

# Management of Postpartum Haemorrhage

## 1. INTRODUCTION

The aim of this guideline is to provide evidence based recommendations in the management of primary post partum haemorrhage (PPH). This is the commonest direct cause of maternal death globally and in Sri Lanka. The objective of this guideline is to ensure anticipation, prevention, early detection and timely and appropriate management of PPH.

## 2. DEFINITION

For the purpose of this guideline PPH is defined as blood loss of 500 ml or more from the genital tract within 24 hours of the birth of a baby. Blood loss of over 1000 ml is defined as major PPH.

Irrespective of blood loss, the appearance of cardiovascular instability (i.e. tachycardia and hypotension) signifies major obstetric hemorrhage.

- Since blood volume differs between persons, blood loss must be individualized. In general, blood volume = body weight in Kg+12 (e.g. in a 60 kg woman 60/12 = 5litres)
- The loss of 40% or more of the blood volume is life threatening and will be defined as a massive obstetric hemorrhage e.g. 2400 ml in a 60kg woman.

## 3. PREVENTION OF POST PARTUM HAEMORRHAGE

Active management of the third stage of labour is the cornerstone of prevention of primary PPH. For details please refer guideline on management of third stage of labor.

Anemia in pregnancy should be corrected during antenatal period.

## 4. PREDICTION OF POST PARTUM HAEMORRHAGE

**PPH occurs most often in women without risk factors. Therefore the blood group of every woman who goes into labor must be known.**

However, there are known risk factors associated with PPH, as listed in Box 1. Such women should be advised to deliver in a specialist obstetric unit under extra vigilance. Out of these, abruptio placentae and placenta praevia have a particularly higher risk.

### Box 1.

<p>Risk Factors for PPH</p> <ul style="list-style-type: none"> <li>Risks existing prior to labour</li> <li>Grand multiparity</li> <li>Previous PPH</li> <li>Fibroids complicating pregnancy</li> <li>Anaemia complicating pregnancy</li> <li>Pre-existing haemorrhagic conditions</li> <li>Treatment with anticoagulants</li> <li>Obesity</li> <li>Pre-eclampsia/ gestational hypertension</li> <li>Uterine over distension e.g. multiple pregnancy, etc.</li> <li>Large baby (&gt;4 kg)</li> <li>Chorio-amnionitis</li> <li>Dengue infection</li> </ul>
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Any woman with risk factors should have intravenous access established with either a 16 or 14-gauge cannula and a sample of blood taken and preserved.

## 5. MANAGEMENT OF PRIMARY PPH

In Sri Lanka, the usual practice has been to commence treatment when there is continuing bleeding despite uterine massage irrespective of the amount of blood lost. **It is recommended that this practice be continued.**

It is good practice to estimate and record blood loss in all deliveries.

### 5.1 General measures

- Call for help.
- Maintain a calm atmosphere.
- Keep the mother (and labor companion/family) informed and reassure the mother regularly.
- Assess, monitor and record: general condition, estimated blood loss, pulse, blood pressure and respiratory rate (every 15 minutes)
- Insert a Foley catheter and monitor urine output hourly.
- Commence an ongoing chronological record of patient's condition and interventions. It is recommended that one member of staff is delegated specifically for this task and to coordinate with other relevant disciplines.

- Ensure there is intravenous access with two wide (14 - 16 G) bore cannulae.
- Send blood for cross matching and baseline full blood count. In cases of massive haemorrhage, other investigations such as clotting profile will be needed.
- Start Ringer's lactate (Hartmann's) solution.
- Identify the cause of bleeding.
- Keep the woman warm.
- Pay attention to the temperature of labor room, operating theatre, intravenous fluids, blood, blood products and fluids used for lavage. Hypothermia is known to promote coagulopathy.
- Where available, the early involvement of the anesthetic team, even while the patient is still in the labor room is recommended.
- Give oxygen via a face mask at a minimum rate of 8L/minute (where suitable masks are available, oxygen must be given at a rate of 10-15L/min).
- If deterioration of the patient is greater than expected for the visible blood loss, internal hemorrhage is the probable cause.
- Check for completeness of the placenta. If incomplete or in doubt consider exploration of the uterus under anesthesia.
- The Consultant **must** be informed in the situations listed in Box 2.
- Administer either ergometrine maleate 0.5 mg slow IV or methyl ergometrine 0.2 mg slow IV or oxytocin 5 IU IV and start an infusion of 40 IU in 500 ml of Hartmann's solution at 125 ml per hour via an infusion pump.
- Start bimanual compression of uterus.
- If the bleeding fails to abate completely in 5-10 minutes administer/repeat ergometrine 0.5mg IV.
- If the bleeding fails to abate completely in a further 10 minutes administer misoprostol 800µg per rectally or sublingually.
- If the bleeding fails to abate completely in a further 10 minutes proceed to uterine balloon tamponade and inform the Consultant. At the same time, administer tranexamic acid 1g by slow IV over 10 minutes. This dose may be repeated after 30 minutes if necessary and later if bleeding recommences. For details of the method of balloon tamponade please refer appendix 1.
- Balloon tamponade is an important step in managing patients who continue to bleed despite medical measures. It should always be considered before resorting to surgical measures.
- If the institution does not have personnel trained in the use of balloon tamponade, the woman must be transferred to a higher institution, at the point where the administration of ergometrine and oxytocin infusion has failed to stop bleeding.
- Temporizing measures such as manual aortic compression and sand bags to compress the uterus are recommended while the patient is in transit.
- Inform the receiving institution.
- After the balloon is inserted and the vagina packed (to keep the balloon in the uterus), the woman's vital parameters and the level of the fundus must be monitored carefully. Where these indicate the woman is continuing to bleed, she should be moved to the theatre, since the situation would indicate the need for a laparotomy.
- She should be shifted to the theatre without delay in this situation.
- Prior to laparotomy the woman must be examined under anesthesia for tears in the genital tract.
- In case laparotomy is needed it is best to keep the patient in the modified Lloyd Davis position so that observations for bleeding could be done with minimum inconvenience and delay.
- The surgical measures would depend on the woman's condition. "Too little too late" is the main contributor to mortality in PPH. Surgical measures include brace (compression) sutures (see appendix 2), uterine de-vascularization (See appendix 3), haemostatic mattress sutures to bleeding sinusoids, box sutures to include the bleeding lower segment in placenta previa, internal iliac ligation and hysterectomy.
- The "sandwich technique" involves inserting a balloon tamponade after the application of brace sutures.

#### Box 2. Situations in which the Consultant must be informed

1. Blood loss of >1000 ml
2. Pulse rate of >100/minute
3. Systolic blood pressure <100 mm Hg
4. Drop of systolic blood pressure by 30 mm Hg
5. Increase of pulse rate by >30 beats/minute
6. Increasing fundal height
7. Deterioration of the patient out of proportion to the overt blood loss

## 5.2 Specific measures

### 5.2.1 Establish a cause for the bleeding

Palpate the uterine fundus.

A poorly contracted uterus usually indicates atonic PPH, which is the commonest cause. However, the possibility of concomitant genital tract trauma needs to be considered.

If the uterus is well contracted, the genital tract must be inspected for trauma with adequate exposure, in good light.

### 5.2.2 Management of atonic haemorrhage

- Start uterine massage by 'rubbing up the fundus'.
- Clear the cervical canal and vagina of blood clots by vaginal examination.

- It is important that hysterectomy is resorted to **sooner than later**.
- Hypothermia is a particular risk in the theatre environment. Measures must be taken to minimize the loss of heat from the woman.

### 5.2.3 Management of traumatic PPH

- Exclude high vaginal and cervical tears before suturing episiotomy.
- When the apex of the tear or episiotomy is not visible, apply a suture at the highest visible point, pull downwards and apply continuous sutures at progressively higher points until the apex is reached.
- Examine for paravaginal and broad ligament haematomata with a combined per vaginal and per rectal examination.
- The management should be individualized according to the situation.
- Paravaginal hematomas of more than 5 cm diameter will usually require surgical evacuation. A bleeding point is usually present and must be looked for. In cases where it is difficult to control bleeding, a Foley catheter with its balloon inflated may be left in the cavity. Packing of the vagina may also be useful.
- Cervical tears must be identified by systematic inspection of the cervix using GreenArmytage forceps and sutured.
- In case of multiple tears with venous oozing, it may be better to insert a balloon catheter into the vagina or to pack the vagina with **moistened** vaginal packs than to try to suture all the tears.

### 5.2.4 Rupture of the uterus

- Rupture of the uterus must be suspected when the general condition is deteriorating out of proportion to the visible blood loss and there is continuing bleeding in the presence of a contracted uterus.
- This is particularly so in a woman with a scarred uterus.
- Immediate involvement of a Consultant and surgical intervention are important in this situation.

### 5.2.5 Coagulopathy causing PPH

- This could be due to coagulopathy following death in utero, abruptio placentae, severe preeclampsia, HELLP syndrome, sepsis, amniotic fluid embolism, acute fatty liver, pulmonary immune thrombocytopenia, Von Willebrand's disease etc.
- It could also be due to suboptimal management of the PPH.
- Early involvement of a haematologist or transfusion medicine specialist will be important in this situation.

Where available, thromboelastometry would be useful in this situation.

## 6. RESUSCITATION AND FLUID MANAGEMENT

### PPH up to 1000 ml

- Commence a crystalloid infusion of 2-3 times the estimated blood loss.

### PPH oimore than 1000 ml

- PPH of over 1000 ml should be managed in consultation with other relevant specialists e.g. anesthesiologists, hematologists, transfusion specialists etc.
- Assess airway, breathing and circulation.
- Give oxygen via face mask.
- Keep the woman warm and flat.
- Transfuse warmed blood as soon as possible.
- Until blood is available, warm crystalloids (up to 2 litres) and colloids (up to 1-2 litres) may be transfused as rapidly as required, up to a maximum of 3.5 litres in total.
- Depending on urgency, group-specific blood may be given until cross-matched blood is available.
- If group-specific blood is not available, 0 Rhesus D negative blood could be given.
- Blood transfusion should be individualized according to the situation. When available, involve blood transfusion specialist/Haematologist. Where three or more units of blood are being transfused, an equal number of packs of fresh frozen plasma must also be transfused. If available, thromboelastometry will enable factor-specific replacement.
- Due consideration must be given to keeping transport facilities available to obtain blood and blood products from another institution.

## 7. DEBRIEFING

- It is possible that a major PPH could result in significant psychological morbidity.
- This could be minimized by timely debriefing of the patient and her family, preferably by the Consultant.
- This should be done immediately after the event, before discharge and at the postnatal visit or at any time as requested by her or the family.

## 8. RISK MANAGEMENT

- It is good practice to conduct a case review with the members of the team involved in the management and other staff as soon as possible after the event. *The spirit of such a meeting should be one of lessons learnt rather than of apportioning blame.*

**APPENDIX 1****Insertion of a 'condom catheter'**

This may be performed as an independent procedure or following inspection of the cervix and upper vagina for trauma.

Therefore, whenever it is planned to inspect the cervix, or where there is an indication that medical therapy may fail to bring the bleeding under control, keep the materials needed for insertion of a condom catheter ready.

1. Explain to the mother the need to insert a condom catheter and explain the procedure briefly. Be reassuring.
2. Wear a pair of sterile gloves.
3. The required items are:
  - Size 20 - 22 (or largest available) Foley catheter,
  - A condom,
  - Sterile No. 0 or 1 suture,
  - A bottle of warmed saline,
  - Intravenous infusion set released from the pack
  - Arrange these items on a sterile towel laid on a side trolley.
4. Take the Foley catheter out of the packing.
5. Unfold the condom over the end of the Foley catheter to about two thirds of its length. Hand tie it to the catheter firmly, using several rounds of sterile suture at a point about 2 cm distal to the open end of the condom.
6. Have an assistant connect the infusion set to the bottle of warmed normal saline suspended 4-6 feet above the patient.
7. Connect the other end to the catheter, run saline into the condom to make sure the system is water tight by holding the catheter tip upwards.
8. Afterwards, empty the balloon of the saline and leave it on the sterile trolley, ready for insertion.
9. Wash the condom with either warm saline or 5% povidone iodine lotion.
10. Place the woman either in the dorsal or lithotomy position and expose the cervix by using one or two Sim's speculae.
11. Grasp the anterior lip of the cervix with a sponge holder.
12. Now insert the entire condom catheter system into the uterus. You may keep the condom catheter between the index and middle fingers and introduce it like exploring the uterus (or doing a pelvic examination).
13. Reconnect the catheter to a giving set and start filling the condom with warmed saline.
14. Keep watching the cervix for the balloon to bulge out of it and stop filling it any further for now. You may notice cessation of bleeding from the uterine cavity.
15. At this point pack the vagina with a moist vaginal pack (Two inch ribbon gauze pack or a gauze towel) around the catheter in a circumferential manner.
16. Continue filling till the gravity aided filling stops. Usually 400 - 500 ml is needed.
17. Proximal end of the catheter is folded and a tight tie placed on it to prevent backflow.
18. Insert a size 12 Foley catheter to the bladder.
19. Mark the level of the fundus on the abdomen with a marker pen. Start a pulse and blood pressure chart.
20. Give tranexamic acid 1 G slow i.v. and repeat after 8 hours.
21. Keep pack and the condom catheter for 12 - 18 hours.
22. Consider appropriate antibiotic prophylaxis.
23. If there is no vaginal bleeding and vital signs are stable, plan to remove the catheter at a convenient time, after 12 hours.
24. Release half the instilled volume of saline. Do not remove the pack at this stage.
25. Observe for bleeding through the pack.
26. 30 minutes later remove the vaginal pack, without removing the condom catheter.
27. If there is no further bleeding for another 30 minutes, release the total volume of instilled saline and remove the condom catheter gently.

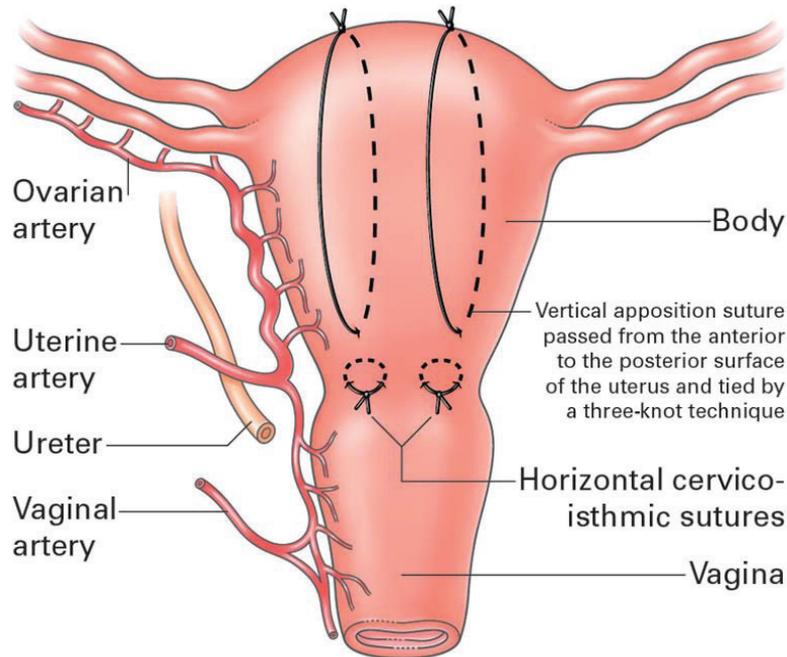
**APPENDIX 2**

Brace sutures, the best known of which is the modified B-Lynch sutures are very useful in the presence of a bleeding atonic uterus.

The uterus is exteriorized. An absorbable No.2 suture (or highest gauge available) on a curved 'hand-needle'

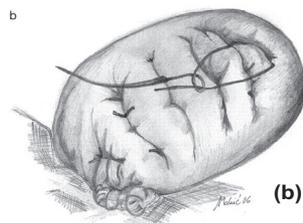
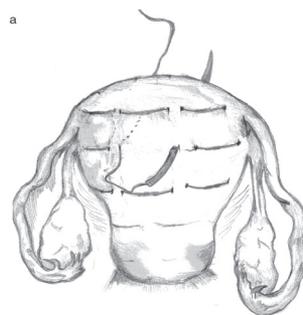
is passed anteroposteriorly through the uterus above the reflection of the bladder about 2 cm medial to the lateral edge.

The process is repeated on the contralateral side. The sutures are tied tightly over the fundus, with an assistant manually squeezing the uterus. Additional sutures may be applied medially.



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(a) Posterior view of the uterus showing the U-suturing technique.



(b). Anterior View

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### APPENDIX 3

Steps of uterine de-vascularization technique (Adapted from: Salah A. AbdRabbo. Stepwise uterine devascularization: A novel technique for management of uncontrollable postpartum hemorrhage with preservation of the uterus AJOG 1994 Volume 171 Number 3).

#### Step 1: Bilateral uterine vessel ligation

In this step the uterine arteries are ligated at the level where they run along the uterine border beside the upper part of the lower uterine segment (Fig. 1 Note: Steps I and II in the diagram constitute step 1 in our description. We recommend that both sides are done in one step).

With the surgeon on the right side of the patient, the uterus is grasped and elevated to the contralateral side. A large needle (48 mm or greater) with number 1 absorbable suture is passed through the avascular area of the left broad ligament from anterior to posterior and then brought forward, guided by the four fingers of the left hand, through the myometrium from posterior to anterior 2 cm medial to the left uterine vessels, and the suture is tied. This process is repeated on the contralateral side.

In these two steps there is no need for bladder mobilization, because the sutures were not placed low. Also, there is no need for a peritoneal incision in cases having vaginal deliveries; however, in cases having caesarean section the suture should be placed below the level of the transverse uterine incision, under the reflected peritoneal flap.

#### Step 2: Low bilateral uterine vessel ligation

This step is reserved only for cases having continued lower uterine segment haemorrhage diagnosed at caesarean section and not controlled by step 1.

In this step the bladder is reflected downwards and lower bilateral uterine vessel ligation is performed at the lower part of the lower uterine segment, 3 to 5 cm below the upper ligatures, with the same technique in step 1. At this level the uterine artery is ligated after its cervicovaginal branch turns abruptly upward to extend along the uterine margin. This ligature would obliterate most of the branches of the uterine artery to the lower uterine segment and a branch of considerable size that extends to the upper portion of the cervix. It is important to include a significant amount of myometrium to avoid damage to the uterine vessels and to obliterate some of the intramyometrial ascending arterial branches of the cervicovaginal artery (Fig. 1).

#### Step 3: Ligation of uterine/ovarian arterial anastomosis

This step is indicated in continued uterine bleeding in spite of performing step 1. The uterus is grasped and pulled to the contralateral side by the left hand, and a large needle with a number 1 absorbable suture is passed through the avascular area in the broad ligament from anterior to posterior, at the level of the ovarian ligament. The needle is then passed anteriorly 2 cm medial to the edge of the uterine wall, to include the uterine muscle. The suture is tied anteriorly.

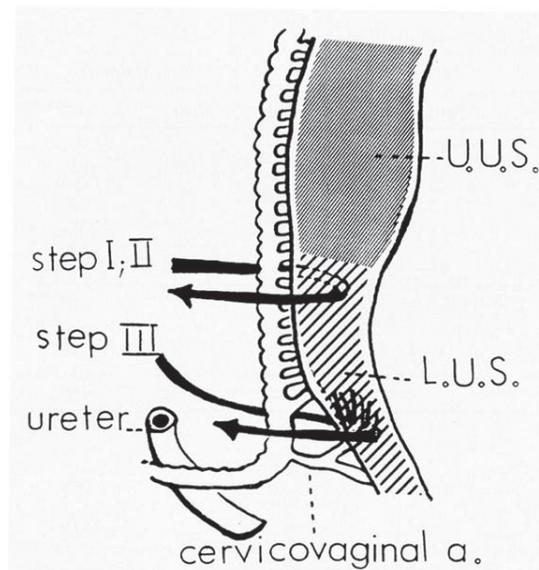


Fig. 1. Sites of uterine artery ligation in steps 1, 2 (upper arrow), and 3 (lower arrow). U.U.S., Upper uterine segment; L.U.S., Lower uterine segment