutes
- provide early blood transfusion / blood component therapy if bleeding is massive or progressive
- use blankets to keep woman warm
- obtain temperature, oxygen saturation and assess level of consciousness
- insert in-dwelling urinary catheter and monitor urine output
- observe signs and symptoms of shock to guide management:
  - blood volume loss is frequently underestimated.
- ascertain cause of PPH.

Table 1: Observation table

<table>
<thead>
<tr>
<th>Blood volume loss</th>
<th>BP (systolic)</th>
<th>Pulse</th>
<th>Signs &amp; symptoms</th>
<th>Degree of shock</th>
</tr>
</thead>
<tbody>
<tr>
<td>500–1000 ml</td>
<td>Normal</td>
<td>Normal</td>
<td>Palpitation, dizziness</td>
<td>Compensated</td>
</tr>
<tr>
<td>(10–15%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000–1500 ml</td>
<td>Slight fall</td>
<td>&gt; 100</td>
<td>Weakness, tachycardia, sweating</td>
<td>Mild</td>
</tr>
<tr>
<td>(15–25%)</td>
<td>(80–100 mm Hg)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1500–2000 ml</td>
<td>Moderate fall</td>
<td>&gt; 120</td>
<td>Restlessness, pallor, oliguria</td>
<td>Moderate</td>
</tr>
<tr>
<td>(25–30%)</td>
<td>(70–80 mm Hg)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000–3000 ml</td>
<td>Marked fall</td>
<td>&gt; 140</td>
<td>Collapse, air hunger, anuria</td>
<td>Severe</td>
</tr>
<tr>
<td>(35–45%)</td>
<td>(50–70 mm Hg)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.2 Management of atonic uterus

In the case of atonic uterus\(^8,9\):

- massage the fundus to stimulate contraction
- ensure active management of third stage has occurred
- check placenta for completeness
- administer intravenous Ergometrine 250 mcg\(^7,8,10\) OR intravenous Oxytocin 5–10 IU if blood pressure is elevated
- commence intravenous Oxytocin infusion 10 IU per hour as a sideline.
If bleeding continues and uterine tone has not improved with the above management:

- administer 800–1000 mcg Misoprostol per rectum
- and/or
- administer intramyometrial Prostaglandin F2α 500 mcg (ensure medication diluted—refer to drug table)
- insert urinary in-dwelling catheter
- apply bi-manual compression (Figure 1)\(^2\):
  - compress uterus between external hand placed on the fundus, and intravaginal hand
  - avoid vigorous massage that can injure large vessels of the broad ligament.
- transfer to theatre.

Once in theatre:

- ensure that the uterus is empty by manual exploration of the uterine cavity
- if retained placenta, follow management of retained placenta (see Section 2.4).

![Figure 1: Bimanual compression](image)

If bleeding and non-responsive to above, go to advanced medical or surgical management

### 2.3 Management of genital trauma

When genital trauma is considered a potential cause of bleeding:

- assess for genital tract trauma:
  - place in lithotomy position
  - inspect vagina and cervix for lacerations, clamp any bleeding vessels or apply pressure and repair as necessary
  - transfer to theatre to facilitate repair if necessary.

If excessive loss persists and is not related to a lower genital tract laceration, consider the possibility that the placenta has not been completely delivered.

### 2.4 Management of retained placenta

When retained placenta is the likely cause of bleeding:

- ensure active management of the third stage of labour has occurred
- perform vaginal examination to establish if placenta is trapped or adherent
- remove placenta if in vagina.
If placenta remains in-situ:

- repeat dose of Oxytocin 10 IU IMI or 5–10 IU slow IVI
- insert in-dwelling urinary catheter
- consider using portable ultrasound if available to determine if placenta has separated and its location
- prepare for transfer to theatre for manual removal of placenta, or if theatre not available, consider manual removal of placenta under sedation using Nitrous Oxide, Midazolam, Fentanyl or Ketamine.

While in theatre:

- explore the uterine cavity for signs of uterine rupture:
  - perform curettage if retained products are suspected
  - check for cervical, vaginal and perineal trauma, and repair as necessary.

### 2.5 Advanced medical management of non-responsive PPH

If bleeding continues in spite of the above management:

- continue maternal resuscitation and fluid replacement
- consider activating a massive transfusion protocol if available.

The following techniques should be performed by suitably qualified clinicians in the operating theatre.

#### 2.5.1 Balloon tamponade

Intra-uterine balloons, such as the Bakri balloon (illustrated in Figure 2) can be inserted into a contracting uterus. Balloon devices are not effective in a uterus that contains retained products or excessive blood. They are of more benefit to lower segment bleeding as gentle traction can be applied to further enhance the tamponade. Tamponade balloons are also able to facilitate drainage of blood from the uterine cavity.

The process for using the intra-uterine balloon is as follows:

- insert the end of the balloon through the cervix into the uterine cavity, ensuring the balloon is completely inside the uterus (Figure 3)
- Inflate the balloon with sufficient volume of warm sterile saline (approx 250–500 ml); the uterus should now be firm with minimal blood loss
- Commence broad spectrum antibiotic cover
- Continue or commence oxytocic infusion.

If bleeding is not controlled, remove the balloon and attempt further management options.
If the bleeding is controlled, remove the balloon when the bleeding subsides—within 12 to 24 hours\textsuperscript{9,10}.

To remove the balloon\textsuperscript{8,10}:

- an anaesthetic is not necessary
- ensure specialist care is available in case bleeding recommences
- gradually deflate the balloon by removing 100 ml per hour
- monitor for increased blood loss.

### 2.5.2 Angiographic embolisation

Angiographic embolisation is a highly effective technique for abating bleeding, with success rates of approximately 90 per cent\textsuperscript{7,8,9,12}. The procedure, which is relatively safe, allows for selective embolisation of vessels and preserves fertility\textsuperscript{72}. Angiographic embolisation is of great value in elective cases with a high-risk of PPH, such as placenta accreta\textsuperscript{7,10,13}. However, there are some logistical limitations with this technique.

An interventional radiologist is required, along with the necessary radiological infrastructure and equipment\textsuperscript{7,13,14}. The procedure can take about 60 minutes to complete.

The use of angiographic embolisation is appropriate when:

- an interventional radiologist and necessary angiographic equipment are readily available\textsuperscript{13}
- the PPH is a continuing slow haemorrhage\textsuperscript{11}
- there is time to perform the procedure, and the patient is stable\textsuperscript{7,14}.

#### 2.6 Surgical management of non-responsive PPH

If bleeding continues in spite of the above management:

- continue maternal resuscitation and fluid replacement
- consider activating a massive transfusion protocol.

The following surgical management options are available and should be performed by suitably qualified clinicians in the operating theatre.

##### 2.6.1 Fundal compression suture

Fundal compression sutures, such as the B-Lynch suture, are of value when bleeding is stemmed with compression techniques such as bimanual compression (figure 1)\textsuperscript{7,9,13}.

The role of the compression suture is to maintain compression.\textsuperscript{16} Compression sutures may be an effective alternative to hysterectomy, maintaining fertility\textsuperscript{7}.

The technique is performed at laparotomy or caesarean section using the following process:

- (re) open the abdomen and (re) open the uterus
- check the uterine cavity for bleeding sites that might be oversewn
- test before using the B-Lynch suture using bimanual compression and swabbing the vagina—if bleeding is controlled temporarily in this fashion the B-Lynch stitch is likely to be effective.
Figure 4 provides a graphical guide to the application of the compression suture.

**2.6.2 Bilateral uterine artery ligation**

Bilateral uterine artery ligation (Figure 5)\(^1\)\(^2\) has been described as a simple and effective technique for the control of intractable PPH\(^3\)\(^4\).

![Figure 5: Bilateral uterine artery ligation](image)

**2.6.3 Bilateral internal iliac artery ligation**

This procedure can be effective in reducing bleeding from all genital tract sources, and may avoid the need for hysterectomy\(^7\). This complex procedure must be performed by an experienced surgeon.

**Before progressing to hysterectomy, consider the use of recombinant activated factor VII if not contraindicated (see Section 2.7.4)**

**2.6.4 Hysterectomy**

The decision to perform a hysterectomy can be difficult to make; however, given its curative outcome, the decision should be made early. This is especially so for those women who have uncontrolled bleeding that has not responded to the above management options.

**2.7 Coagulopathy**

It is important to monitor the coagulation profile for changes. Circulating volume loss can be managed in the short term with crystalloid fluid. This can be followed as necessary with blood component therapy or by activating a massive transfusion protocol if the bleeding is ongoing or severe.

Look for signs that blood is no longer clotting (e.g. petechial bleeds, subconjunctival haemorrhage, oozing from puncture sites) as these could indicate coagulopathy changes.\(^5\)

Involve a haematologist to help manage the coagulation.
2.7.1 Volume replacement

- Ensure bilateral 16 g intravenous access is in-situ and patent
- Give 2–3 litres of Hartmann’s solution for each litre of estimated blood loss
- Use rapid infusion sets, pump sets or pressure bags
- Reassess
- If signs of shock, or if bleeding continues, commence blood component therapy or a massive transfusion protocol.

2.7.2 Blood component therapy

Blood component therapy provides oxygen carrying capacity to the circulating volume, plus components to aid in clotting. The following blood component therapy for severe obstetric haemorrhage is recommended\(^15\).

a) 4 units packed red blood cells (PRBC: Group specific or ‘O Neg’ if unavailable)
b) coagulopathy correction
   - 4 units PRBC
   - 4 units fresh frozen plasma (FFP)
   - single adult dose of platelets
c) repeat PRBC, FFP and platelets
d) administer calcium as appropriate.

Repeat b) and c) as necessary.

2.7.3 Cryoprecipitate

Cryoprecipitate at one unit per 10 kg body weight should be considered when\(^16,17\):

- clinical bleeding is present
- disseminated intravascular coagulation is present
- fibrinogen levels are lower than 1.0 g/L.

2.7.4 Recombinant activated factor VII (rFVIIa)

The use of recombinant activated factor VII (rFVIIa) in the management of bleeding in PPH is ‘off-label’ and, as such, its use rests with the prescribing clinician.

It can be used for patients with religious beliefs that forbid the administration of blood products.

The decision to use rFVIIa should occur when\(^15\):

- all previously mentioned non-surgical and surgical attempts, other than hysterectomy, have been attempted to stop the bleeding
- a centre is not resourced for the above surgical procedures. In these cases rFVIIa can be given earlier
- 8–12 units of PRBC have been administered, and bleeding continues.

The administration of rFVIIa\(^15\):

- 90 mcg/kg (rounded to nearest vial) is administered as a single bolus intravenous injection over three to five minutes
- allow 20 minutes, and if bleeding is ongoing, check the following:
  - temperature
  - acidaemia
  - serum calcium
  - platelets and fibrinogen
- deliver a second dose of rFVIIa 90 mcg/kg as a single bolus intravenous injection over three to five minutes
- consider hysterectomy if bleeding persists after these two doses.

Notify the Haemostasis Registry if rFVIIa is given:
3 Ongoing care

3.1 Inter-hospital transfer

The decision to transfer the critically ill or high-risk obstetric patient requiring a higher level of care should be made early. This will ensure that early specialist advice can be sought, and appropriate clinical crewing, efficient tasking of retrieval services as well as determining the destination facility can be arranged quickly.

For an obstetric patient greater than 20 weeks gestation requiring a nurse and/or medical escort to facilitate a safe transfer, contact Retrieval Services Queensland on 1300 799 127.

Your call will be directed to an obstetric registrar and/or consultant, and to an intensivist if necessary.

If the obstetric patient is stable and does not require a medical or nursing escort, the referring centre should contact the receiving facility directly to arrange a bed. The road transport can be booked through the Queensland Ambulance Service on 13 12 33.

Please note that if you are unsure about the level of escort or mode of transport required, call for advice on 1300 799 127.

Ensure all documentation is completed prior to transfer.

3.2 Documentation

- Partogram
- Vitals signs
- Medication chart
- Fluid order sheet
- Fluid balance chart
- Pathology results
- Medical notes
- Clinical pathways
- Midwifery notes
- Allied health notes
- Peri-natal data sheet
- Incident report.

3.3 Feeding support

Breastfeeding should be established as soon as practical with the support of a midwife or lactation consultant.

3.4 Social work

If necessary, a referral should be made to a social worker who can assist in providing support to the family and support network.

3.5 Physiotherapy

Early referral to a physiotherapist will ensure early interventions are initiated in a timely manner.

3.6 Critical incident stress management

Immediate post-event debriefing for staff is essential. Debriefing can be provided locally or, by the Employee Assistance Service.
References


### Appendix A: Drug table

<table>
<thead>
<tr>
<th>Drug Name</th>
<th>Dose</th>
<th>Route</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stat drugs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Oxytocin combined with Ergometrine (Syntometrine) | 1 ml (Syntocinon 5 units, Ergometrine 0.5mg) | IM    | • Contra-indicated with severe hypertension and cardiac disease  
• Side effects: nausea, vomiting, raised BP |
| Ergometrine                     | 0.5 mg                              | IM    | As per Syntometrine                                                                |
| Ergometrine                     | 0.25 mg                             | IV    | As per Syntometrine                                                                |
| Oxytocin (Syntocinon)           | 5–10 IU                             | IM / IV |                                                                                           |
| Prostaglandin F2α               | 500 mcg (2 ml) increments as required max 3 mg | Intramyometrial | • Off-label use  
Prepare a 20 ml solution:  
• Add 19 ml of N/Saline to 1 ml of a 5 mg/ml ampoule  
• Final concentration 250 mcg/ml (dose = 2 ml)  
• Repeat dose every 15 min as required |
| Misoprostol                     | 800–1000 mcg                        | PR    | Off-label use                                                                     |
| **Infusions**                   |                                     |       |                                                                                           |
| Oxytocin infusion               | 10 IU per hour                      | IV    | As a side line  
(eg. 40 IU in 1000 ml N/S at 250 ml/hr; or 30 IU in 500 ml N/S at 167 ml per hour) |
| 0.9% Sodium Chloride 1000 ml    | 1000 ml as necessary                | IV    | Blood component therapy                                                            |
| Hartmann’s solution 1000 ml     | 1000 ml as necessary                | IV    | Blood component therapy                                                            |
| Packed red blood cells          |                                     | IV    | Blood component therapy                                                            |
| Fresh frozen plasma             |                                     | IV    | Blood component therapy                                                            |
| Platelets                       |                                     | IV    | Blood component therapy                                                            |
| Cryoprecipitate                 | 1unit/10 kg                         | IV (no min. time; max 4 hours) | New IV line; use 170–200 micron filter |
| Recombinant factor Vila         | 90 mcg/kg (nearest ampoule)         | IV over 3–5 min | Off-label use  
• Repeat after 20 min if bleeding ongoing.  
• Notify Monash Haemostasis registry |
Appendix B: Acknowledgements

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