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# Manual of Emergency and Essential Surgical Care

in Sub-Saharan Africa



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## Postpartum Haemorrhage

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### Introduction

Postpartum haemorrhage (PPH) is the leading cause of obstetric haemorrhage worldwide, and it is also the commonest single cause of maternal mortality. One out of every four women that die from pregnancy and childbirth dies as a result of haemorrhage. The majority of these deaths occur within 4 hours of delivery. PPH occurs in about 10% of all births.

### Definition of terms

1. Primary PPH is bleeding from the genital tract in excess of 500ml following vaginal delivery or 1000ml following Caesarean delivery, or severe enough to compromise cardiovascular status within the first 24 hours of delivery.
2. Secondary PPH is bleeding from the genital tract after the first 24 hours to within 6 weeks of childbirth.

### Risk Factors for Postpartum Haemorrhage

1. Poor management of third stage of labour (commonest cause)
2. Antepartum haemorrhage (abruptio placenta, placenta praevia)
3. Over-distended uterus (multiple pregnancy, polyhydramnios)
4. High parity
5. Prolonged labour
6. Precipitate labour
7. Co-existing fibroid

8. Previous uterine surgery
9. Coagulopathy
10. Previous history of postpartum haemorrhage
11. Induction or augmentation of labour

Table 50.1 Major causes of postpartum haemorrhage

Mnemonic (4 Ts)	Interpretations
T - Tone	Atonic uterus -commonest
T - Trauma	Genital tract lacerations, paragenital haematoma, ruptured uterus
T - Tissue	Retained or adherent placenta
T - Thrombin	Coagulation abnormalities

## Clinical Features

### Symptoms

1. Bleeding per vaginam
2. Fainting or dizzy spells
3. Loss of consciousness

### Signs

1. General examination: pallor, cold and clammy extremities if in shock
2. Respiratory system: tachypnoea
3. Cardiovascular system: small volume pulse or no palpable peripheral pulse depending on the degree of bleeding, tachycardia (pulse rate more than 100/minute), hypotension
4. Abdomen: findings depends on the cause. Assess the state of the uterus
5. Pelvic examination: inspect the introitus, perform a digital and speculum examination

### Basic Investigations

**NOTE: THESE TESTS SHOULD BE DONE WHILE RESUSCITATION IS ON-GOING!!!**

1. Determine the haematocrit level (packed cell volume or haemoglobin estimation).
2. Do a complete blood count/full blood count including peripheral blood film.
3. Have grouped and crossmatched blood ready; un-crossmatched blood could be requested if blood loss is massive, with symptoms and signs of imminent grave danger.

4. Determine the coagulation state (bed-side clotting time can be crudely determined but PT/PTTK is more appropriate).
5. Urgent pelvic ultrasound may be necessary, especially when retained product of conception is suspected.

### Practical Steps for Managing PPH

#### I. Resuscitation: Commence the ABCD of resuscitation

1. Call for help first
  - a. Mobilize all other medical staff to the scene: doctors, nurses, anaesthetist and auxiliary staff and give specific instructions.
2. A - Airway: maintain the airway
  - a. Gently extend the neck.
  - b. Clear the mouth and nostrils of any secretion.
3. B - Breathing
  - a. Administer oxygen (ensure 6 - 8 litres/hour of oxygen is delivered by face mask or intranasal catheter)
4. C - Circulation
  - a. Ensure intravenous access with wide bore cannula (size 14G or 16G or 18G) and infuse fluids up to 1.5 to 3 times the estimated blood loss before resuscitation is commenced. It is better to site two venous accesses to ensure adequate and timely rehydration.
  - b. Use warm Ringers lactate or normal saline solution for the initial fluid replacement to prevent risk of coagulopathy.
  - c. Apply non-pneumatic anti-shock garment (NASG).
  - d. Transfuse fresh whole blood if indicated.
  - e. Ensure that the BP is maintained at least at 80/50mmHg (permissive hypovolaemia).
  - f. Catheterize and retain and ensure that 30-50mls of urine is produced per hour.
5. D - Drugs
  - a. Dopamine infusion can be administered to improve renal perfusion and haemodynamic status. The recommended dosage is 1 - 5mg/kg/hour in infusion.
  - b. Adrenaline can also be administered in protracted hypotension. The recommended dosage is 2mcg/kg/min, titrate the dose with BP changes.

## II. Evaluate the patient

1. Brief history relating to the onset and volume of bleeding per vaginam should be obtained. Is the patient currently pregnant or not? Is there any evidence of bleeding disorders (bleeding from other orifices or non-clotting)?
2. Are there signs of hypovolaemic shock (pulse above 100/minute or BP < 80/50 mmHg)?
3. What is the level of consciousness?
4. Use the stepwise algorithm in figure 50.1 to determine the cause of PPH.
5. Investigate depending on the probable cause.
6. Continue resuscitation as the evaluation process continues.

## III. Remedy the cause

1. Definitive treatment depends on the cause.

Step 1 Initial Assessment and Treatment			
<b>Resuscitation</b> <ul style="list-style-type: none"> <li>• large bore IV(s)</li> <li>• oxygen by mask</li> <li>• monitor BP, P, R, U/O</li> <li>+/- catheter</li> <li>+/- oxygen saturation</li> </ul>	<b>Assess Aetiology</b> <ul style="list-style-type: none"> <li>• explore uterus (tone, tissue)</li> <li>• explore LGT (trauma)</li> <li>• review history (thrombin)</li> <li>• observe clots</li> </ul>	<b>Laboratory Tests</b> <ul style="list-style-type: none"> <li>• CBC</li> <li>• coagulation screen</li> <li>• group and cross-match blood</li> </ul>	
Step 2 Directed Therapy			
<b>"Tone"</b> <ul style="list-style-type: none"> <li>• massage uterus</li> <li>• compress</li> <li>• drugs (oxytocics)</li> </ul>	<b>"Tissue"</b> <ul style="list-style-type: none"> <li>• manual removal</li> <li>• curettage</li> </ul>	<b>"Trauma"</b> <ul style="list-style-type: none"> <li>• correct inversion</li> <li>• repair laceration</li> <li>• identify rupture</li> </ul>	<b>"Thrombin"</b> <ul style="list-style-type: none"> <li>• reverse</li> <li>• anti-coagulation</li> <li>• replace factors</li> </ul>
Step 3 Intractable PPH			
<b>Get Help</b> <ul style="list-style-type: none"> <li>• obstetrician/surgeon</li> <li>• anaesthesiologist</li> <li>• lab and ICU</li> </ul>	<b>Local Control</b> <ul style="list-style-type: none"> <li>• manual compression</li> <li>+/- pack uterus</li> <li>+/- vasopression</li> <li>+/- embolization</li> </ul>	<b>BP and Coagulation</b> <ul style="list-style-type: none"> <li>• crystalloid</li> <li>• blood products</li> </ul>	
Step 4 Surgery			
<b>Repair Lacerations</b>	<b>Ligate Vessels</b> <ul style="list-style-type: none"> <li>• uterines</li> <li>• internal iliac artery</li> <li>• ovarians</li> <li>• brace sutures to the uterus</li> </ul>	<b>Hysterectomy</b>	

Figure 50.1 A schema for evaluating a woman with PPH, LGT

Notes: PPH – primary postpartum haemorrhage; LGT – laceration of the genital tract

Source: Schurman N, Edmonton AB, Mackumom C, Brantford ON et al. Prevention and management of postpartum haemorrhage. *J Soc. ObstetGynaecol Can* 2000; 22(4): 271-81.

## A. Non-operative Management of Atonic Uterus

### 1. Treatment with drugs

When uterine atony is suspected, the following drugs could be administered as treatment

- **Oxytocin:** This is the first and preferred drug of choice. It is effective within 2 to 3 minutes when administered intramuscularly and within 45 seconds when administered intravenously. It can be used for all women. Usually, for uterine atony, 10 IU of intravenous oxytocin is given as a bolus and then 20 IU of intravenous oxytocin in a litre of normal saline should be infused for between 30 minutes to an hour. It should be stored at a temperature of between 2–8 degrees and light does not destabilize its potency.
- **Ergometrine:** This drug should be administered intramuscularly at a dose of 0.25mg. It is contraindicated in women with hypertensive disorders of pregnancy, anaemic heart failure or vascular disorders. Ergometrine takes effect 6 to 7 minutes after injection and its effect could last 2 to 4 hours. Side effects include nausea and vomiting. The drug's potency is maintained by freezing, but it must be protected from light rays.
- **Misoprostol:** This is a synthetic prostaglandin E1 (PGE1). The naturally-occurring PGE1 is not orally sustainable. It is unstable in acid media and not suitable for parenteral use because of its rapid degradation in the blood. Routes of administration are: oral, sublingual, rectal, vaginal and intrauterine during caesarean section. Dosage for PPH management is 400 – 1000 micrograms (scored tablet – 200 micrograms per tablet or un-scored tablet – 100 micrograms per tablet)

Table 50.2 Drugs used for management of PPH due to atony

	Oxytocin	Ergometrine	Misoprostol
Dose and route	IV: Infuse 20 units in 1 L IV fluids at 60 drops per minute. IM: 10 units.	IM: Give 0.25 mg.  IV bolus 0.25 mg slowly over 2-3 minutes.	200 mcg oral and 200 to 400 mcg sublingually or rectally (Hofmeyr, 2005).
Continuing dose	IV: Infuse 20 units in 1 L IV fluids each litre containing 20 units oxytocin (total 60 units)		Not known
Maximum dose	Not more than 3 L of IV fluids; each litre containing 20 units oxytocin (total 60 units).	5 doses (total 1.0 mg).	Oral dose should not exceed 600 mcg because of side effects of increased temperature and chills.
Precautions and comments	After 2 x 20 units in IV with no result, may give 5 IU as IV bolus slowly.	Contraindicated in cases of pre-eclampsia, hypertension, heart disease.	Contraindicated in cases of asthma.

Sources: WHO 2000, Davies 2005, Hofmeyr 2005, WHO 2006.

*Advantages of Misoprostol*

- o No need of special skill, can be administered by patients or TBAs
- o Longer shelf life
- o Longer duration of pharmacological effect
- o Cheap (less than a dollar per tablet)
- o Not contraindicated in hypertensive patients
- o Widely available

Side effects include fever, headache, vomiting, diarrhoea, hyperthermia, shivering and chest pain (rare)

## 2. Bimanual Compression of the Uterus

While preparing for the theatre, bi-manual compression should be performed in the interim, especially where a non-pneumatic anti-shock garment is not available. Items needed include high-level disinfection glove (above-elbow glove), apron, protective goggles and sterile gown.

*Procedure:*

- i. Place the patient in a dorsal or lithotomy position.
- ii. Put on above-elbow-length sterile surgical gloves.
- iii. Clean the vulva area and suprapubic area with antiseptic, and then drape the patient.
- iv. Empty the bladder of urine to allow better access and effective compression.
- v. Perform a vaginal examination to evacuate the blood.
- vi. Make a fist inside the vagina and then apply force on the uterus and cervix from the vagina (figure 50.2).
- vii. Apply counter pressure with the other hand from the suprapubic area. The opposing forces reduce the depth space of the uterine cavity and also reduce bleeding from other areas within the genital tract.



Figure 50.2 Bimanual compression of the uterus.

### 3. Intrauterine balloon inflation

This procedure is indicated when there is bleeding from the placenta bed or following miscarriage with no evidence of retained product. The process for using the intrauterine balloon (Foley's catheter or male condom could be used as an alternative) is as follows:

*Procedure:*

- i. Insert the end of the balloon through the cervix into the uterine cavity, ensuring the balloon is completely inside the uterus.
- ii. Inflate the balloon (fig. 50.4) with sufficient volume of warm sterile saline (approximately 250–500 ml or 100mls using Foley's catheter for bleeding due to abortion); the uterus should now be firm with minimal blood loss.
- iii. Commence broad-spectrum antibiotic cover
- iv. Continue or commence oxytocic infusion.

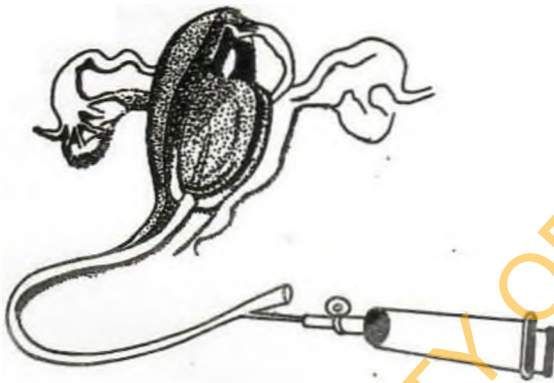


Figure 50.4 Intrauterine balloon inflation.

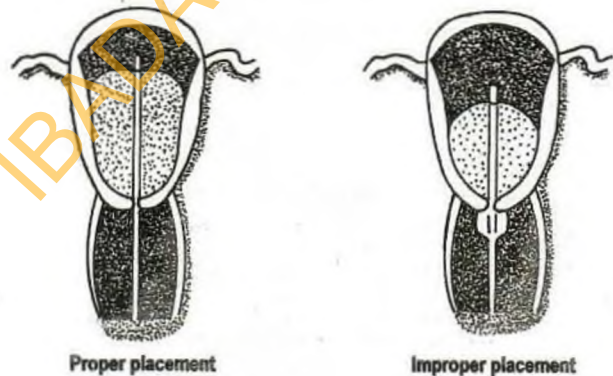


Figure 50.5 Placement of intrauterine balloon.

### B. Operative Management of Non-responsive Uterine Atony

PLEASE DO NOT ATTEMPT TO DO ANY OF THESE OPERATIVE PROCEDURES UNLESS YOU ARE TRAINED TO DO SO.

#### 1. B-Lynch suture (Brace suture)

The brace suture is a useful technique to conserve the uterus in women of low parity. The application of absorbable suture (chromic 2 catgut or vicryl 1 or 2) is performed to reduce the dead space of the atonic uterus.



*Procedure:*

- i. Place patient in Lloyd-Davies position to assess the vaginal bleeding.
- ii. Make a Pfannenstiel or midline incision on the abdomen to access the uterus.
- iii. Exteriorize the uterus and manually compress to determine whether the bleeding will stop or not. If the bleeding stops, it suggests that B-Lynch will be beneficial even when there is coagulopathy.
- iv. Make a lower segment transverse incision (hysterotomy) on the uterus and reflect bladder downwards (anterior view).
- v. Inspect the uterine cavity.
- vi. Insert the first stitch 3cm below the hysterotomy on the patient's left side and thread through the entire anterior uterine wall into the cavity. Bring out stitch through the same wall 3cm above the upper incision margin, approximately 4cm from the lateral border of the uterus (figure 50.3a – anterior view).
- vii. Carry the suture outside the uterus over its anterior surface to the posterior surface, lying 4cm from the cornu, where it is inserted through the wall into the cavity at a point on the horizontal plane at the level of the uterine incision (figure 50.3b – posterior view).
- viii. Then take the suture out through the posterior wall on the right side and bring anteriorly to enter the uterine cavity 4cm from the right lateral border of the uterus, 3cm above the hysterotomy incision and then out of the cavity anteriorly 3cm below the incision opposite the entry point.
- ix. Assistant applies constant pressure on the uterus, to squeeze out blood clots and maintain uterine contractions.
- x. Knot the two ends of the suture anteriorly to compress the uterus using a double throw knot ( figure 50.3c – anterior view).
- xi. Repair the hysterotomy incision in layers.
- xii. Request another assistant to inspect the perineum to ensure effectiveness of procedure.
- xiii. Repair anterior abdominal incision in layers and dress appropriately.

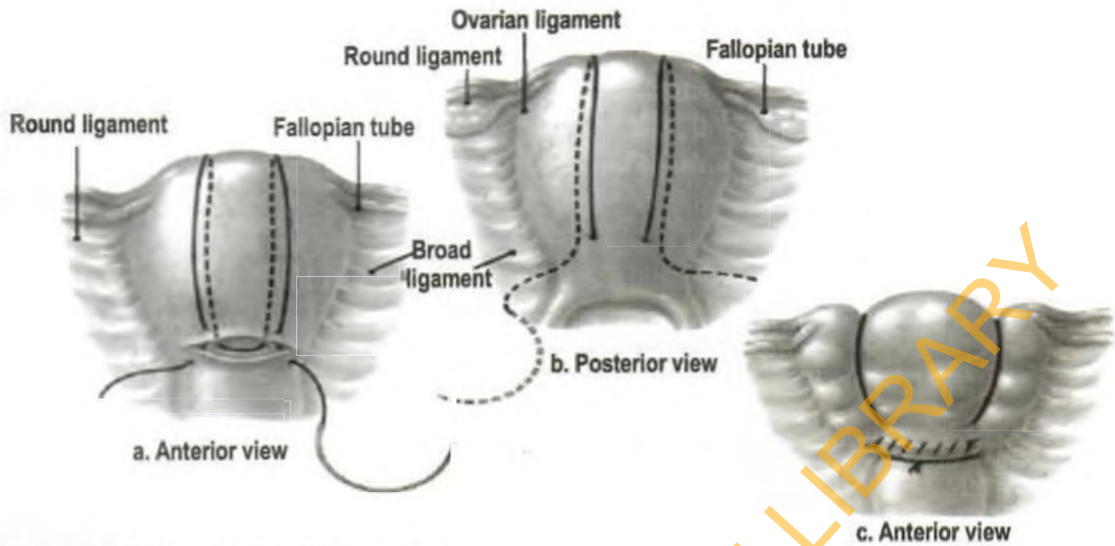


Figure 50.3 B-Lynch suture (Brace suture).

## 2. Systematic devascularization

This may include the uterine artery, and/or ovarian artery.

On very rare occasions, internal iliac artery ligation could be performed. It is also a conservative surgical method. Ligation of vascular supply to the body of the uterus (uterine and/or utero-ovarian vessel ligation)(fig. 50.6) is easier to perform and may be all that is needed to save the patient.

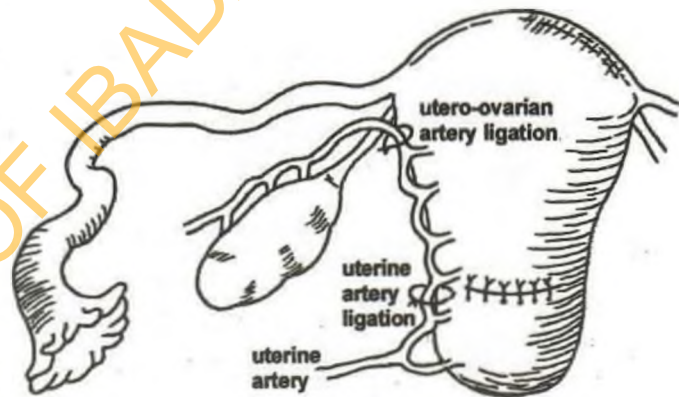


Figure 50.6 Ligation of vascular supply to body of the uterus (uterine and ovarian).

## 3. Hysterectomy

This can be performed as a last resort and the extent will depend on the skill of the surgeon and the haemodynamic status of the patient in theatre.

**Trauma**

The repair of trauma depends on the exact cause, and this includes:

1. *Cervical laceration*: The repair is best performed in the theatre under general anaesthesia. The patient is placed in lithotomy position. After cleaning the vulva and vagina with an antiseptic solution, the operative field is draped. The vaginal walls are retracted to make the cervix visible. The anterior and posterior lips of the cervix are identified and grasped with sponge holding forceps. The cervix is pulled down to identify the extent of the laceration. The repair is commenced at least 1cm above the apex of the laceration and it is performed using the "simple interrupted" or the "mattress suture" technique (fig. 50.7). This is done with an assistant. Items needed include: Sims speculum X 2; Sponge holding forceps X 4; Needle holder, vicryl 0 or chromic catgut 0 or 1 (or similar sutures) and angle poise lamp.

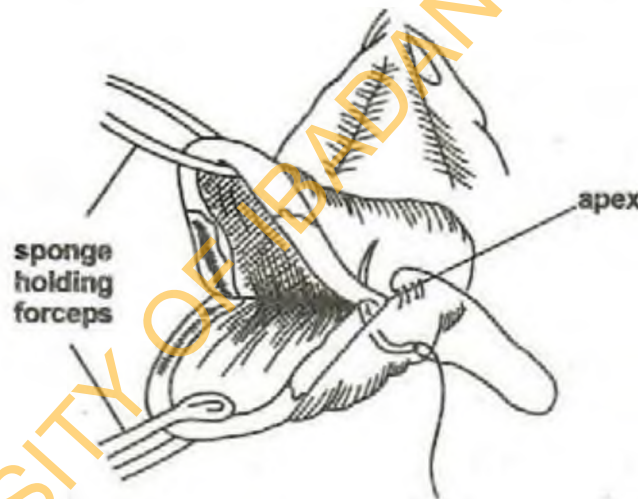


Figure 50.7

2. *Ruptured uterus*: Management of ruptured uterus could be either by repair of the rupture or hysterectomy, depending on the extent of the injury or clinical condition of the patient and skill of the surgeon.
3. *Paragenital haematoma*: This may be drained through the vagina and haemostatic sutures applied if it is below the pelvic floor (levator ani muscle) or through laparotomy if it is above the pelvic floor on review.

## Management of Retained Placenta

A retained placenta may be due to:

- i. The uterus not contracting well after the baby is born so the placenta remains fully, or partially attached inside the uterine cavity.
- ii. The umbilical cord snapping.
- iii. The placenta being attached abnormally deeply (placenta accreta, placenta increta or placenta percreta) and unable to separate.

Determine if placenta is adherent or trapped.

In case of significant blood loss consider if placenta has separated and repeat controlled cord traction. If not separated and there is delay in theatre access, consider manual removal (MROP) under appropriate IV sedation or Entonox in delivery room. Arrange for manual removal of the placenta in theatre with anaesthesia.

1. If the placenta is not removed, hold tension on the cord with one hand while placing the other hand into the vagina (fig. 50.8). Follow the cord up to the placental edge. Once the hand is in the uterus, do not bring it out until you have separated the placenta using the ulnar border of the hand by gently shelling it off the decidua of the uterus. Use the other hand to hold the uterus firmly through the abdomen to stabilize it (fig. 50.9). Do not take your hand in and out of the uterus, because this increases the risk of infection. When all of the placenta is separated and in the palm of your hand, rub the uterus to make the uterus contract. Examine the placenta to be sure it is complete.
2. Administer any oxytocic that is available to keep the uterus contracted.
3. Administer parenteral broad spectrum antibiotics.

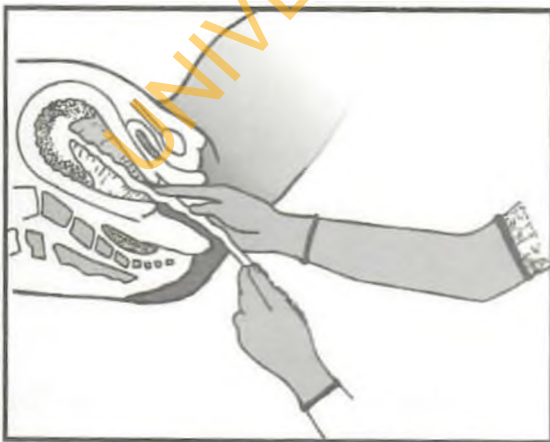


Figure 50.8 Hold tension on the cord with one hand while placing the other hand into the vagina.

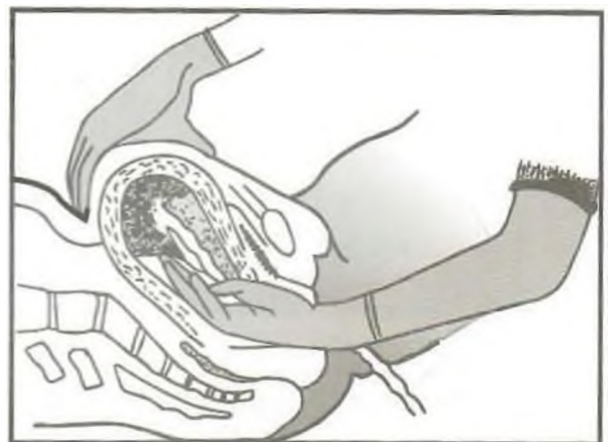


Figure 50.9 Use the other hand to hold the uterus firmly through the abdomen to stabilize it.

### Active Management of Third Stage of Labour (AMSTL)

Active management of the third stage of labour is one of the most effective strategies to prevent PPH, and the components include the following:

1. Administer intramuscular or intravenous (preferably oxytocin 10 IU) oxytocics within a minute of childbirth.
2. Delayed cord clamping (1-3 minutes after birth).
3. Deliver the umbilical cord by controlled cord traction (fig. 50.10).
4. Regular and frequent assessment of uterine tone by palpation of the uterine fundus after delivery of the placenta (fig. 50.11).

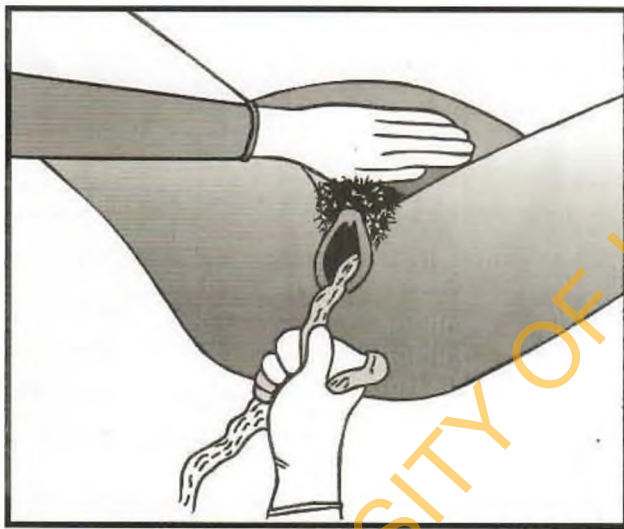


Figure 50.10 Deliver umbilical cord by controlled cord traction.



Figure 50.11 Assessment of uterine tone by palpation.

### Non-pneumatic Anti-shock Garment (NASG)

The non-pneumatic anti-shock garment is made from elastic material and when applied looks like a fenestrated trouser. The NASG diverts blood from the lower area of the body to important organs like the brain, heart and kidneys.

PLEASE DO NOT APPLY NASG IF YOU HAVE NOT BEEN TRAINED TO DO SO.

### Benefits of NASG

- It is efficient.
- It is simple and easy to use.
- It is safe.
- It stabilizes the patient while looking for the cause of bleeding.
- It keeps the patient alive while being transferred to a higher level of care.
- It may control bleeding while other forms of management are being instituted.
- It can be applied by any trained health person.

### When to apply NASG

Patients who have suffered from severe blood loss and are in shock will benefit from the use of NASG or in cases of bleeding per vaginam associated with:

- Pulse rate above 100/min
- Systolic BP less than 100mmHg

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#### DO NOT APPLY NASG

- to a pregnant woman with a live foetus
  - when bleeding is from the chest region
  - to patients with heart disease
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### How to Apply NASG

The NASG application points are numbered 1, 2, 3, 4, 5 (see fig. 50.12).

The health worker should:

- Put on gloves
- Open the NASG and put on a flat surface
- Place the patient back down on top of the NASG making certain that the marked "navel" (number 5) aligns with the patient's navel
- Wrap the garment from each end starting from the lowermost part of the leg (number 1) to the navel region (number 5). Wrap one section at a time on each side
- Monitor the patient's pulse rate and BP every 15 minutes i.e., pulse rate of more than 100 per minute and/or a BP of 90/50mmHg

- Monitor urinary output every hour
- Resuscitate patient with intravenous fluids and blood as required
- Look for the site of haemorrhage and provide definitive management or refer as appropriate



Figure 50.12 Non-pneumatic anti-shock garment (NASG).

### Further Reading

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