

STANDARD GUIDELINE FOR MANAGEMENT OF POSTPARTUM HAEMORRHAGE



Reproductive, Maternal and Neonatal Health Programme
Department of Public Health
Ministry of Health



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PREFACE

Postpartum haemorrhage (PPH) is an obstetrical emergency and is the leading cause of maternal mortality worldwide. PPH is the number one cause of maternal mortality in Bhutan. It contributes significantly to severe morbidity and long-term disability and maternal conditions that affect their lives for rest of their life. From the review of maternal deaths in Bhutan, from 2001-2015, forty four percent of maternal deaths were contributed by PPH. However, majority of the PPH cases that caused maternal deaths in Bhutan were preventable type of PPH.

PPH is caused by abnormalities of one or more of four Ts, which include Tone (Uterine atony is the major cause) due to abnormalities in uterine contraction; Tissue due to retained products of conception; Trauma due to genital tract lacerations or haematoma, and Thrombin due to abnormalities of coagulation. Common risk factors include maternal anemia, prolonged labor, retained placenta, multiple pregnancies and poor management of third stage of labor.

The health system faces enormous constraints including human resource capacity that hinders the delivery of emergency obstetric care, which is vital for saving the lives of women who develop severe complications. To help this situation, it is important that healthcare providers in Bhutan have Standard Management Guideline in place to guide them once PPH is identified in the healthcare settings. Being prepared in advance to deal with PPH and saving time is critical in managing every PPH case.

Therefore, the first edition of Standard Guideline for Management of PPH 2009 has been updated. A new chapters on Massive Blood Transfusion and Postpartum Counseling and simulation drill for PPH has been added. This aims to enhance knowledge and skills of health care providers in the management of PPH. This guideline contains clear roles of healthcare providers at different levels of health facilities and therefore is strongly recommended for use by all health centers in the country.



(Dr. Phurb Dorji)

Technical Advisor to RH Program

ACKNOWLEDGEMENT

The Department of Public Health would like to acknowledge the efforts of healthcare providers who have revised the "Standard Guideline for Management of Postpartum Hemorrhage, 2009" in 2016. Postpartum Hemorrhage is one of the major cause of preventable maternal deaths in the country. I am confident that the inclusive process of developing this guideline by healthcare providers would go a long way in the management and prevention of PPH in the country. The list of participants who participated and made contribution in the development of this guideline is included in the Appendix.

We also would like to thank Dr. Phurb Dorji, Obstetrician and Gynecologist, JDWNRH, for facilitation and technical guidance during the entire phase of the revision of this document.

Finally, we would like to extend our gratitude to UNFPA Country Office, Thimphu, for their financial support for the development and printing of this guideline.



(Dr. Pandup Tshering)

Director

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INTRODUCTION

Postpartum haemorrhage (PPH) continues to be the main cause of maternal mortality in developing countries especially in Asia and Africa. In Bhutan, PPH is the number one cause of the maternal deaths. Since the revitalization of the Maternal Death Investigation (MDI) in Bhutan in 2000, annual review of reported maternal deaths done by the Maternal and Neonatal Deaths Review Committee persistently show PPH on the top of the list every year.

A summary review of the causes of the maternal deaths in Bhutan (2001-2015) showed that 44 % of all maternal deaths were directly due to postpartum haemorrhage.

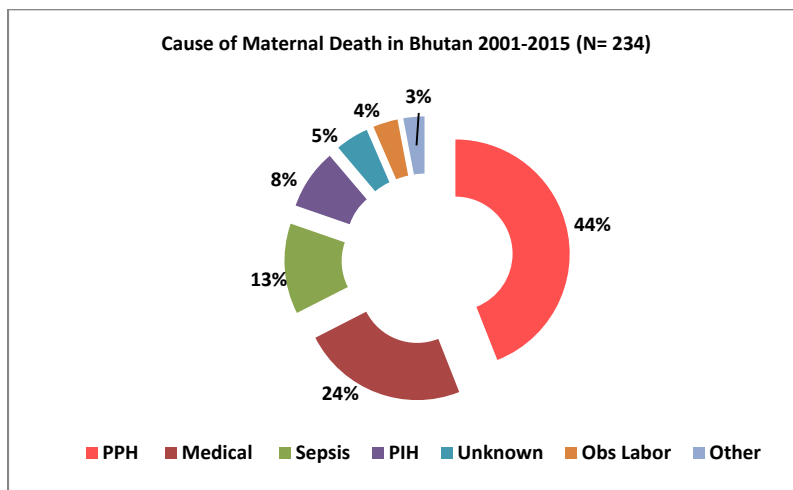


Fig.1 Causes of Maternal Deaths in Bhutan

The need for a standard guideline for the health care providers was identified as a top priority in response to postpartum haemorrhage (PPH) being the leading cause of maternal mortality in Bhutan.

This standard guideline is developed for the in-service and preservice health workers of all categories including doctors who are involved in giving care to women with the following objectives:

General Objectives

1. To prevent maternal deaths due to preventable PPH
2. To provide a comprehensive guidance on the management of PPH to all health care providers (hospitals and BHUs)

Specific Objectives

1. To serve as a standard protocol for the management of postpartum haemorrhage (PPH) in Bhutan
2. To provide a simplified and standardized approach on postpartum haemorrhage (PPH) management at different levels of health centers.
3. To provide adequate knowledge and the practical basis for the acquisition of skills by health care providers in the management of PPH

This guideline is adapted from the WHO's training module on postpartum haemorrhage by the WHO Maternal Health and Safe Motherhood Programme and other standard sources as given in the reference.

It has fifteen chapters covering important topics related to postpartum haemorrhage. Every effort has been taken to ensure feasibility of the management options at the field level. It can be used both as bedside guideline and as a training manual on postpartum haemorrhage management. It can also be used to teach midwifery students as part of midwifery training programmes, but not meant to replace any midwifery text-books.

SECTION 1: THIRD STAGE OF LABOUR – PHYSIOLOGY AND MANAGEMENT

1.1 PHYSIOLOGY

1.1.1 Mechanism of placental separation

Separation of the placenta is brought about by contraction and retraction of the myometrium which thickens the uterine wall reducing the size of the placental bed. As the placental bed becomes smaller, the placenta begins to separate from the uterine wall because it is not elastic like the uterus and cannot contract and retract. At the areas of separation, a retroplacental clot forms. The weight of this clot increases the pressure on the placenta and further helps separation. Subsequent uterine contractions completely detach the placenta from the uterus and push it out of the vagina along with the membranes and retroplacental clot (see figure 1.1).

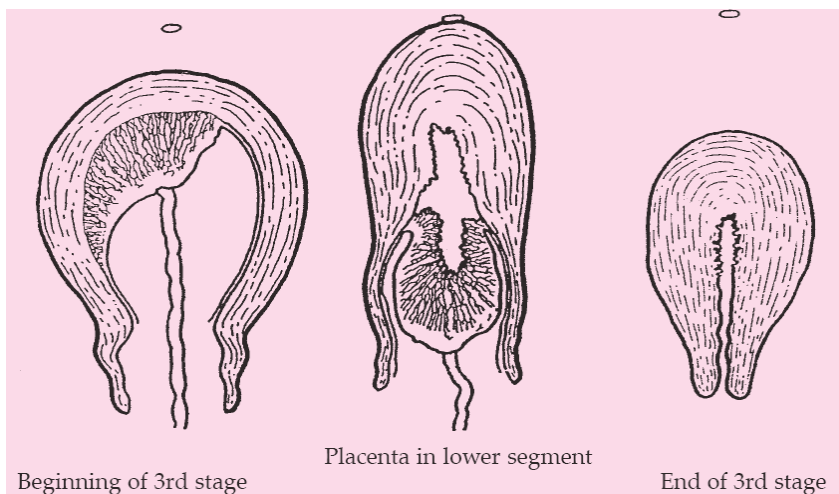


Fig.1.1. Placental separation

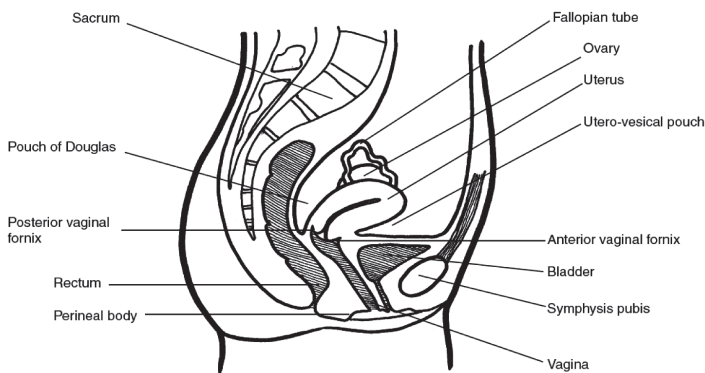


Fig.1.2. Cut section of female pelvis

1.2 MANAGEMENT OF THIRD STAGE

i. Prophylactic use of oxytocics drugs

- Oxytocin:** Oxytocin is a pituitary (posterior lobe) extract which:
- causes contraction of smooth muscle and therefore has a powerful action on uterine muscle.
 - acts within 2.5 minutes when given intramuscularly but its action is not sustained.
 - The advantage is that it has a rapid action and does not cause side effects in most cases.

- Ergometrine :** Ergometrine is a preparation of Ergot which may be given intramuscularly or intravenously; it takes about 6-7 minutes to take effect when given intramuscularly and 45 seconds when given intravenously.
- it causes marked spasm of the uterus by a series of rapid contractions.
 - it has an effect lasting about 2-4 hours:
 - it causes headache, nausea, vomiting and hypertension
 - Ergometrine is therefore **contraindicated** in cases of raised blood pressure or cardiac disease.

Recommendations for practice:

- IV Syntocinon 10 units as bolus dose for patients with hypertension or cardiac disease
- Oxytocics should be stored in a refrigerator (at 2-8 degrees Celsius) and away from light
- IM Methergin for normotensive patients if oxytocin is not available

Timing of administration of Oxytocin drugs

- After delivery of the baby when it is confirmed that there is no second twin.

ii. Early clamping and cutting of the umbilical cord

The advantage is that the duration of the 3rd stage is reduced.

iii. Active management of the Third Stage of Labour(Reduce PPH by 50%)

- Injection of oxytocin 10 units IM after delivery of the baby
- Check vital signs especially colour, blood pressure and pulse rate
- Place the left hand on the mother's abdomen at the fundus to ensure that the uterus is well contracted
- Deliver the placenta skillfully by CCT (See Fig 1.1)
- Note the time when the placenta is completely expelled
- Check on the state of the uterus to confirm that contraction and retraction of the uterus is sustained
- Examine the placenta and membranes for completeness
- Estimate the blood loss
- Set an intravenous line if blood loss > 500 ml
- Examine the genital tract carefully for lacerations and tears after a change of sterile gloves. Proceed to repair episiotomy if required
- Re-check the state of the uterus and ensure that it is well contracted before leaving the mother to attend to the baby
- Maintain vigilance on maternal condition at all times throughout this period to ensure that she is not in shock. At the end of the third stage, the following observations must be carried out and the findings recorded into the mother's delivery records:
 - general appearance
 - blood pressure
 - pulse
 - temperature
 - state of uterus
 - state of bladder
 - state of perineum
 - blood loss
- Identify complications that require referral to a higher centre
- Give appropriate advice before leaving the patient

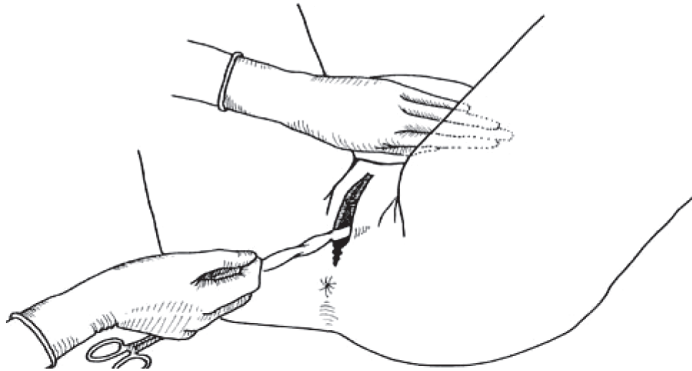


Fig.1.3 Controlled cord traction

1.2.3 Monitoring of cases with PPH in the postnatal ward for 6 hours

- Monitor colour, blood pressure, pulse and temperature closely
- Check that the uterus is well contracted at regular intervals
- Examine the pad for excessive bleeding
- Continue with an oxytocin drip when indicated
- Always ensure that cannula is in-situ in a patient with high risk for PPH
- Inform/call for help early if there are signs and symptoms of excessive bleeding

The MDI showed that many cases of PPH were managed by relatively inexperienced doctors who did not institute adequate treatment early enough or failed to consult senior colleagues until it was too late.

SECTION 2: UNDERSTANDING POSTPARTUM HAEMORRHAGE

2.1 DEFINITION

Postpartum haemorrhage (PPH) is defined as bleeding from the genital tract measuring 500 ml or more after the birth of the baby. Recent research indicates that **clinical estimates of blood loss frequently fall below the actual amount** and the incidence of PPH is being under reported by 30-50%.

Clinical Definition

Ideal definition would mean the patient:

- is haemodynamically unstable (presence of tachycardia and hypotension)
- has a blood loss of >1000ml from genital tract
- has a >10% change in her haematocrit between pre-delivery and the postpartum period or
- requires blood transfusion.

2.2 CLASSIFICATION AND CAUSES OF PPH

There are two types of postpartum haemorrhage

1. Primary postpartum haemorrhage
2. Secondary postpartum haemorrhage

Primary postpartum haemorrhage is defined as loss of blood > 500ml from or into the genital tract within 24 hours after delivery of the baby.

Table. 1. Causes of Primary PPH....the Four Ts

Tone	Trauma	Tissue	Thrombin (Coagulopathy)
Grand Multiparity	Operative delivery		Pre-eclampsia
Multiple pregnancy	Cervical / vaginal lacerations	Retained placental	HELLP Syndrome
Polyhydramnios	Previous caesarean section increases risk of morbidly adherent placenta	tissue	Placental abruption
Macrosomia		and membranes	FDIU>4/52
Fibroids uterus			Amniotic Fluid Embolism
Prolonged labour			Sepsis
Precipitate labour			Bleeding disorders
Dysfunctional labour			Drugs (aspirin/heparin
Intrauterine infection			

2.3 SPECIFIC CAUSES OF PRIMARY PPH

Uterine Atony

Uterine atony is the condition when the uterus is empty, soft, lacks tone, and doesn't contract. This accounts for the majority of the deaths from PPH. Associated risk factors can be divided into two main categories:-

- i. **Predetermined Risk Factors :** (risk factors present in patient which are beyond the control of staff managing the delivery)

Uterine overdistension

Muscle fibres if overstretched will not contract quickly or efficiently enough (Starling's Law). This may occur with polyhydramnios, multiple pregnancies, hydrops fetalis and large babies. In addition, with multiple pregnancies there is a large placental bed.

Multiparity

With each pregnancy, there is an increasing amount of fibrous tissue which replaces normal myometrium. This fibrous tissue hinders the effectiveness of the myometrial contractions.

Anaemia

Poor oxygenation of the uterus will result in failure of intrinsic biochemical activity that is needed to produce a contraction of the muscle fibers of uterus.

Past obstetric history

With a previous history of PPH, there is a definite increase in risk. The recurrence rate is about 15 - 30%.

Antepartum haemorrhage

There may be a caagulopathy and a Couvelaire uterus resulting in ineffective uterine contractions. In cases of placenta praevia, the lower segment has less muscular tissue so there is less retraction and contraction of the placental site, resulting in more bleeding.

Uterine fibroids/ retained products of conception

A fibroid especially large intramyometrial myoma may prevent part of the uterine musculature from contracting effectively. A submucous myoma may behave like retained products and may hinder effective contractions. With retained products, there may be a failure of contraction of the uterus especially over where the products are retained.

- ii. **Controllable risk factors** (contributed by and within the control of the staff managing the delivery)

Operative deliveries

The average blood loss during a caesarean section has been estimated to be about 600 to 1000 ml. Thus, technically most caesarean sections are associated with PPH. Forceps or ventouse deliveries for prolonged labour are associated with maternal and uterine exhaustion and may result in uterine atony

Anesthesia

Use of general anesthesia will cause uterine relaxation and will prevent effective uterine contraction. Modern trend in most cases of caesarean section is towards regional anesthesia.

Prolonged labour

Allowing a mother to have a long and protracted labor leads to maternal and uterine exhaustion. Maternal ketosis and dehydration will also result in ineffective uterine contractions because of electrolyte imbalances.

Mismanagement of third stage

Application of traction on an uncontracted uterus may hasten the third stage resulting in delivery of the placenta and a uterus that is atonic. It may also lead to retained products, partial separation of the placenta, bleeding and uterine inversion.

Genital Tract Trauma

Bleeding from or into the genital tract in the presence of a well contracted uterus. It is an important cause of haemorrhage.

Types of tear:

- Perineal tear or episiotomy wound
- Ruptured varicosities around the vulva
- Vulval trauma
- Vaginal lacerations
- Cervical lacerations
- Uterine rupture

Perineal, vaginal and cervical tears

A poorly repaired episiotomy wound can cause excessive blood loss. This is especially so when the apex of the episiotomy wound is not properly sutured.

Vulval haematomas can be the result of ruptured varicosities or incomplete haemostasis during episiotomy repairs. It usually occurs in the subcutaneous tissues of the labia major but can make tracts to the ischioanal fossa.

Perineal, vaginal and cervical tears are more common with instrumental deliveries, precipitate labour and macrosomic babies.

Uterine Rupture

Incidence is approximately 1: 400 to 1: 4000 deliveries and may occur in scarred uterus as well as in intact uterus.

▪ Scarred Uterus

With past classical caesarean sections, the risk of uterine rupture is 2.2% and in lower segment CS the risk is about 0.5%. Rupture after a classical caesarean section is therefore more serious and more likely compared to lower-segment caesarean section. Rupture is also more likely in

women who have had more than one previous caesarean section, history of T-shaped or vertical incisions, sepsis following caesarean section, hysterotomy and myomectomy in the past.

- **Intact Uterus**

Rupture in intact uterus is usually seen in patients of high parity (very rarely seen in a primigravida). If cephalopelvic disproportion (CPD) is undiagnosed the rupture usually occurs intrapartum. It is also more likely in patients with a previous history of manual removal of placenta (MRP), dilatation and curettage (D&C) or postpartum pelvic sepsis. Rupture may also occur during severe trauma e.g. automobile accidents.

Uterine Inversion

This is an uncommon but serious complication of the third stage of labour. The diagnosis may be missed and this could delay treatment. It may occur spontaneously or could be the result of mismanagement of the third stage of labour with traction on cord before uterus is contracted. Spontaneous inversion is often associated with a fundally placed placenta.

Coagulation Disorders

As a primary factor, coagulation disorders account for 1 to 2% of all maternal deaths from PPH. Disseminated intravascular coagulation (**DIC**) is of two types:

Chronic DIC

This includes inherent blood disorders i.e. von Willebrand's disease, idiopathic thrombocytopenia as well as acquired problems i.e. chronic liver disease, hepatitis and in patients who are on anticoagulant therapy (for heart valve replacement).

Acute DIC

Acute coagulation dysfunction may occur with:

- Severe eclampsia or pre eclampsia
- HELLP syndrome (Haemolysis, Elevated Liver Enzymes and Low Platelets)
- Amniotic Fluid Embolism
- Septicaemia
- Following massive blood transfusion
- Dengue haemorrhagic fever

SECONDARY PPH

It is defined as abnormal bleeding from the genital tract occurring after 24 hours of delivery of the baby up to 6 weeks postpartum (including excessive lochia). The amount of blood loss is not quantified in contrast to Primary PPH.

Causes of Secondary PPH

1. Retained products of conception
2. Infection of genital tract
3. Shedding of dead tissue following obstructed labour (this may involve the cervix, vagina, bladder or rectum)
4. Breakdown of uterine wound (after caesarean section or ruptured uterus)
5. Trophoblastic disease (rare)
6. Chronic subinvolution of the uterus (rare)

2.4 EFFECTS OF POSTPARTUM HAEMORRHAGE

It is important to understand that a healthy woman can bleed to death very quickly from PPH in about 2-3 hours.

Even if a woman does not die as a result of PPH, her health can be seriously affected.

Anaemia will make the woman less able to:

- look after herself
- lactate and feed her baby
- care for her family
- Make her prone to infection and illnesses.

Table.2. Clinical Findings in Obstetric Hemorrhage

Blood volume loss	BP	Sign &Symptoms	Degree of shock
500-1000 mL (10-15%)	Normal	Palpitations, tachycardia, dizziness	Compensated
1000-1500 mL (15-25%)	Slight fall (80-100 mm Hg)	Weakness, tachycardia, sweating	Mild
1500-2000 mL(25-35%)	Moderate fall (70-80 mm Hg)	Restlessness, pallor, oliguria	Moderate
2000-3000 mL (35-50%)	Marked fall (50-70 mm Hg)	Collapse, air hunger, anuria	Severe

Adapted from *Int J Gynaecol Obstet* 1997 May; 57(2): 219-26

Long-term sequelae of severe PPH and shock are Sheehan's Syndrome. This is caused by hypovolaemia which causes necrosis of the pituitary gland. There will be failure of lactation, ovarian function and other endocrine functions.

- **Senior staff should be directly involved in the management of PPH**
- **Maternity units should have well rehearsed protocols for the management of massive haemorrhage – MDI 2001-2003**

SECTION 3: BEING PREPARED

Introduction

In every delivery we have to anticipate PPH and it is very important to be prepared in advance to deal for an emergency. All health facilities must be prepared in advance to deal a postpartum haemorrhage. Being prepared in advance helps us to act in time to save lives of women from postpartum haemorrhage.

Approach

1. Use Color Code to identify an Emergency and give alarm.
2. Alert Advance Team
3. Prepacked Emergency PPH Equipments in working condition and supplies up to date in PPH tray
4. Fill PPH Patient Transfer Form, if patient is referred with gynecologist
5. Maintain Emergency Communication Link

1. Color Code Call to Identify An Emergency

RED ALERT CALL: It means an emergency situation that needs help by many people to deal with the situation. Immediate action is needed when the staff on duty encounter with a case of postpartum haemorrhage. He or she should send out a **RED ALERT CALL** if the situation is dangerous to the life of the mother. After receiving the **RED** alert call, all pre-identified staff members in the PPH Response Team must rush to the spot. They must leave their other duty or personnel work whether on leave or off duty.

GREEN ALERT CALL:

This is a situation that is not a real emergency but requires urgent help by few other staff to deal with the situation. When a **GREEN ALERT CALL** is made then the pre-identified PPH Response Team members must go to the scene to give assistance.

The obstetric and gynecology department or units/CMOs, MOs, EmOC focal persons/BHU In-charge, must explain the **color call system** to all their health staff including the support staffs. The support staff working in the hospital PABX center must be trained in using color code and giving the color code correctly at the time of emergency. The PPH Response Team member name list should be given to PABX/telephone operator of respective health facility in advance.

2. Advance Color Coded Team Formation

It is very important to have the color coded teams formed in advance at the hospitals and health centers to deal with postpartum haemorrhage. The size of the team depends on the situation that needs to be tackled. The working group has recommended the following team members in each team at various levels of health facilities. Final changes can be made a local level.

Level I (BHU)

PPH Response Team : HA/ ANM / BHW/ caretaker

Level II (D/H, BHU-I)

PPH Response Team : Medical officer/ ACO/ Nursing staff / Lab tech / driver/sweeper/ Ward boy

Level III

PPH Response Team : Gynecologist on call/ EmOC trained senior nurse/Senior Gynecologist /Anesthetist/OT staff/ Lab tech /Blood Bank staff/ ward boy/ Sweeper

3. Prepacked PPH Managements Equipments And Supplies

When an emergency comes it is very difficult to look for things scattered all over and we lose precious time in saving life. It is very important to have Pre-packed PPH trays in working condition for both management and transfer of the patient. Recommended list is included in appendix (need to provide no of the appendix and state the purpose Eg. PPH pre-packed tray).

4. PPH Transfer Form

As the patient with PPH is referred from lower centers to a higher health facility level, there is usually no time to discuss and find out about important points for management. Often the usual referral sheet doesn't contain important points. The working group has developed a PPH REFERRAL SHEET see appendix. It is recommended to be used when a patient is referred from a center. When this form is used, then there is no need to write a referral letter or fill out the general referral sheet.

SECTION 4: ESTIMATION OF BLOOD LOSS

Use Quantification of blood loss using under buttock drape with calibrated pouch for high risk cases and Visual EBL for other cases until QBL can be incorporated as a routine practice.

1) Visual Estimation of Blood loss

- Most commonly used but highly unreliable and subjective. Can lead to gross underestimation.
- Pictorial guide to EBL

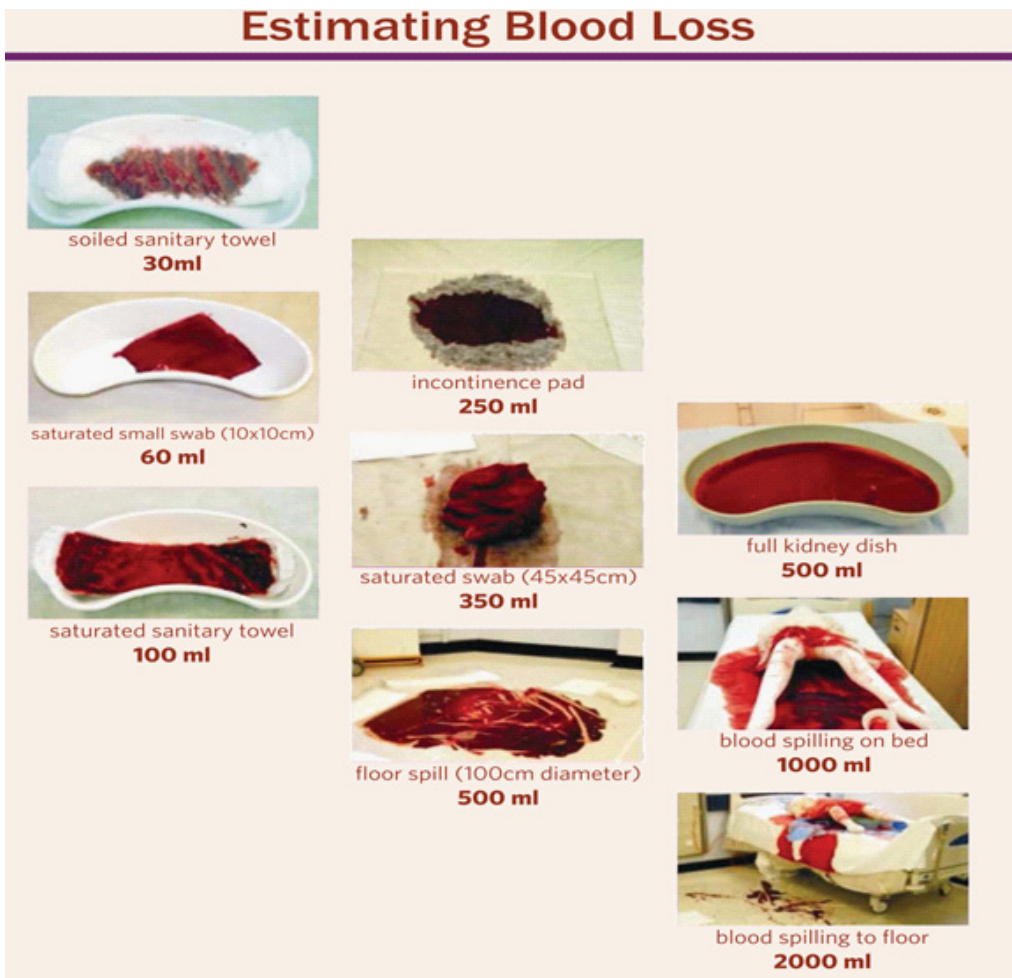


Fig. 4.1 Estimating Blood Loss

Adapted from: P.Bose, F. Regan, S. Paterson Brown, *improving the accuracy of Estimated blood loss at obstetric haemorrhage using clinical reconstructions*

2) Quantification of Blood loss

2.1. *Direct measurement*

2.1.1 Under-buttocks drapes with calibrated pouches.

- Measure amount of fluids after birth of the infant. The majority of the bleeding is after the placenta is delivered.
- Note amniotic fluid, urine, etc. in the under-buttocks bag prior to birth.
- Continue ongoing QBL measurement until active bleeding has ceased (usually for 2-4 hours).



Fig. 4.2 Calibrated pouches

- 1.1.2 Graduated suction canister in operation theatre should be used to measure blood loss at cesarean section.

2.2 *Indirect measurement by Weighing*

- Standardize products used for deliveries and determine their dry weights.
- Create a laminated list of dry weights of items used during birth that may become blood soaked. Attach to every scale.
- Use scales to weight all blood-saturated items
- 1 g = 1ml
- blood loss = weight of blood saturated items – dry weight of item

SECTION 5: MANAGING PPH IN HOSPITALS

PREVENTION OF PPH

- Identification of high risk patients
- Active management of the 3rd stage of labour (**Section 1**)
- Early intervention

IDENTIFICATION OF HIGH RISK PATIENTS

Anticipate PPH in the following patients and take extra precautions

- Prolonged labour
- Antepartum Haemorrhage
- Multiple pregnancies
- Previous history of LSCS
- Previous history of retained placenta
- Previous history of PPH
- Polyhydramnios
- Anaemia
- Grand-multiparity
- Fibroids with pregnancy
- PIH
- Teenage pregnancy
- GDM
- Pre existing medical conditions such as ITP, hemophilia, alcoholic liver disease and hepatitis.

MANAGEMENT OF HIGH RISK CASES

- Delivery for these high risk cases should be in a well equipped hospital.
- Set up IV line with large bore (16-18 G) cannula.
- Grouping and cross matching blood (2 units).
- Full blood count on admission.
- Active management of 3rd stage of labour (see section I)
- After delivery, such patients should subsequently be given 40 units Syntocinon drip in normal saline or RL at 20-40 dpm for 4-6 hours.

- Where available misoprostol 600 mg should be given sublingually as prophylaxis

MANAGEMENT OF PRIMARY PPH

The principles of managing PPH are:

- Speed - PPH can be torrential, therefore prompt action is essential
- Skillful Intervention – the right technique can save lives
- Prioritizing the management steps

1.1.1 General Measures

- i. Each hospital/BHU must have a **RED ALERT TEAM** to deal with life threatening PPH management. Whenever the staff on duty encounters a case of life threatening PPH, they must alert the Red Alert Team and the team members must rush to help at once. It is important to consider both the patient's prior haemoglobin when assessing the severity of PPH. There must be PPH management trays and transfer kits in place.
- ii. Resuscitative measures are to be carried out simultaneously with the assessment of the patient and determination of the cause of the PPH and institution of corrective measures.

Basic measures for MINOR PPH (blood loss 500–1000 ml, no clinical shock):

- Intravenous access (14-gauge cannula x 1)
- Give IV RL or NS only, usually need 3.5 litres for each litre of blood loss
- Insert indwelling urinary catheter 12-14 FG

Full protocol for MAJOR PPH (blood loss > 1000 ml and continuing to bleed OR clinical shock):

- Oxygen by mask at 8–10 litres/minute
- record BP and pulse
- Intravenous access (2 large gauge cannula, 14- 16 G, x 2)
- Position flat
- Keep the woman warm using appropriate available measures
- Cross match minimum of 4 units of blood.
- Transfuse blood as soon as possible

- Until blood is available, infuse up to crystalloid (3.5 litres), rapidly as required
- The best equipment available should be used to achieve RAPID WARMED infusion of fluids
- Insert a foley’s catheter (aim to maintain urinary output of atleast 30ml/hr).

**The clinical picture should be the main determinant for the need of blood transfusion and time should not be wasted waiting for laboratory results.

Fluid therapy and blood product transfusion:

- Crystalloid Up to 3.5 litres Hartmann’s solution or normal saline
- Blood Cross-matched
- If cross-matched blood is unavailable, give when available 3 units of group-specific blood or give ‘O RhD negative’ blood, whichever is available sooner.

Table 5.1 : Assessment of the degree of blood loss

BLOOD LOSS (% of blood volume)	MEAN ARTERIAL BLOOD PRESSURE	SYMPTOMS/ SIGNS
10-15%(500 ml)	Normal	Postural Hypotension Mild Tachycardia (90-100 bpm)
15-30% (1000-1500 ml)	Slight Fall	Tachycardia (110-120 bpm) Thirst Weakness
30-40% (1500-2000 ml)	50-70 mmHg	Tachycardia (120-140 bpm) Pallor Oliguria (<30 ml/hr) Confusion Restlessness
>40%(> 2000 ml)	<50 mmHg	Tachycardia (>140 bpm) Anuria Air Hunger Coma Death

Table 5.2 Signs of shock

Early shock	Late shock
Awake, aware, anxious	Confused or unconscious
Fast pulse	Very fast and weak pulse, rate of 110 per minute or more
Slightly fast breathing	Fast and shallow breathing (rate of 30 per minute or more)
Pale	Marked pallor, especially of inner eyelid, palms or around mouth
Sweatiness	Cold, clammy skin
Low blood pressure	Very low blood pressure
Urine output of 30ml per hour or more	Urine output of less than 30 ml per hour

1.1.2 Management of Uterine Atony

- Group and cross match 4 units of blood
- Start blood transfusion
- Massage the uterus to produce contraction
- Start medical treatment if there is no response to prophylactic treatment
 - IV ergometrine 0.5 mg
 - Administer IM oxytocin 10IU and 40IU in 500 ml normal saline at 40 dpm
 - IM carboprost 250 micrograms and repeat after 15 mins up to a maximum of 2 - 3 doses if available
 - Tab misoprostol 600-800 mcg PR if carboprost is not available.
- Check placenta for completeness
- Examine the mother for cervical and vaginal lacerations especially if the uterus is contracted and there is continuing PPH.

- Send the appropriate investigations and get the results urgently
- These methods should be tried
 - Uterine massage
 - Aortic compression
 - External bimanual compression
 - Internal bimanual compression
 - Condom tamponade
- If bleeding persists, prepare patient **for surgical intervention** or arrange for **urgent Referral** to the next Com-EmOC center if not possible at the center
- Perform coagulation screen : hemoglobin (Hb), platelet count (PC), clotting time (CT), prothrombin time (PT) and activated partial thromboplastin time, serum fibrinogen level, FDP, and D-dimer if available.
- Surgical methods see Methods to stop PPH.

3.4.3 Management of Retained placenta

The general principles of management are the same as for the cases where the placenta is delivered.

- Assess the patient's condition and estimate how much blood has been lost
- Group and cross match 2-3 units of blood
- Start blood transfusion if needed
- Empty the bladder and give an attempt for CCT. If it is successful, examine the placenta to ensure its completeness. Maintain uterine contractions by massaging the fundus of the uterus. Add 40 IU of oxytocin in 500 ml NS and run at 20-40 dpm
- If CCT is not successful, a gentle vaginal examination should be performed. If the placenta can be felt protruding through the cervix, it should be grasped with the fingers and steadily withdrawn from the uterus, which should be supported through the abdominal wall by the other hand (to prevent inversion of uterus).

- If the placenta cannot be delivered, MRP should be done after adequate resuscitation and with use of appropriate analgesia (Inj. Pethidine 100mg IM before procedure), if Anaesthesia is not available. Experienced staff should attempt MRP.
- Following MRP, continue IV infusion of oxytocin as in uterine atony
- Use of prophylactic broad spectrum antibiotics:
 - IV inj Ampicillin 1g 6 hourly and Metronidazole 500 mg IV 8 hourly.
- Continue observing for excessive vaginal bleeding after MRP
- Refer to the nearest Com-EmOC center if MRP fails with
 - Catheter
 - Syntocinon drip and medical escort

3.3.4 Management of PPH due to Genital Tract Trauma

- Resuscitate the patient
- Group and cross match 2-3 units of blood
- Start blood transfusion if needed
- Insert catheter for continuous bladder drainage
- Place the patient in lithotomy position
- Find the source of bleeding
- Vulval haematoma – explore/ evacuate or secure haemostasis under anaesthesia in the operating theatre
- If necessary suture tear/ lacerations immediately
- Pack the vagina if necessary with dry sterile gauze
- Check vital signs and observe general condition and further bleeding
- Institute broad spectrum antimicrobial or antibiotics
- Estimate cumulative blood loss, at this stage
- Observe for Remove vaginal pack (if in situ) after 8-24 hours

MANAGEMENT OF PRIMARY PPH IN A EQUIPPED HOSPITAL SET UP

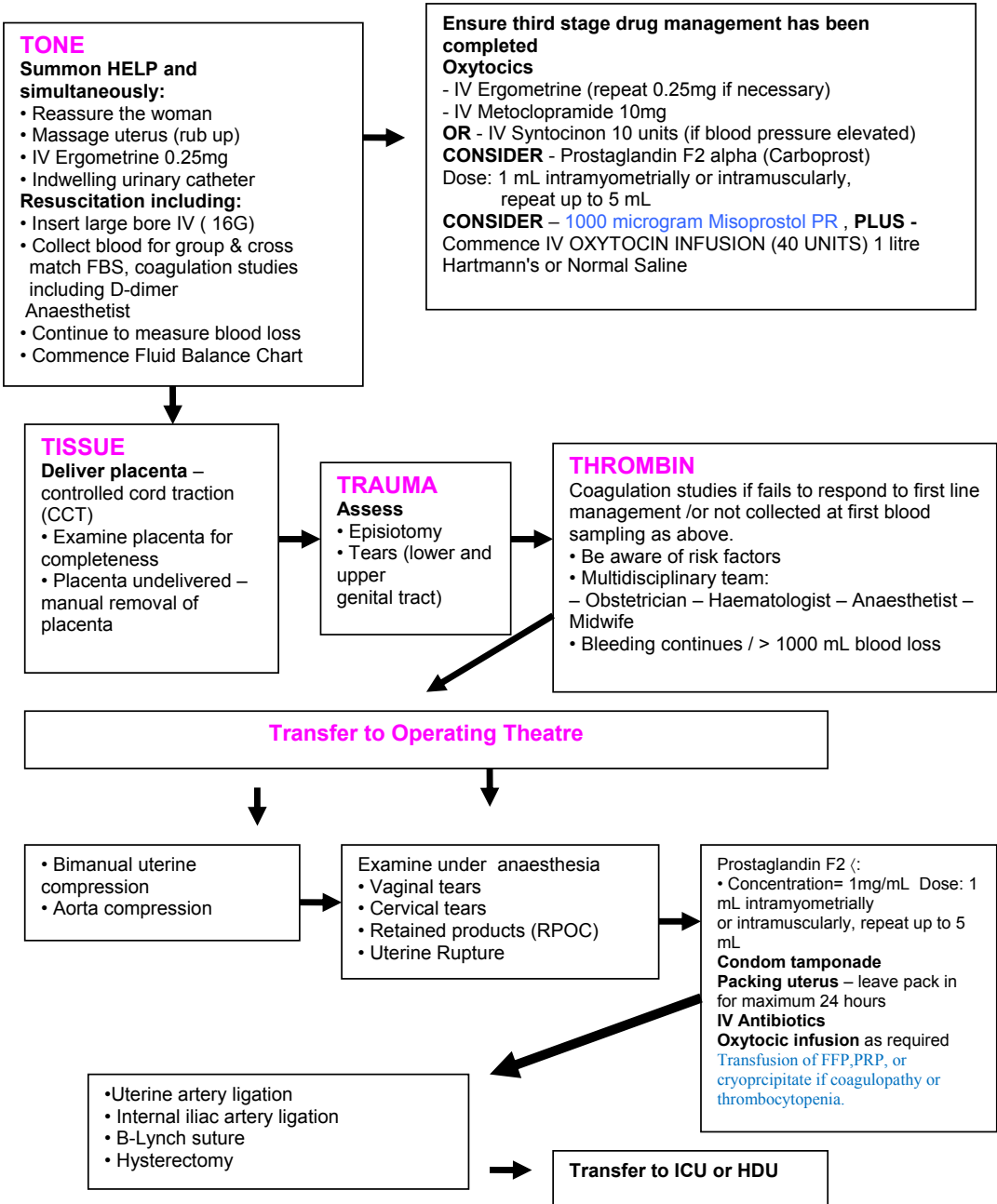


Fig.5.1 : Algorithm for Management for Primary PPH

DURING TRANSFER OF CASES BETWEEN FACILITIES

- i. Continue resuscitation.
- ii. Perform aortic compression with vaginal packing. Release once every 15 mins for 1min till you reach to the center
- iii. Continuous observation and monitoring of vital signs.

MANAGEMENT OF SECONDARY PPH

General measures

- Admit patient to the hospital.
- Start broad spectrum antibiotics after taking blood culture and high vaginal swab (HVS) for culture
- Perform ultrasound scan to rule out retained products of conception.
- Ask for coagulation test and other investigations
- In hospital without specialist start general resuscitative measures before transferring the patient to hospital with specialist.
 - if excessive bleeding persists, give IM Syntocinon 10 units and 40 IU in 500ml NS drip @ 20 dpm
 - IV Methergin if necessary during transfer
 - Continue resuscitation during transit

Specific measures:

- Adequate resuscitation with blood transfusion to correct anaemia.
- Continue IV antibiotics until afebrile and change to oral for 5 days
- Exploration and evacuation of products of conception after 6 to 8 hours of antibiotic therapy.
- If bleeding is excessive, consider emergency examination under anesthesia or evacuation after adequate resuscitation and initiating antibiotic therapy.

It is recommended that all hospitals should have a system for rapidly calling on the services of all personnel, including blood bank and anaesthesia staff in an emergency situations.

SECTION 6: MANAGING PPH IN HOME (IN EMERGENCY) AND BHU DELIVERIES

Majority of the maternal deaths in Bhutan have taken place at home from PPH. When a staff is called to attend a case of PPH in *an emergency situation*, he or she must be fully prepared to deal with the situation. The response must be very prompt and appropriate to prevent a maternal death.

Immediate measures

- Call emergency obstetric team if needed
- *Get* clear instructions for help from the center or from the next level hospital
- Keep patient flat in bed or floor without pillow.
- Massage the uterus gently
- Set up intravenous lines using large bore cannula (size 16 or 18G) and take blood for grouping and cross match in a plain test tube.
- Run one pint Hartman's/ Normal Saline solution fast within half an hour if patient is in shock or at 40 drops per minute if the condition is stable.
- Give IM oxytocin 10 IU and repeat if necessary.
- Consider nipple stimulation or put the baby to breast if you have nothing in hand

Quick Assessment

- Colour (e.g. pallor, cyanosis)
- Blood pressure, pulse rate and respiration rate.
- Palpate for the uterus eg. size, consistency, contractility.
- Check the bladder and catheterize if necessary.
- If placenta is delivered, examine carefully the placental membranes and its cotyledons to ensure its completeness.
- Assess the amount of blood loss. Estimates used are:
 - 1 tampon fully soaked = 30 ml
 - 1 sanitary pad fully soaked = 120 ml
 - 1 piece of cloth fully soaked = 500 ml

PPH due to uterine atony

- Repeat Syntocin (oxytocin) 10 IU IM
- If bleeding continues, minimize further bleeding by doing the following procedures:
 - continue massaging the uterus
 - external compression of uterus / bimanual external compression
 - aortic compression
 - Condom tamponade
- Keep patient warm with blankets.
- If bleeding doesn't stop, consult District Hospital/Com.EmONC centre and arrange for **URGENT REFERRAL** to the hospital by land or air

PPH due to genital tract trauma

Uterus is well contracted and the patient is still bleeding suspect genital trauma and carry out the following:

- Examine the vulva, perineum and lower vagina for tears.
- If there is a first and second degree tear, suture with catgut # 2/0.
- If there is third and fourth degree tears, pack the tear with roller gauze and keep the patient on the lateral side.
- Put a catheter and start in Ampicillin 1g IV stat
- **Transfer** the patient to hospital.

PPH due to Retained Placenta

- If the placenta is retained within the vagina, it can be safely removed manually
 - Check for its completeness
 - May need to repeat IM syntocin if the uterus is soft (not contracted)
- If the placenta is morbidly adherent as evidenced by the absence of placental separation and the patient is stable carry out the following:
 - Leave the placenta in situ
 - Arrange and transfer to nearest Com-EmONC center
 - Keep patient warm
 - Maintain the intravenous line
 - Catheterize the bladder

- Continue monitoring the patient during transfer and document with timing
- If the patient is in shock institute the following measures:
 - Keep the airway open
 - Maintain the IV infusion with double lines with 16/18G cannula
 - Keep patient warm
 - Elevate the legs
- **Transfer** the patient immediately to the comprehensive EmONC center after stabilization with medical escort by land or air

NOTE: Signs that the woman is improving includes a rising blood pressure (aim for a systolic blood pressure of at least 100 mmHg or more) and a stabilizing heart rate (aim for pulse below 100 beats per min).

MANAGEMENT OF SECONDARY PPH AT HOME/BHUs

- The staff must monitor the following:
 - Temperature
 - Blood pressure
 - Pulse rate
 - Respiratory rate
 - Check for involution of uterus
 - Examine lochia
 - Check history from the mother for any persistent fresh bleeding
- Management of Secondary PPH at Home or ABC
 - Assess the patient's general condition
 - Set up IV infusion using large bore cannula size 16/ 18G
 - Transfer the patient immediately after stabilization to hospital
 - Continue to monitor the patient's vital signs while in transit to hospital

Good speed of response and timely intervention including timely referral is the only way to save the mother dying from PPH

SECTION 7: REFERRAL PROCEDURES AND DOCUMENTATION

INTRODUCTION

Cases of PPH should be referred to the nearest hospital for further management with **SPEED**.

THE SYSTEM OF REFERRAL is as follows:

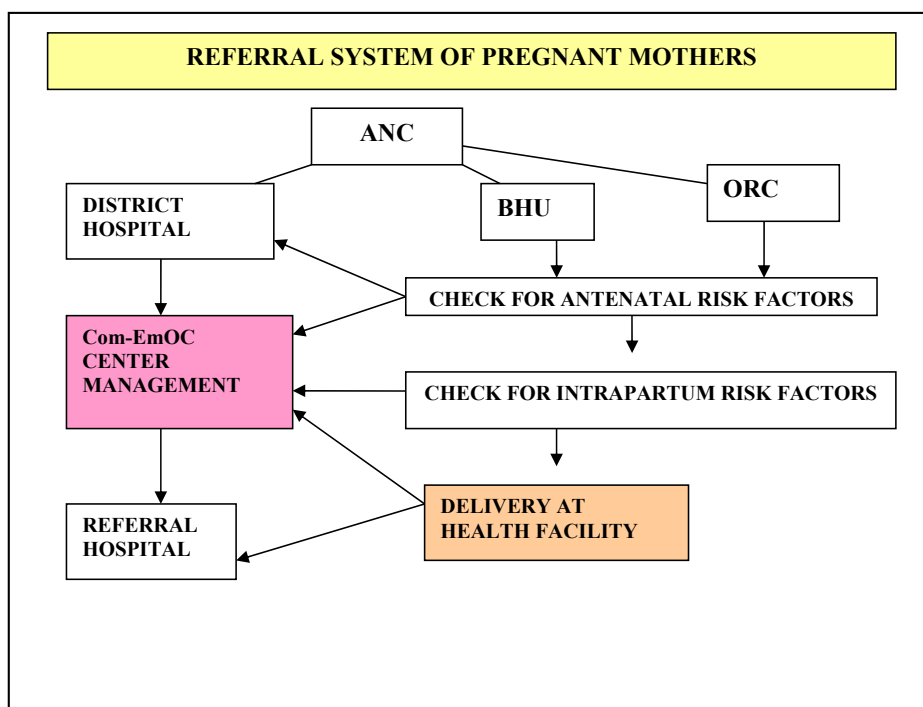


Fig 7.1 Flow chart of Referral System

PREPARATION FOR TRANSFER OF CASE

The ultimate patient outcome may depend on the care of these patients before and during transport.

Recommendation are:

- Call for the Emergency Obstetric Team if needed
- Stabilize patient

- Arrange for the quickest means of transport to send patient to the com-EmONC centre by land or air
- Inform the nearest hospital to alert the hospital staff
- Do not give any food or drink to the patient
- Arrange for husband or close relative to accompany the patient
- Always take the patient to the nearest health centre or hospital for further resuscitation and management
- Never leave the patient alone
- Continue monitoring the vital signs while waiting for the transport
- **Telephone** communication between the referral and receiving hospitals is vital. Treatment and advice can be given to the referring doctor to stabilize and management during transfer.
- **Identify** skilled nursing staff to accompany the patient.
- **Continue resuscitation:** The principle is to resuscitate and stabilize the patient as far as possible before transportation and continue same till you reach the next center. This includes fluid resuscitation, maintaining airway and maintaining ventilatory support if available and is needed. All lines must be well secured including splinting to prevent accidental dislodgement.
- **Equipment and supplies:** Take all essential equipment and supplies as IV fluid, blood, oxytocin and antibiotics. (see Appendix II)

WHERE TO REFER

The place of referral will depend on the suspected cause of PPH in the patient.

- If the condition can be managed by staff at the district hospital without specialist, then the patient must be referred to the nearest district hospital or BHU-I.
- If the condition requires surgical intervention then the patient must be referred directly to the nearest Com-EmONC center.
- If the patient requires tertiary care, then referral must be made to the nearest referral hospital.

HELICOPTER REFERRAL SERVICE

- Where the distance is very far or takes days to reach, Chopper service may be requested during day time if the weather is good.
- PPH needing emergency management is an indication for chopper service. Other indications are labor with abnormal presentation, multiple pregnancy in labour, cord prolapse, APH, ruptured ectopic pregnancy and eclampsia.
- Before referral, patient should have IV line, indwelling catheter, oxytocin drip in case of PPH
- One attendant and one medical escort
- Estimated weights of the patient, attendant and medical escort are needed before calling air service
- Patient should be taken to the nearest referral Hospital with gynecologist and blood bank facilities

USE PPH TRANSFER SHEET

- Fill this form properly and take along with the patient. If any extra-procedure/ intervention is done on the way, it must be communicated to the receiving staff at the next level.

DURING TRANSFER

- Maintain stability of patient, oxygen and running IV drips
- Constant monitoring and documentation of patients condition and treatment
- If an acute problem arises stop the vehicle to carry out resuscitative measures or divert to the nearest health facility for further supportive management.

Table 7.1 Care during transfer of patient with PPH

Maintain	Use
Contraction of uterus	Fundal massage Bimanual compression of the uterus or aortic compression; repeat oxytocin 10 IU IM, if necessary
Empty bladder	Self-retaining catheter
Blood volume	IV fluids
Observation of condition	Check colour, pulse, blood pressure, blood loss, level of consciousness, check blood clotting time
Warmth of patient	Blankets
Accurate records	Charts, notes
Relatives prepared to give blood should accompany the patient	

ON ARRIVAL

- Ensure safe disembarkation
- Hand over to the appropriate person with all documents/notes
- Explain any important relevant points not documented in notes

"Prompt referral can save lives. However, patients must be stabilized before transfer and treatment continued during transfer".

SECTION 8: MANUAL REMOVAL OF PLACENTA

DIAGNOSIS

The placenta is considered retained if it is not delivered within 30 minutes after delivery of the fetus.

PREPARATION FOR MRP

Take blood for typing and cross-matching and for haemoglobin level if it has not been done already.

- Start IV drip, either Ringer lactate or Normal saline if not done already.
- If available grouped and cross matched blood, check Hb and give blood if needed
- Give oxytocin 10IU IM and start oxytocin infusion of 40 units in 500 ml Normal Saline at 40-60 dpm.
- Institute general resuscitative measures if patient is in shock.
- Catheterize the patient
- Give inj Ampicillin 1g IV 6 hourly (1st dose after skin test) with IV Metronidazole 500mg 8hourly ,if available, before procedure
- **Explain the intervention and reassure the patient and her guardian**
- Equipment and Supplies
 - Antiseptic solution (e.g. Savlon/Povidone)
 - 2 pairs of sterile gloves
 - RL or NS and Blood if available
 - Analgesic
 - Oxytocin, Methergin, antibiotics
 - Delivery pack
 - Foleys Catheter
- **ANALGESIA:** Analgesic such as inj pethidine 1mg/kg IM.

PROCEDURE

- Place patient in lithotomy position. Catheterize and empty the bladder if not done.
- Administer analgesic or anesthetic agent if required.
- Clean vulva and perineum with an antiseptic solution.
- Wash and scrub your hands and arms well.

- Put on short sterile gloves first after gowning. Then, on the hand that will be inserted into the vagina, put on a second pair of gloves (in future we may have supply for **long sterile gloves**) on top of the first one. This will reduce contamination.
- Introduce one hand in the shape of a cone (by drawing the fingers and thumb together) into the vagina, while the other hand holds the umbilical cord. By gentle rotation, go through the cervical os into the uterine cavity. Follow the cord until you find the placenta. (see fig 8.1)

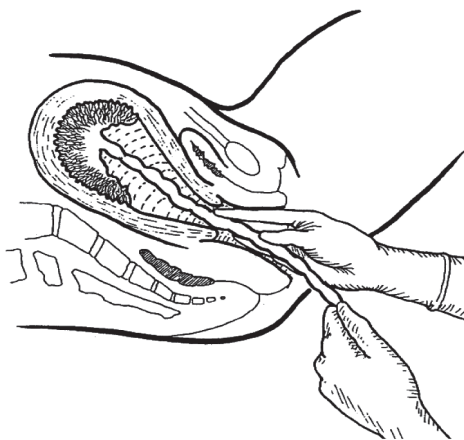


Fig. 8.1: Manual removal of the placenta: introducing one hand into the vagina along the cord

- Let go of the cord with the other hand and grasp the fundus of the uterus through the abdomen. This will stop the uterus from moving and help keep the uterus contracted (Fig. 8.2)

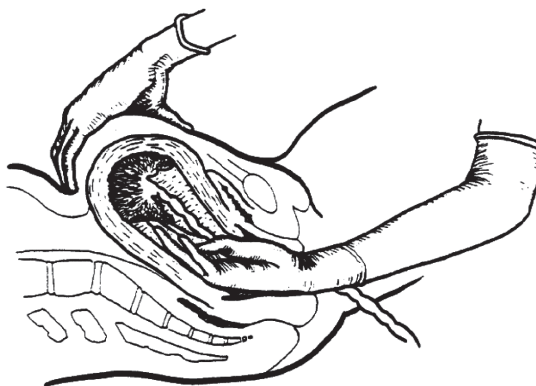


Fig. 8.2 Manual removal of the placenta: grasping the fundus with the other hand, while detaching the placenta by a sideways slicing movement of the fingers

- Reach the placenta and find its edge. Slip the fingers of your hand between the edge of the placenta and the uterine wall. With your palm facing the placenta, use a sideways slicing movement to gently detach the placenta.
- When the placenta is separated into the palm of your hand, rub the fundus for contraction with the other hand.

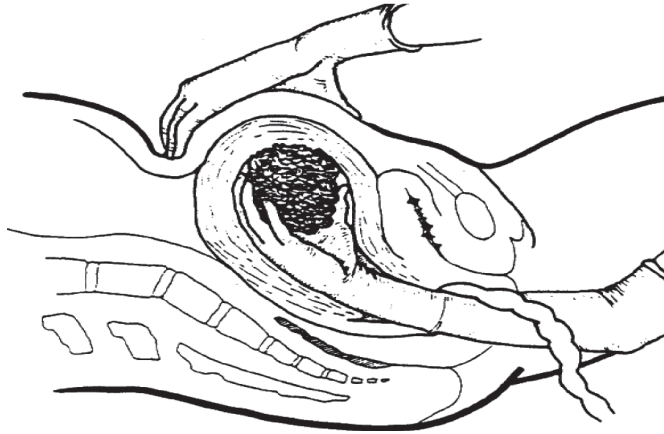


Fig 8.3: Manual removal of the placenta: placenta in palm of hand

- Gently withdraw the placenta with your hand during the contraction. Do not pull as it may tear from the rest of the placenta.
- The membranes will follow the delivered placenta. Pull them out slowly and carefully as they might tear off and be left in the uterus giving rise to haemorrhage or infection.
- Explore the uterine cavity with your hand for any remnants of the placenta or the membranes.
- Examine the placenta and check for its completeness (see fig 8.4)

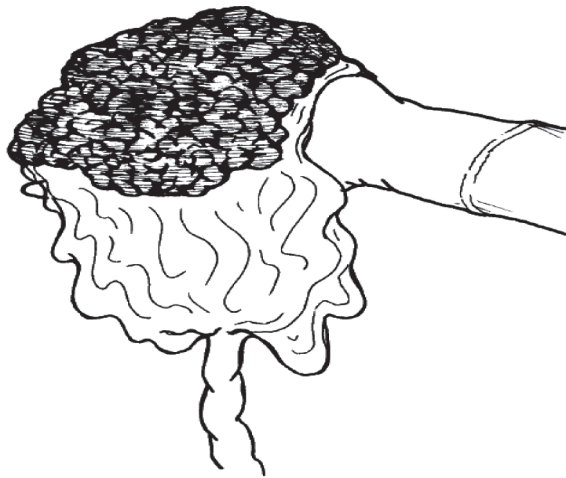


Fig. 8.4: Manual removal of the placenta: examining the placenta for completeness

- Rub the uterus to make sure it is contracted.
- Maintain 40 units of Syntocin in 500 ml of normal saline at 40 dpm to help the uterus contract.
- Examine the genital tract for tears/ lacerations
- If there are still retained pieces of the placenta and the woman needs curettage, transfer her to a facility where this service is available.

CARE AFTER MRP

- Monitor the woman's pulse, blood pressure, respiration and check the amount of vaginal bleeding every hour or more frequently depending on the patient's condition, until normal.
- When applicable, correct dehydration or shock by giving intravenous fluids and blood.
- Administer a broad spectrum antibiotic of combination of inj Ampicillin 1gm iv and Inj Metronidazole 1 bottle (500mg) IV at induction of anesthesia and 1 dose 6 hours later.
- Start IV infusion of oxytocin 40 units in 500 ml Normal saline at (40– 60 dpm) for 4-6 hours to ensure uterus remains contracted.
- If required, give an analgesic such as paracetamol to ease abdominal pain.

SPECIAL CASE

Mothers with the following problems however should have the procedure carried out in hospital with specialists and with the assistance of an anesthetist.

- History of repeated retained placenta
 - Retained placenta in a patient with a previous caesarean section
 - Patients who have collapsed and require prolonged resuscitation (Obstetric shock)
-
- If patient is unstable, stabilize and may try MRP at BHU/District hospital if bleeding is severe to save the mother.
 - If bleeding is not life threatening, stabilize and arrange urgent referral to nearest Com-EmOC center by land or air.

COMPLICATIONS OF MRP

The major complications that can occur following MRP are:

- Haemorrhage and shock
- Infection and septic shock
- Injury to or rupture of the uterus
- Vasovagal syncope or cardiac arrest

Management of Haemorrhage

- Determine the cause for persistent bleeding (vaginal/ cervical tear, retained bits of placenta, ruptured uterus).
- If it is a tear, secure hemostasis. If bleeding is from a torn vessel, clamp the bleeder and tie it off. In case of atonic bleeding, initiate uterine contractions with oxytocics.
- In the case of retained bits of placenta, remove them with your hand. After you have removed them, apply bimanual compression on the uterus for 10 to 20 minutes. Give oxytocin 10 IU or Inj ergometrine 0.5 mg IM or IV.
- In case of ruptured uterus, do urgent laparotomy for repair / hysterectomy. If facility is not available, make urgent referral to nearest Com-EmOC

- In all cases give IV fluids and blood as necessary. Monitor pulse and blood pressure frequently.

Management of infection

- Any rise in temperature or chills should alert you to the possibility of infection. If you suspect infection, take a high vaginal swab and send it for culture and sensitivity if available.
- Give a combination of antibiotics
 - Ampicillin 2 g IV every 6 hours
 - Gentamicin 5 mg/kg IV every 24 hours
 - Metronidazole 500 mg IV every 8 hours
- Continue antibiotics until fever-free for 48 hours. If fever still present after 72 hours, refer for re-assessment and appropriate treatment

Management of Ruptured uterus

- Women with retained placenta may have injury to the uterus from an unsuccessful attempt to remove the placenta.
- Injury to the uterus can be caused by rough handling of the uterus during manual removal of the placenta.
- If the woman has had a previous curettage, a previous caesarean section or uterine operation, there may be weak areas on the uterine wall, making it susceptible to rupture.
- Rupture of the uterus requires immediate laparotomy with possible hysterectomy or repair of the tear.
- Make URGENT Referral after treating shock.
- Senior staff should go as escort.

- Use aseptic precautions during the procedure
- All intrauterine manipulations should be carried out skillfully
- It is very easy to perforate the lower uterine segment if the hand is forced through the os
- It is also easy to perforate the uterine wall if forceful scratching or digging movements are made with the fingers

SECTION 9: REPAIR OF TEARS IN GENITAL TRACT AFTER CHILDBIRTH

It is sometimes seen that the uterus is empty and well contracted but the patient is bleeding profusely. In these situations, the cause is always a tear in the genital tract. If you don't repair the tear, the patient can die from bleeding.

REPAIR OF CERVICAL TEARS

- Explain the procedure to the patient/party. Anesthesia is not required for most cervical tears. For tears that are high and extensive, give inj pethidine 1mg/kg body wt. IM.
- Have a good source of light
- Put the patient in lithotomy or dorsal position
- Catheterize the bladder
- Apply antiseptic solution to the vagina and cervix
- Ask an **assistant** to massage the uterus and provide **fundal pressure to push down** (This is the secret of successful repair).
- Gently grasp the cervix with ring or sponge forceps. Apply the forceps on both sides of the tear and gently pull in various directions to see the entire cervix(see Fig.9.1) There may be several tears.

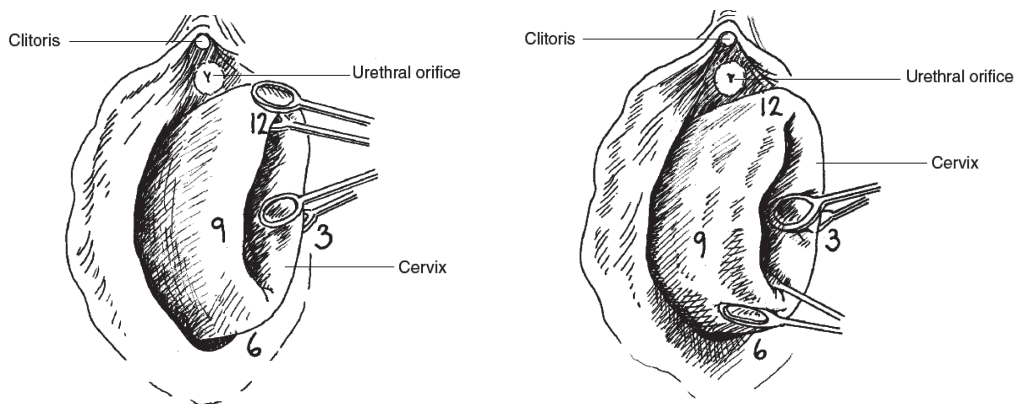


Fig 9.1 Checking tear between 12 and 3 O'clock and between 3 and 6 O'clock

- Close the cervical tears with continuous 1/0 chromic catgut or vicryl 1/0 suture starting at the apex (upper edge of tear), which is often the source of bleeding.
- If a long section of the rim of the cervix is tattered, under-run it with continuous suture.
- If the apex is difficult to reach and ligate, it may be possible to grasp it with artery or ring forceps. Leave the forceps in place for 4 hours. Do not persist in attempts to ligate the bleeding points as such an attempt may increase the bleeding. Then:
 - After 4 hours, open the forceps partially but do not remove;
 - After another 4 hours, remove the forceps completely.

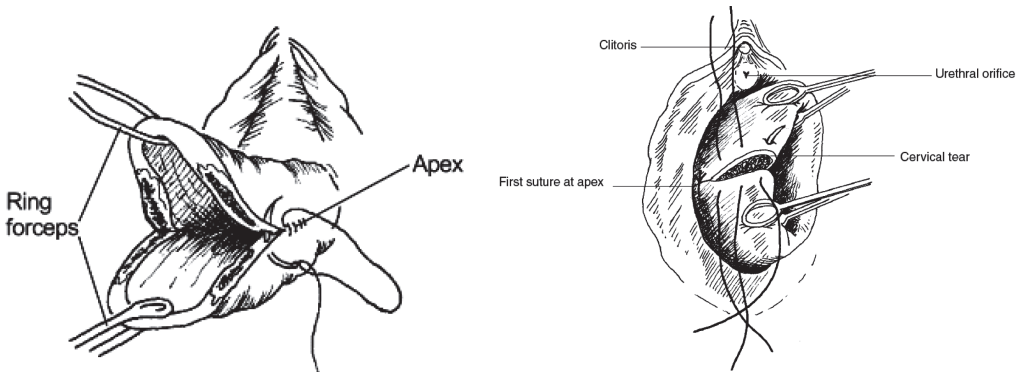


Fig 9.2 Method of catching and suturing technique

REPAIR OF VAGINAL AND PERINEAL TEARS

There are four degrees of tears that can occur during delivery:

1. **First degree tears** involve the vaginal mucosa and connective tissue.
2. **Second degree tears** involves vaginal mucosa and perineal tissue up to anal sphincter
3. **Third degree tears** involve complete transaction of the anal sphincter.
4. **Fourth degree tears** involve the rectal mucosa.

REPAIR OF FIRST AND SECOND DEGREE TEARS

Most first degree tears close spontaneously without sutures.

- Explain the procedure to the patient/party. Pain relief is required for vaginal tears repairs. For tears that are high and extensive, give inj pethidine 1mg/kg IM.
- Have a good source of light
- Put the patient in lithotomy or dorsal position
- Catheterize the bladder
- Apply antiseptic solution to the vagina and cervix
- Ask an assistant to massage the uterus and provide fundal pressure.
- Carefully examine the vagina, perineum and cervix
- If the **tear is long and deep through the perineum**, inspect to be sure there is no third or fourth degree tear:
 - Place a gloved finger in the anus;
 - Gently lift the finger and identify the sphincter;
 - Feel for the tone or tightness of the sphincter.
- Change the gloves
- If the **sphincter is injured**, see below for repair of third and fourth degree tears.
- If the **sphincter is not injured**, proceed with repair.
- Apply antiseptic solution to the area around the tear
- Infiltrate beneath the vaginal mucosa, beneath the skin of the perineum and deeply into the perineal muscle using about 10 mL 0.5% lignocaine solution (*Method: 2.5ml 2% lignocaine plus 7.5ml distilled water*)
- **Note:** *Aspirate (pull back on the plunger) to be sure that no vessel has been penetrated. If blood is returned in the syringe with aspiration, remove the needle. Recheck the position carefully and try again. Never inject if blood is aspirated. The woman can suffer convulsions and death if IV injection of lignocaine occurs.*
- After injecting lignocaine, wait 2 minutes and then pinch the area with forceps. If the **woman feels the pinch**, wait 2 more minutes and then retest.
- Repair the vaginal mucosa using a continuous 2-0 chromic suture

- Start the repair about 1 cm above the apex (top) of the vaginal tear. Continue the suture to the level of the vaginal opening;
- At the opening of the vagina, bring together the cut edges of the vaginal opening;
- Bring the needle under the vaginal opening and out through the perineal tear and tie.
- Stitch the muscle layer (chromic catgut 2/0) with interrupted suture with not much tension but only enough to appose the muscle
- Lastly, stitch the skin with interrupted suture

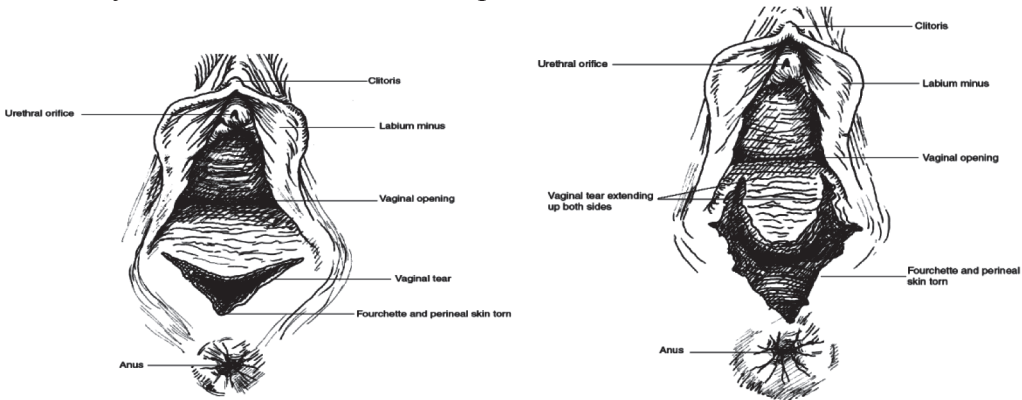


Fig 9.3 First degree tear and second degree perineal tear

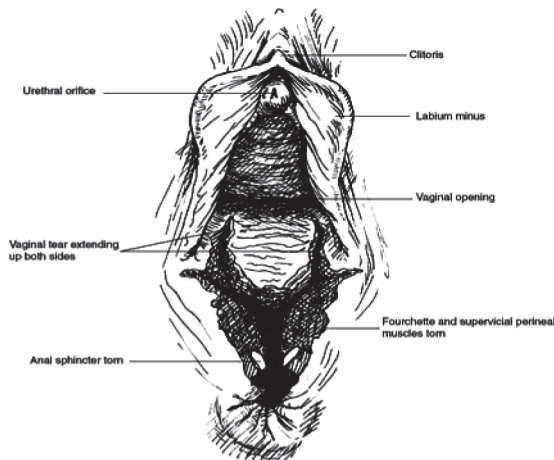


Fig 9.4 third degree tear (involves fourchette and superficial perineal muscles and anal sphincter); when the damage extends to the rectal mucosa, it is sometimes called a fourth degree tear

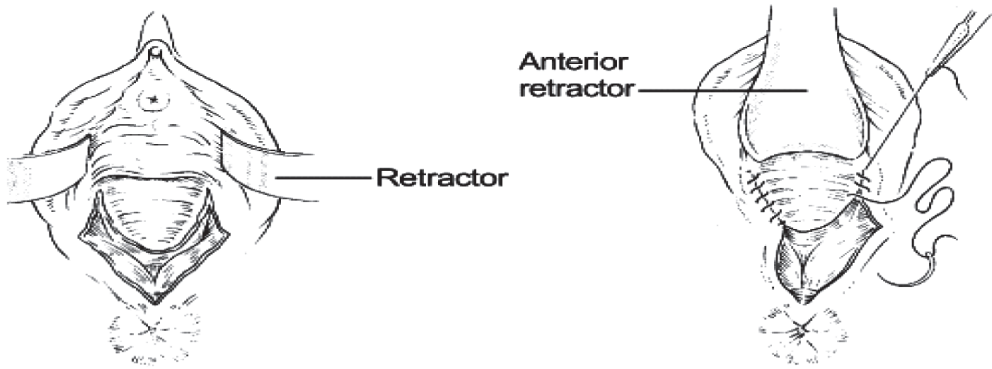


Fig 9.5 Exposing vaginal tear and Mucosa repair

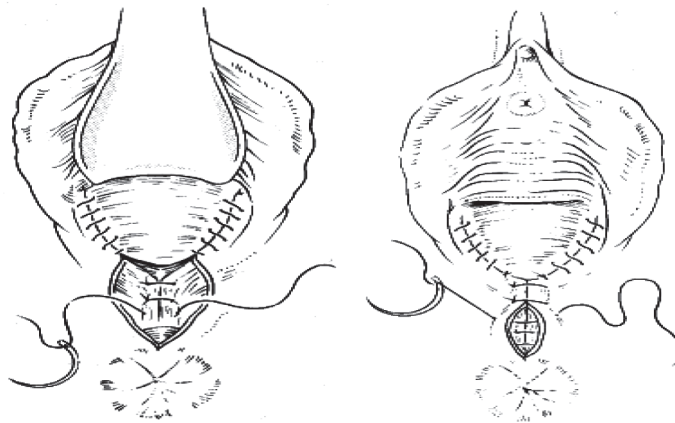


Fig 9.6 Perineal muscle and skin repair

REPAIR OF THIRD AND FOURTH DEGREE PERINEAL TEARS

*Note: The woman may suffer loss of control over feces and flatus if a torn anal sphincter is not repaired correctly. If a **tear in the rectum is not repaired**, the woman can suffer from infection and rectovaginal fistula (passage of stool through the vagina).*

If possible repair must be done in the operating room set up.

- Explain the procedure to the patient/party.
- Have a good source of light
- Put the patient in lithotomy or dorsal position with knees bent
- Catheterize the bladder

- Apply antiseptic solution to the vagina and cervix
- The repair can be done using local infiltration of 0.5% lignocaine and IM ,1mg/kg body wt. Examine the vagina, cervix, perineum and rectum.
- To see if the anal sphincter is torn:
 - Place a gloved finger in the anus and lift slightly;
 - Identify the sphincter, or lack of it;
 - Feel the surface of the rectum and look carefully for a tear.
- Change the gloves
- Apply antiseptic solution to the tear and remove any faecal material, if present
- Infiltrate beneath the vaginal mucosa, beneath the skin of the perineum, and deeply into the perineal muscle using about 10 mL 0.5% lignocaine solution (*Method: 2.5ml 2% lignocaine plus 7.5ml distilled water*)
- *Note: Aspirate (pull back on the plunger) to be sure that no vessel has been penetrated. If **blood is returned in the syringe with aspiration**, remove the needle. Recheck the position carefully and try again. Never inject if blood is aspirated. **The woman can suffer convulsions and death if IV injection of lignocaine occurs.***
- After injection of lignocaine, wait 2 minutes and then pinch the area with forceps. If the **woman feels the pinch**, wait 2 more minutes and then retest.
- Repair the rectum using interrupted 3-0 or 4-0 catgut/ vicryl sutures 0.5 cm apart to bring together the mucosa. Place knot inside cavity.
- **Remember:** Place the suture only through the muscularis (not all the way through the mucosa).
 - Cover the muscularis layer by bringing together the fascial layer with interrupted sutures;
 - Apply antiseptic solution to the area frequently.

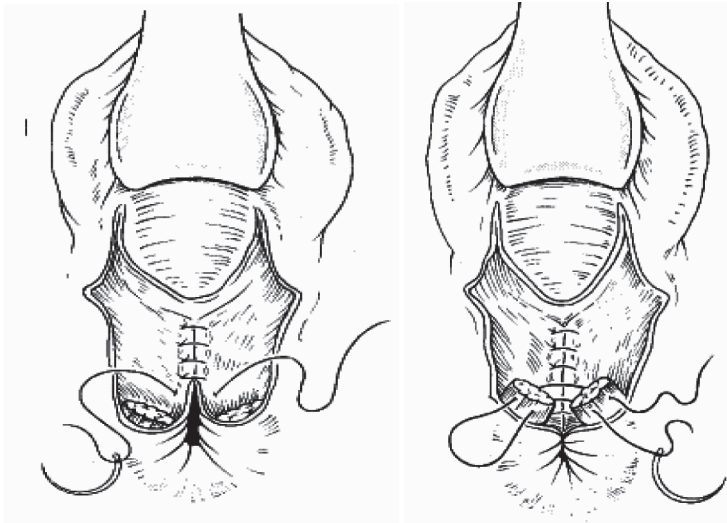


Figure 9.7: Suturing of muscle wall of rectum and anal sphincter repair

- If the **sphincter is torn**:
 - Grasp each end of the sphincter with an Allis clamp (the sphincter retracts when torn). The sphincter is strong and will not tear when pulling with the clamp
 - Repair the sphincter with two or three interrupted stitches of 2-0 suture. Not necessary for figure of 8 stitch.
- Apply antiseptic solution to the area again.
- Examine the anus with a gloved finger to ensure the correct repair of the rectum and sphincter. Then change the gloves.
- Repair the vaginal mucosa, perineal muscles and skin as described above

POST-PROCEDURE CARE FOR THIRD AND FOURTH DEGREE TEAR

- If there is a **fourth degree tear**
 - Liquid diet for 48 hours and give
 - Amoxicillin 500 mg by mouth TDS for 5 days
 - PLUS metronidazole 400 mg by mouth TDS for 5 days.
- Advice for semi-solid soft diet for 3 to 4 days
- Follow up closely for signs of wound infection.
- Avoid giving enemas or rectal examinations for 2 weeks

PARA-UETHRAL TEAR

Sometimes when the fetal head is delivered in extension, there can be bilateral para-urethral tears. These tears can bleed severely.



Fig 9.8 to show sites of paraurethral tear

- Explain the procedure to the patient/party.
- Have a good source of light
- Put the patient in lithotomy or dorsal position
- Catheterize the bladder
- Apply antiseptic solution to the vagina and cervix
- The repair can be done using local infiltration with lignocaine and inj pethidine 1mg /kg body wt or Inj diazepam 10mg IV slowly (do not mix in the same syringe).
- Repair with 2/0 chromic catgut

COMPLICATIONS OF TEAR REPAIRS

Early complications

1. *Bleeding*

It may occur if the blood vessels have not been ligated properly. Prevent this by carefully ligating the bleeding points while suturing. Make sure that the bleeding is not coming from an atonic uterus.

2. *Haematoma*

This is a collection of blood in the vaginal wall that commonly occurs as a complication of vaginal injury. It may be present with vaginal or vulval swelling or intense pain and retention of urine. Prevent it by carefully ligating the bleeding

points while suturing. If the haematoma is large and painful, it should be incised and drained under analgesia. The bleeding points should be ligated and deep interrupted sutures applied to close the cavity. In difficult situations you can ligate the main bleeding points and then pack the area with gauze and apply pressure bandage.

3. Retention of urine

Keep catheter for few days in case of 3rd and fourth degree perineal tear. In other cases the woman should be encouraged to void frequently. If she is unable to void urine on her own, an indwelling catheter may have to be inserted to avoid straining.

4. Infection

This is a common complication and may be avoided by using an aseptic technique to repair the tear. If the wound becomes infected, the sutures may have to be removed and allow the wound heal by secondary intension. Take swab for culture if facility is available. Give antibiotic and analgesic for 5 to 7 days.

Late complications

- 1 Scarring and vaginal stenosis (narrowing) may occur in neglected tears of the vagina and may cause pain during intercourse and obstructed labour in subsequent deliveries.
2. Cervical scarring due to an un-repaired cervical tear may lead to prolonged labour in subsequent pregnancies because the cervix may not dilate properly.
3. Vesico-vaginal, vesico-cervical or recto-vaginal fistulae can occur if vaginal or cervical tears extend into the bladder or rectum.

Don't practice the skills of repair on the patient in an emergency. Being prepared in advance is very important to a make difference in saving lives. learn the techniques in advance.

SECTION 10: DIFFERENT METHODS TO MANAGE PPH

INTRODUCTION

The traditional approaches to PPH management utilizing a stepwise method depending on where the event occurs, has been highlighted in the preceding chapters of this manual. One needs to consider alternatives in the usual approach even before the occurrence of postpartum haemorrhage. This chapter considers some of the recent views and practices in managing this obstetric catastrophe.

UTEROTONIC AGENTS IN PPH

- 1 Oxytocin** 10 IU is the recommended dose whether given intravenously or intramuscularly is recommended. The use of bolus injections of undiluted oxytocin in hypotensive patients is discouraged because of the risk of cardiac arrhythmias and cardiac arrest. Alternative is to give by IV drip infusion 40mg IU in 5% NS/RL.
- 2 Ergometrine** is available in district hospitals and should be used if oxytocin is ineffective. The use of IM/intramyometrial PGF-2 alpha 250 microgram (Carboprost) has been in practice in the country for some years now. But it is only available in referral hospitals.
- 3 Misoprostol** is available in referral hospitals used for other conditions. Success has been reported in literature with Misoprostol. For prophylaxis the dose is 600 Mg sunlingually or per-rectal and for treatment the dose is 800 Mg to 1000 Mg.
- 4. Teanaxamic acid** is recommended for treatment of PPH if Oxytocin and other uterotonics fail to stop the bleeding or if the bleeding is partly due to extensive tear or trauma. It works as antifibrinolytic agent. Dose is 1g IV slowly and may repeat another dose after 30 minutes if bleeding persists.
- 5. Injection Carboprost (15-methyl-PGF₂α)** use if available.
 - IM of 0.25mg, repeat every 15 minutes to maximum of 2.0 mg or total of 8 doses.
 - Intramyometrial injection of 0.5 mg by the obstetrician.

Table 6: Comparison of uterotonics

PARAMETERS	DRUGS		
	Oxytocin	Ergometrine	Misoprostol
Efficacy	Drug of choice Highly effective	Effective	Less effective than oxytocin
Response time	Acts in 2–3 minutes	Acts in 6–7 minutes	Time to attain peak concentration 13–42 min
Route of administration	Injection (IM/IV)	Injection (oral less effective and unstable)	Oral (3 x 200 µg pills or 600 µg) Rectal (600- 800 µg)
Side effects	Minimal	Nausea vomiting	<ul style="list-style-type: none"> ▪ Shivering ▪ Fever
Storage	3 months at room temperature (30 ° C)	Cold storage Light sensitive	Room temperature Sensitive to humidity

MECHANICAL METHODS

- **Manual compression of aorta**
- **External Bimanual Compression**
- **Internal Bimanual Compression**
- **Uterine packing**
- **Condom tamponade**

MANUAL COMPRESSION OF THE AORTA

Aortic compression is recommended when there is difficulty doing the bimanual compression to reduce blood loss in cases of PPH. With adequate training aortic compression can be done by paramedical staff as well. After the baby has been born, the abdominal wall is extremely lax and the aorta can be compressed against the backbone just under the umbilicus with very little discomfort to the patient. This will usually stop most of the bleeding. However, because of collateral circulation some bleeding will continue. If the patient is in shock, this procedure will help to ensure the blood flow is directed preferentially to the heart, brain and the kidneys - while resuscitative measures replace the blood loss. Because of the ease of this procedure and little discomfort to the patient, it is far **superior to bimanual compression** as an emergency control of bleeding. The aortic compression is done in preparation for

laparotomy or buy time for getting blood or during transfer.

Technique : Two hands should be used, one held in the groin to check for pulsations of the femoral artery, while the fist of the other is held over the umbilicus and slowly lowered towards the anterior side of the vertebral column. When the femoral arterial pulsations have vanished, the aortic compression is sufficient and the vaginal bleeding will stop.

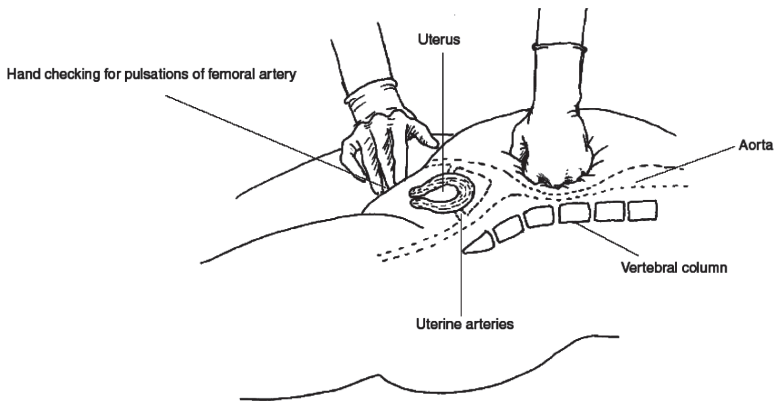


Fig. 10.1: Manual compression of the aorta

EXTERNAL BIMANUAL COMPRESSION

Bleeding from the placenta bed will not be controlled unless the uterus contracts. If the uterus does not contract after the usual procedures to empty the uterus and giving oxytocics drugs, external bimanual compression can be very helpful.

Technique :

1. Place the left hand on the fundus and make it go down as far as possible behind the uterus.
2. Place the right hand flat on the abdomen between the umbilicus and the symphysis pubis.
3. Press the hands towards each other in order to compress the blood vessels at the placenta site.

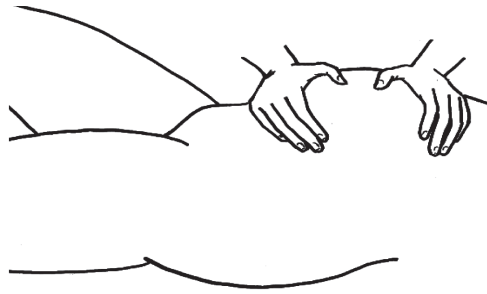


Fig. 10.2: Hand positions for external compression of the uterus

INTERNAL BIMANUAL COMPRESSION

Bimanual compression of the uterus prevents an increase in the radius of the uterus due to bleeding in the uterus and atony. Simultaneously, the uterus is pushed cephalad, which puts the uterine arteries under tension and reduces blood flow to the uterus.

Technique :

1. Wash and scrub hands
2. Use sterile gloves
3. In this procedure the left hand is placed on the fundus as in external bimanual compression. The fingers of the right hand are placed in the anterior vaginal fornix. If good pressure is not obtained and the vagina is lax, the whole fist may be inserted into vagina.

Internal bimanual compression is advisable:

- in severe haemorrhage if external compression is not effective;
- when the woman is anaesthetized;
- if bleeding persists after manual removal of the placenta.

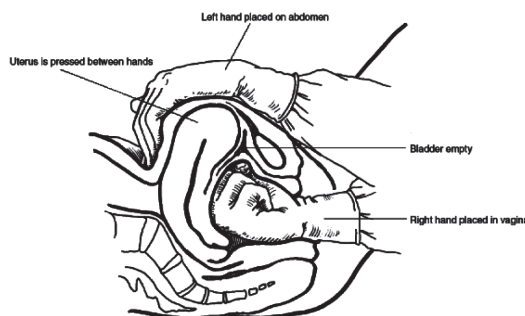


Fig. 10.3: Internal bimanual compression of the uterus

UTERINE PACKING

There has been a re-look at uterine packing since the 1990's using long ribbon gauze together with continuous infusion of syntocinon. Such procedures are best undertaken under anesthesia. The anterior lip of the cervix is grasped with a sponge holding forceps and the entire uterine cavity is packed with the help of another sponge holding forceps systematically beginning from the fundus downwards including the vaginal cavity. The patient's vital signs are monitored continuously and the pack is retained for about 24 hours. Continuous bladder drainage is maintained and antibiotic prophylaxis is instituted. Surgical intervention is needed if there is evidence of continuous bleeding or if the vital signs deteriorate. Uterine packing has been advocated for bleeding due to atonic uterus, placenta accreta and placenta previa where we need to conserve the uterus if possible.

CONDOM TAMPONADE

Since 2003, condom tamponade has been found to be very effective in low resource setting situations or when no other alternatives are available. It is very simple procedure and doesn't require expensive equipments. Compared to other methods, this method allows convenience in terms of posture and buying time for the patient to be transported to a higher hospital.

Things required

- Normal saline 1 bottle
- Sterile infusion set 1
- Sterile string 1 piece (cut silk thread)
- Sponge holding forcep 1
- Sterile gloves 2 pairs



Fig 10.4: To show equipment for condom tamponade

Technique

- 1 Join the infusion set to a bottle of NS and Have somebody to hold or use IV stand.
- 2 Under aseptic precautions put the lower free end of a IV infusion set into a condom and tie tightly near the mouth of the condom with a sterile piece of string on to the set. Run the fluid to take out air and close the regulator.
- 3 The free end of infusion set remains inside the condom
- 4 Put the patient in the dorsal position with knees bent or lithotomy position. Clean the vagina with antiseptics and clearly expose the cervix.
- 5 Put a Foley's indwelling catheter
- 6 Now insert the condom into the uterine cavity using sponge holding forceps.
- 7 Run 250-500 ml of running normal saline by external pressure to inflate the condom. Another staff or patient's attendant can help squeeze the NS bottle.
- 8 Observe for bleeding. When bleeding is reduced considerably, stop further inflation. The outer end of the tube is clamped using the regulator. The tube is cut at reasonable length and fixed to the thigh with plaster.
- 9 Tightly pack the posterior vaginal fornix with gauze packing to keep the condom in uterine cavity. If gauze is not available another inflated condom can be placed in the vagina.
- 10 Uterine contraction is maintained by oxytocin drip (40 units in 500ml normal saline @ 20- 40dpm)
- 11 Monitor her vital signs closely
- 12 If further bleeding occurs, **TRANSFER** the patient immediately to the next higher level with the condom tamponade in place.
- 13 If bleeding stops then no need for transfer but:
 - Maintain the oxytocin drip at least for 6 hours after the condom is inserted.
 - The condom catheter should be kept for 24-48 hours and then to be deflated gradually over (10-15 minutes) and removed.
 - Ensure antibiotic cover for 5days.

SURGICAL METHODS

The MDI Report 2001-2006, clearly indicated the need for prompt decisions including surgical intervention if the patient is haemodynamically severely compromised and the risk of mortality is high. In clinical practice it is common to take a conservative approach but critical decision should be made at the first instant in order not to lose time when dealing with massive PPH.

The following are the surgical methods to deal with massive PPH.

1. **Uterine +/- ovarian artery ligation**
2. **Bilateral internal artery ligation**
3. **Brace sutures**
4. **Modified B-Lynch suture**
5. **Square suturing technique**
6. **Hysterectomy**

Which Method to Use

One must be well aware of the need for rapid and continuous resuscitation of the shocked patient together with preparation and while proceeding with surgery.

During laparotomy, if bimanual compression of the uterus together with oxytocin infusion stops bleeding, then conservative surgical methods should be tried in order to conserve the uterus in a primi or woman with no living children. Otherwise, the surgeon should not lose time and go for a rapid subtotal hysterectomy.

UTERINE ARTERY LIGATION

Bilateral uterine artery ligation with or without ovarian artery ligation has been reported in literature for uncontrolled pelvic haemorrhage. Mass ligation of the uterine arteries and veins at caesarean section does not require the need for exposing the internal iliac arteries and is technically easier. Sutures are placed below the uterine incision at cesarean section including 2-3 cm of the myometrium.

INTERNAL ILIAC ARTERY

Technique

- 1 The internal iliac (hypogastric) vessel is exposed by opening the peritoneum and dissecting the reflection medially with the attached ureter.
- 2 The vessel is dissected free of connective tissue using a blunt right-angle clamp. Care is taken not to injure the underlying thin-walled iliac vein.
- 3 A double ligature of non-absorbable or Vicryl #1 is drawn under the artery and firmly tied.
- 4 Femoral and distal pedal pulses are routinely confirmed before and after ligating the vessel.
- 5 The vessel is not divided.

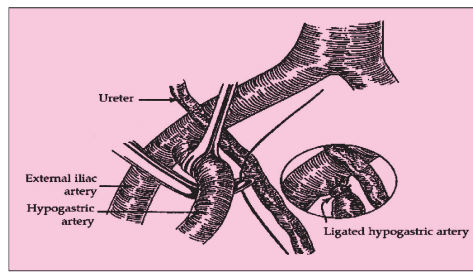


Fig 10.5: ligation of the internal iliac artery is depicted. Note that the artery is not divided.

MODIFIED B-LYNCH SUTURE

Prefessor Christopher B-Lynch first described the ‘brace sutures’ to compress and oppose the anterior and posterior walls of the corpus (uterine wall) in 1997. Success of the brace suture is predictable when bimanual compression markedly decrease bleeding. Since the initial description of the brace suturing technique by B-Lynch, the Modified B-Lynch suture technique has been introduced. This modification could also be used for bleeding from the lower segment of the uterus especially in adherent placenta previa where an isthmo-cervical stitch is inserted using vicryl No.1 suture on a straight needle puncturing the entire uterine wall anterior to posterior above the bladder. The sutures are initiated at about 3 cm below and 2 cm medial to the lower segment through to the posterior wall. This procedure is repeated on the opposite side and the sutures are tied posterior ensuring the cervical canal patency is maintained by leaving an artery forceps within the canal as the sutures are tied. To oppose the anterior and posterior walls of the body of the uterus (original B-Lynch) chromic No.2 suture on a straight needle is used placing the entry point above the horizontal suture described above.

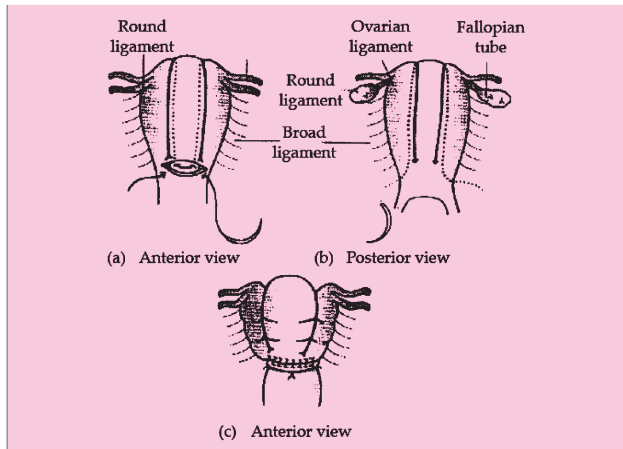


Fig 10.6: The Modified B - Lynch Suture

This brace suture is carried up over the fundus 3-4 cm medial to the cornu and tied. A similar brace suture is placed on the opposite side. This simple procedure has been successfully used for intractable uncontrolled major haemorrhage. In view of the sutures piercing the uterus through and through due care must be given to avoid injury to the urinary bladder, ureter and gut during the procedure. The concern about maintaining cervical canal patency by maintaining an artery forceps during the modified B-Lynch procedure is down played by the multiple square suturing technique.

In this procedure (multiple square suturing) sutures are knotted through the entire uterine wall including the uterine cavity around bleeding areas. Seven to eight squarely knotted sutures may be placed with atraumatic chromic No.1 sutures to stop bleeding. The procedure is taken through a step by step method 2-3 cm above and below the initial suture site avoiding hysterectomy. Follow-up of cases with multiple square sutures showed return of normal menstruation and patency of the uterine cavity at hysteroscopy.

Under-suturing of the placental bed to arrest localised bleeding areas during caesarean section for placenta previa has been in vogue for many years and is worth reminding. A thinned out lower segment may make it not possible to do under-suturing. In such situations full thickness suturing may be employed avoiding including the bladder within the sutures.

Planned surgery especially in placenta previa and placenta accreta in the presence of experienced surgeons will keep morbidity low.

Adherent bladder can retard the progress of resection during caesarean section. One should focus on the delivery of the baby and control of bleeding as the bladder is

a versatile organ which can be easily repaired. Should the bladder be in the way, it should be opened and the ureters catheterized with ureteric catheters. Any adherent bladder tissue may be shaved off with the adjoining lower uterine wall. The bladder is the reconstituted.

HYSTERECTOMY

Conservation of the uterus should be tried, and hysterectomy with adequate fluid and blood transfusion should be a last resort. However, the surgeon should not make a last minute decision, when surgery is not possible due to deteriorating condition of the patient. A judicious timely decision will have to be made to save the mother.

8.5 CONCLUSION

Appropriate methods to stop PPH should be tried in buying time for transfer of the patients to higher centers or as life saving procedures.

Suturing techniques may be employed in uterine atony in attempting to conserve the uterus. Development of expertise in performing surgery, timely intervention and a team approach in resuscitation are still the key to effective treatment. Early resort to hysterectomy in indicated cases where uterine bleeding is torrential especially in placenta previa is to be considered in developing countries like Bhutan especially in cases where there is delay in referral to a tertiary hospital. Doctors performing caesarean section need to be well versed in total or subtotal hysterectomy and ligation of the internal iliac arteries as these are essential when more conservative measures fail.

SECTION 11: FLUID REPLACEMENT IN PPH

INDICATIONS FOR INTRAVENOUS INFUSION AFTER DELIVERY

1. After a prolonged labor
2. Mother with conditions such as
 - high fever
 - delirium
 - unconscious
 - dehydration
3. Postpartum haemorrhage

GENERAL INFORMATION

- 1 **Under estimation** of fluid resuscitation of women experiencing obstetric hemorrhage is sometimes overly conservative. Possible reasons for this includes:
 - Blood loss being generally underestimated both in volume
 - Women initially compensating well for losses because of their good health and the hypervolemia of pregnancy.
 - Concerns that over resuscitation leads to pulmonary edema, and
 - Failure to appreciate the dynamics of fluid shifts in the body.
- 2 NS is a reasonable solution in the labor ward setting because of its low cost and compatibility with most drugs and blood transfusions. The risk of hyperchloremic acidosis is very low in the setting of PPH.
- 3 If large amounts (> 5 L) of crystalloid are being infused, a change to Ringer lactate solution can be considered.
- 4 Dextrose-containing solutions, such as 5% dextrose (DA) or diluted NS in 5% dextrose saline (DNS), have no role in the management of PPH.
- 5 Remember that the loss of 1 litre of blood requires replacement with minimum of 3.5 lts of crystalloid because most of the infused fluid is not retained in the intravascular space but instead shifts to the interstitial space. This shift, along with oxytocin use, may result in peripheral edema in the days following PPH. Healthy kidneys easily excrete this excess fluid.
- 6 The goal of infusing the required replacement volume should be over minutes rather than hours. PPH of blood loss up to 1500 mls in a healthy pregnant woman can usually be managed by crystalloid infusion alone if the cause of bleeding is arrested.

- 7 Blood loss in excess of 1500ml usually requires blood/pack cell transfusion.
- 8 It is now recommended that colloids infusion should not be used to correct hypovolemia in PPH.

CHOICE OF REPLACEMENT FOR BLOODLOSS

Hartman's solution (Ringer's lactate) and Normal saline are first line resuscitation fluids. A rule of thumb is to infuse 1000 ml of Ringer's lactate which will raise the plasma volume by 200ml as about 80 % will be in the extravascular space.

1. Crystalloids followed by packed cells (red blood cells) are indicated where blood loss is estimated to be >40 % of the total blood volume (average blood volume in pregnant female is 4.5 to 5L).

BLOOD TRANSFUSION

2. Un-cross matched Group 'O' Rhesus Negative red blood cells is only considered in torrential blood loss where access to group specific blood is not possible within the required time.
3. Blood transfusion is the ideal replacement for blood loss. It should be started at the earliest. Blood products (fresh frozen plasma, cryoprecipitate, platelets and red cells) are available only in referral hospitals and protocols must be followed for their use. Clinical evaluation and empirical use is justified in severe PPH.
4. Order blood transfusions if loss is in excess of 2000 ml or if the patient's clinical status reflects developing shock despite aggressive resuscitation.
5. With Active Management of third stage of labor 1 in 16 women experiencing PPH requires a blood transfusion. If expectant management is used 1 in 9 requires a blood transfusion.
6. In real emergency; uncross matched O-negative can be given for catastrophic bleeding.
7. The goal is to rapidly transfuse 2-4 Units of packed cells to replace lost oxygen-carrying capacity and to restore circulating volume by crystalloids.
8. Use a blood warmer if the infusion rate (>100 mL/min) or the total volume infused is high. PRBCs are very viscous; 100 mL of NS to each unit can be added to run fast.

9. Risk of blood transfusion must be taken care. (Refer National Blood Transfusion Guide)
10. As hypothermia increases the risk of caugulopathy, the use of blood warmers is recommended while going for massive blood transfusion.
11. Drip rate calculation is shown in the table belowas

Table 11.1 to show drop rate calculation

Amount of fluid	Time period	Drops per cc (type of tubing)	Drops per minute
1 litre	20 minutes	10	Too fast to count
1 litre	20 minutes	20	Too fast to count
1 litre	4 hours	10	40
1 litre	4 hours	20	80
1 litre	6 hours	10	28
1 litre	6 hours	20	56
1 litre	8 hours	10	20
1 litre	8 hours	20	40

In general, the formula to figure out any IV infusion rate is as follows:

$$\frac{\text{Amount of fluid given (cc)}}{\text{Time for Infusion to occur (minutes)}} \times \text{No. of drops per cc} = \text{No. of drops per minute}$$

In order to convert the time period from hours to minutes, multiply the number of hours by 60. This will give the number of minutes over which the IV fluids are to be given.

THINGS REQUIRED FOR SETTING UP AN IV INFUSION

1. IV drip set - 2 sets
2. Cannula size 16 and 18G – 2 each
3. Spirit swabs
4. IV RL/NS solution - 6 pints
5. Utility Gloves - 2 pairs
6. Sterile gauze - 2 pieces
7. Plaster
8. Tourniquet
9. Splint 8" x 3" - 1 unit
10. Bandages 2" - 2 rolls
11. Scissors
12. Kidney tray 6" – 1 no
13. Small gallipot (30 cc) - 2 nos
14. Dry cotton swabs in a container

PROCEDURE ON INTRAVENOUS INFUSION USING CANNULA

1. Explain the procedure to mother/next of kin. Make the mother comfortable
2. Wash hands
3. Get ready IV drip stand set up IV drip
4. Hang up the IV solution bottle
5. Fill half the chamber with fluid loosen the clip slowly
6. Let the solution flow along the tube to expel the air
7. Close the drip regulator
8. Expose the arm for IV infusion
9. Apply tourniquet on the upper arm/ at the wrist
10. Put on gloves
11. Identify suitable vein
12. Clean the infusion site with spirit swabs
13. Take a 16G or 18G IV canula
14. Introduce the canula into the vein. Release the tourniquet
15. Remove needle from cannula sleeve/sheath
16. Remove the cap of the tubing
17. Connect the IV tubing to the canula
18. Open the regulator clamp and adjust the drops rate
19. Secure the canula with plaster on the hand or arm
20. Ensure that mother is comfortable
21. Maintain intake output chart.
22. Clean up the area.

Note

1. To ensure that the needle is in the vein, ensure that there will be blood mixed in the tube.
2. Ensure that the flow is according to the rate required.
3. Ensure that there is no swelling at the infusion site.

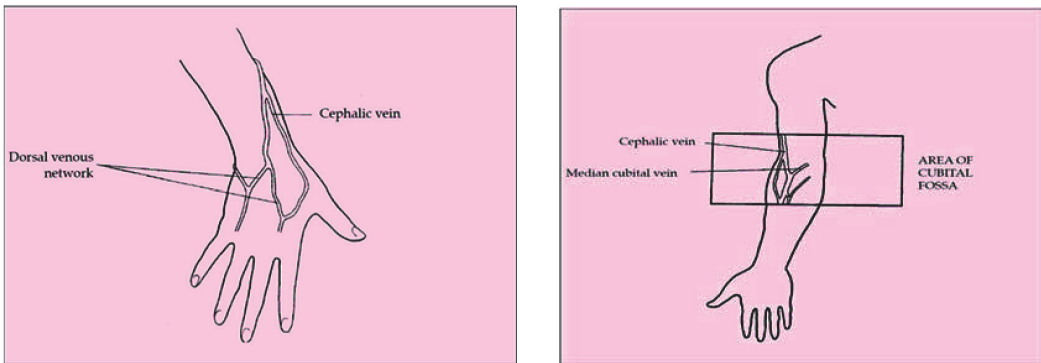


Fig. 11.1: Important veins on back of the hand and cubital fossa

CARE OF THE PATIENT WITH IV INFUSION

1. Continuous observation of the mother
 - Blood pressure
 - Pulse
 - General condition
2. Ensure that the drip is flowing at the required rate.
3. IV infusion site should not be swollen.
4. Stop the IV infusion immediately if the site is swollen and change site
5. Disconnect the tube and release the air if there are any bubbles in the tubing.

GUIDELINES ON CARE OF IV SOLUTIONS AND IV SET

1. Arrange the solutions according to the types and label them in the cupboard.
2. Use the first indented solution first (First in first out).
3. Check the expiry date and check solutions for any cloudiness or change of color when receiving new supplies.
4. Store in cool dry place and away from sunlight (never in the fridge)
5. Make sure that there is no leakage from the bottles before use.
6. Store the IV solutions properly.
7. Check the expiry date before using.

SECTION 12: EMERGENCY: VENOUS CUT-DOWN MAKING AN IV ACCESS

In an emergency situation, this is the last resort to save the life. This procedure should not be left only to surgeons and gynecologist. It should be tried by all Medical officers at district level when situation demands.

Indications

When no other intravenous sites are available for the insertion of percutaneous cannula and the operator is not experienced in central vein cannulation.

Precautions

Before commencing, check that the necessary equipment is available. All hospitals must prepare and keep pre-packed cut-down packs ready for emergency.

Venous Cut-Down Pack

- Small curved artery forceps 2
- dissecting forceps 1
- scissors 1 pair
- scalpel 1
- Blade 1
- needle holder. 1
- Silk suture 1

Sites

1. Medial malleolus: the long saphenous at the ankle joint
2. The wrist : use the cephalic vein
3. Ante-cubital fossa: use either the median or cephalic vein

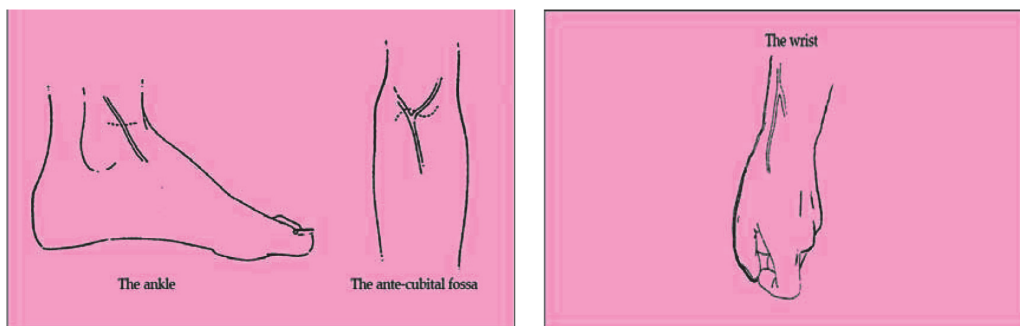


Fig 12.1 Site for venous cut down are Ankle joint, Antecubital fossa and the Wrist joint

TECHNIQUE

- Shave the area, cleanse the skin with an antiseptic solution and apply tourniquet proximally
- Using strict aseptic technique (mask and gloves) infiltrate the area using 1% lignocaine plain and make a 2 to 3 cm transverse incision over the expected site of the vein
- Dissect the vein clear from surrounding tissue taking care to separate the saphenous nerve at the ankle
- Pass a loop of No.3/0 chromic catgut or vicryl beneath the vein and divide it into two strands.
- Firmly tie one ligature around the vein distally. Loosely tie the other proximally and hold with forceps to provide traction and control bleeding
- Make a small V-cut in the wall of the vein with sharp-pointed scissors
- Introduce a 14G or 16G cannula through a separate skin stab just distal to the incision. Withdraw the needle and insert the cannula tip into the V-cut in the vein as the proximal ligature is relaxed
- Advance the canula taking care that the intima is not stripped and remove the tourniquet
- Connect the catheter to the fluid/blood giving set and commence infusion
- Provided the flow is satisfactory, tie the upper ligature firmly and close the skin with 3/0 black silk
- Cover the area with a sterile dressing

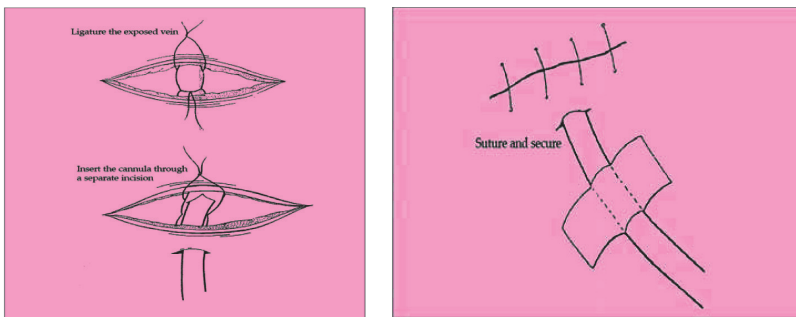


Fig. 12.2 Venous cut-down and dressing

Complications

- **Venous sepsis** and **thrombosis** can occur if kept for longer time.
- Need to remove the canula after five days.

Alternative Technique : Use the external jugular vein of the neck in emergency to save time

SECTION 13: BLOOD TRANSFUSION IN PPH MANAGEMENT

All women coming for delivery should be checked about their blood group in the MCH handbook. If it is not done or reports are not available, a grouping and CBC should be sent.

Grouping, crosshatching and CBC should be done as mandatory for all High Risk women in labor

Identification of High Risk

- Past History Of Pph/ Retained Placenta
- APH in index pregnancy
- Polyhydramnios,
- Multiple Pregnancies
- Hydrops Fetalis
- Large Babies
- Anemic mother
- Prolonged Labor
- PIH

Preparation

- In places without blood bank facilities, it is recommended to have at least 3 to 4 **O Negative** live donors identified to be called in times of emergency.
- All mothers especially at risk for bleeding should have minimum of 2 to 3 units of whole blood/PRC cross matched and kept ready.

Risk of Bleeding

A. LOW RISK:

Minimal bleeding with stable maternal vitals. Vaginal bleeding, which can be expectantly managed by IV fluids.

B. MODERATE RISK

Bleeding with unstable maternal vitals requiring active management including IV fluids and transfusion of up to 4 units of whole blood or PRC.

C. HIGH RISK

Bleeding with quick deterioration of maternal condition requiring active management including IV fluids and transfusion of more than 4 units of whole blood or PRC. A subset of these patients will require the implementation of the **Massive Transfusion Protocol**.

Blood transfusion

- Blood transfusion is a lifesaving procedure in PPH. It should not be delayed and be done early without error in the process.
- Mild to moderate blood loss can be managed with crystalloid or colloid infusions alone. However, with increasing loss, dilutional anaemia and later dilutional coagulopathy sets in.
- Blood component loss during massive blood loss is best managed by following the massive transfusion protocol (MTP).
- MTPs are designed to interrupt the lethal triad of acidosis, hypothermia and coagulopathy that develops with massive transfusion thereby improving outcome.
- **Massive transfusion protocols are activated by a clinician in response to massive bleeding.** Generally this is activated after transfusion of 4-10 units. MTPs have a predefined ratio of RBCs, FFP/cryoprecipitate and platelets units (random donor platelets) in each pack (e.g. 1:1:1 or 2:1:1 ratio) for transfusion

Definitions of massive blood transfusion (MBT)

- Replacement of one entire blood volume within 24 hours
- Transfusion of >10 units of packed red blood cells (PRBCs) in 24 hours
- Transfusion of >20 units of PRBCs in 24 hours
- Transfusion of >4 units of PRBCs in 1 hour when on-going need is foreseeable
- Replacement of 50% of total blood volume (TBV) within 3 hours.

Notification of personnel

The following personnel will be notified at the time when criteria has been met for implementation of the MTP

- Senior Obstetrician
- Senior Nursing staff
- Anaesthesia Team
- Blood bank Incharge

- Wardboy / Wardgirl

Criteria for implementation of MTP (any of below)

1. EBL > 2000 cc with ongoing blood loss of >150 cc/min.
2. Hypotension decrease of BP by 20% in the setting of acute hemorrhage
3. Tachycardia HR >110 in the setting of acute hemorrhage
4. Mental status changes in the setting of acute hemorrhage
5. Chest pain/ECG changes in the setting of acute hemorrhage
6. Oxygen Saturation <95% with Oxygen treatment in the setting of acute hemorrhage or significant change in saturation
7. Prior to the onset of hemorrhage in special cases.
8. Absence/Decrease in urine output.
9. INR > 1.5
10. Temp < 96.5
11. Base Deficit > -6.0

Laboratory Test to send

At the start of activation of MTP and 2 hours after termination of MTP

- a. Type and Match (Red tube)
- b. CBC with Platelets (purple tube)
- c. PT/PTT/INR (blue tube)
- d. Fibrinogen (blue tube)
- e. D-Dimer (blue tube)
- f. RFT and Serum Calcium, Magnesium (Red top)

Patient Preparation for MTP

- The patient must have at least 2 - 18G peripheral IV's
- The patient must be relocated to a room with capability for close monitoring as High Dependency Unit or ICU or OR
- Foley catheter will be placed.
- Continuous pulse oximetry and ECG monitoring.
- Blankets/heater to maintain normothermia
- All intravenous fluids must be warmed through fluid warmers.
- OR suite must be warmed to 27° Celsius (80°F)

Notification of MTP to Blood Bank

- The Blood Bank/Crossmatch Lab will be notified of the implementation of the MTP by ONLY one of the following responsible individuals: Gynecologist, Anesthesiologist, Chief Resident/Charge-circulating nurse.
- The Blood Bank/Crossmatch Lab will be notified via telephone
- The patient name, Reg No, and patient location must be communicated to the Compatibility/Crossmatch Lab.
- It is the responsibility of the contacting individual to ensure the appropriate blood specimen has been collected and sent to the Blood bank.
- In acute situations where there is no current Type and Screen, uncross matched O negative blood may be used

Blood Bank Activity after activation of MTP protocol

1. Perform ABO, Rh typing on specimen.
2. Prepare products per protocol as Table xx
3. Continue preparation of new products until protocol is terminated
4. Notify the charge nurse area that the products are available.
5. Products will be stored in a cooler for storage and transport.

Table 13.1 Sequence of MTP

Massive Transfusion Protocol for Obstetrical Hemorrhage			
Cycle No.	1	2	3
RBC	6 units P RBC	6 units P RBC	6 units P RBC
Plasma	4 units FFP	4 units FFP	4 units FFP
Platelets	5 units	5 units	5 units pooled
Cryoprecipitate	-	10 units	10 units

Transfusion of Products in the following order:

- a. 2 units PRBC
- b. 2 units FFP
- c. 5 units pooled platelets
- d. 2-3 units PRBC
- e. 2 units FFP
- f. Repeat Steps a - e
- g. 10 pooled cryoprecipitate
- h. Repeat steps f & g as frequently as deemed necessary based on patient's status and active blood loss

Blood Transfusion.

If clinical condition warrants (bleeding very heavy with or without shock) consider O negative blood, although group specific blood is preferable. 3 units of O negative blood are available on delivery suite. Blood should be administered through blood warming equipment.

Fresh frozen plasma (FFP)

It is important to use FFP before coagulation results are known in case of uncontrollable bleeding. With on-going bleeding a PRC to FFP transfusion ratio of 2:1 is recommended. When the Prothrombin Time (PT) +/- Activated Partial Thromboplastin Time (APPT) is $>1.5 \times$ normal control, there is an association with an increased risk of microvascular bleeding.

FFP at a dose of 15mls/kg body weight or 4 units for most adults would be appropriate in this setting. Repeat a coagulation screen 30-60 minutes after completion of FFP infusion to assess the response and aim for $PT/APPT < 1.5x$ the normal control value.

Platelets

A platelet count of $< 50 \times 10^9$ /litre is associated with an increase in microvascular bleeding. Give 5 unit of platelet. Repeat the FBC 30-60 minutes post transfusion to ensure the platelet count is 75×10^9 /litre.

Cryoprecipitate.

A fibrinogen level of < 0.5 g/litre is strongly associated with microvascular bleeding. Give cryoprecipitate if the fibrinogen is < 1 g/litre despite initial appropriate treatment with FFP, which is a rich source of clotting factors including fibrinogen. The usual dose is **1 single pack of cryoprecipitate per 7.5kg body weight**. This would equate to 2 pooled packs (10 single packs) for most adult patients. Repeat Screen after 30 -60 mins.

In case of severe bleeding the following drugs to give

- Inj Vitamin K 10mg
- IV tranexamic acid (Cyclokapron) 1g every 8 hours

Massive Transfusion Protocol

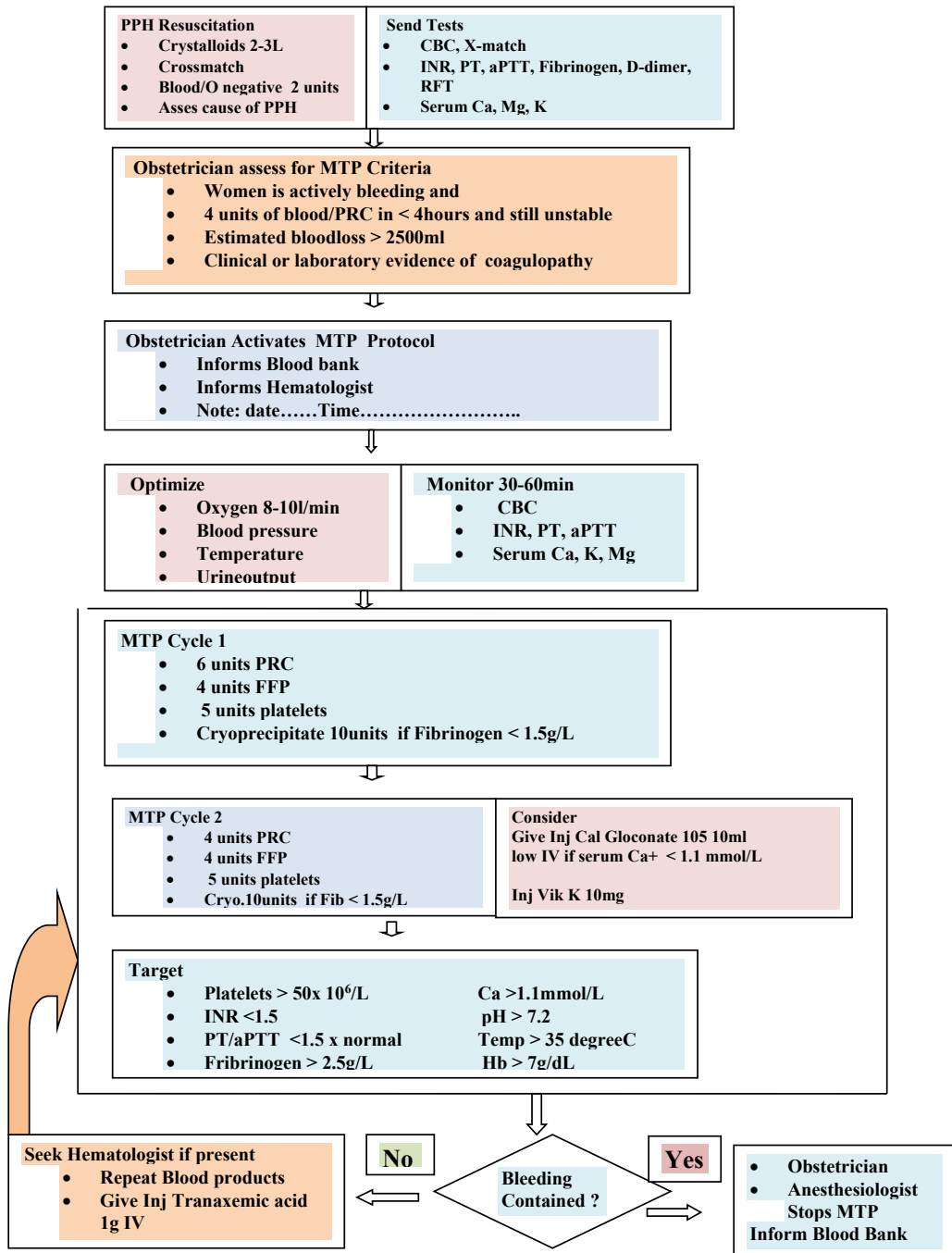


Fig. 13.1 Massive Transfusion Protocol

Documentation to be maintained during the execution of the MTP including the following items:

- a. Vital signs Q 10 minutes (Temp, BP, HR, RR)
- b. Pulse oximetry
- c. Urine output
- d. Products administered
- e. Time of administration of products
- f. Medications administered
- g. Time of medication administration
- h. Laboratory studies

Targets of resuscitation in massive blood loss

- Mean arterial pressure (MAP) around 60 mmHg, systolic arterial pressure 80-100 mmHg (in hypertensive patients one may need to target higher MAP)
- Hb >7-g/dl
- INR < 1.5
- aPTT <42 s
- Fibrinogen > 1.5-2 g/L
- Platelets > $50 \times 10^9/L$
- Core temperature >35.0°C
- Base deficit < 3.0/
- lactates <2 mEq/L.

Termination of MTP

- The termination of the MTP will only be determined by attending gynecologist or the Anesthesiologist or nurse in-charge.
- The Blood Bank/Crossmatch Lab will be notified of the termination of the MTP.

SECTION 14: POST PPH COUNSELING AND FOLLOW UP

Major obstetric hemorrhage can be traumatic to the women, her family and the birth attendants, therefore debriefing by a senior member of the team involved should be done at earliest opportunity.

This should include arrangements for proper follow-up and investigations as necessary, such as screening for coagulopathy if indicated and screening for the rare complications of pan hypopituitarism (Sheehan's syndrome), secondary to hypotension.

Provide information regarding:

- PPH and probable cause of it in her case.
- Interventions undertaken.
- Difficulties encountered during the treatment
- Short term and long term sequelae
 - Provide reassurance. Postpartum hemorrhage (PPH) does not have a detrimental effect on future pregnancies. Proportion of early or late second pregnancy losses is comparable to women without a PPH in their first pregnancy.
 - **Sheehan's syndrome** is a rare complication of PPH. The incidence is about 0.5% of all cases of hypopituitarism in women.

Sign and Symptoms depend on the degree of necrosis of the cells.

In very mild Sheehan's syndrome: there may be no symptoms at all. There may be complaints of vague feelings of ill health or fatigue which are often passed off as the after effects of childbirth, or being due to anemia, or poor nutrition.

In a moderate degree of Sheehan's syndrome: the first signs usually appear within the first few months after childbirth. There is failure to initiate breastfeeding and secrete breastmilk even after putting in the best of efforts. The breasts and genital organs may show mild signs of atrophy. Later Symptoms after Childbirth: amenorrhoea even after a considerable length of time after childbirth . There is also loss of pubic and axillary hair.

Full-blown Sheehan's Syndrome: In a fully developed Sheehan's syndrome, the main symptoms are due to suppression of the thyroid gland (hypothyroidism) and the adrenal glands (Cushing's disease and Addison's disease). The woman typically has a pale, puffy face, coarse scanty hair, cold sensitivity, weight gain, low blood pressure, slow mental functions and delayed response to stimuli. Sometimes, there may be overt psychological disturbances. The breasts and genital organs are atrophied with absent pubic and axillary hair. Insulin tolerance may be reduced and Type I diabetes may occur.

Radiologic imaging with either computed tomography or magnetic resonance imaging is usually not helpful in the acute phase and has not been used frequently in acute diagnosis

Treatment is essentially by *replacing the hormones* that the pituitary gland fails to produce. Hormones like corticosteroids, thyroid hormones and estrogens and medicines to control diabetes become necessary to maintain normal functioning of the body.

Follow up

As in PNC visits up to 6 weeks and thereafter at 6 months and 1 year. Depending on the symptoms following investigations may be advised:

- CBC
- TFT
- Blood sugar
- Serum electrolytes
- Serum FSH, LH and PRL
- Cortisol
- CT Scan and MRI of Brain (in rare cases)

SECTION 15: SIMULATION DRILL FOR PPH

Aim and objective

- To test the preparedness of the facility in emergency situations
- Ensure that equipment and drugs are in order
- To update and maintain the skill of the staff

Frequency of PPH Simulation Drill

- Depends on the facility
- Those that encounter more cases should have less frequently
- Those that encounter less case more often
- Recommendation for PPH Drill
 - ▶ 4 monthly in Referral hospitals
 - ▶ 3 monthly in District and BHU1 and other Hospitals
- Facility should maintain records of the drill and name of the staff who has undergone the drills

Staff to be Involved

- ▶ Referral Hospital Labor and maternity staff
- ▶ District hospital Doctors and all indoor staff including support staff
- ▶ BHU level : all staff
- ▶ To include staff from EMT/Casualty or Emergency Room staff, anesthetist, ambulance driver, blood bank, lab and administration where appropriate

Monitoring supervision

- ▶ At the facility level
 - Daily:- staff on duty should check the trays and drugs and maintain a log book
 - Monthly supervision by the In-Charge and hospital administration
 - Include in the Individual Work Plan (IWP) of the Indoor/ Labour Room In-charge to maintain regular drills activities.

Actual drill

- ▶ Call for help
- ▶ Check list for the drill
- ▶ test time taken to activate Emg, Obstetric team at odd hours
- ▶ blood loss estimation skill and recognition of PPH by staff on duty
- ▶ test staff skill to set IV line with big bore cannula 16G or 18 G by
- ▶ Uterine stimulation skill of staff on duty
- ▶ Aortic compression skill
- ▶ test time taken to Cross match and mobilize multiple blood donars or blood bags by lab or admin
- ▶ Condom tamponade usage
- ▶ Infection control practices measures in the labour room
- ▶ PPH tray contents
- ▶ Debriefing after each session to identify the lapses and way to improve by the lead person (In-Charge/HOD/Obstetricin)

SECTION 16 – APPENDIX

APPENDIX 1: PPH TRANSFER FORM

Reg. No:.....
 Date :.....
 Time :.....
 Name of the Hospital / BHU:.....
 Name of the patient:.....; Age:.....
 Occupation :.....
 Name of the husband/ Guardian:.....
 Address:

Gravida:.....;Para:.....
 Onset of labor:.....
 Date of Delivery:..... Time of Delivery :.....
 Place of delivery:.....
 Type of Delivery:.....

Past history (Circle it)

- (1) Retained Placenta : Yes /No
- (2) Any operation done to uterus : Yes / No

Labor attended by trained personnel : Yes / No

Active management of 3rd stage of labor : Done / Not done

Placenta :delivered / Not delivered

If delivered,

Date:.....; Time :.....AM/PM; Complete / Incomplete

If incomplete : Action taken

.....

.....

Tears / Laceration / Episiotomy/ Intact (Circle it) Repaired : Yes / No

Approximate Blood loss:.....mls (cc)

Blood group:..... Hb:.....

Medication : Time

- | | |
|--------|-------|
| 1..... | |
| 2..... | |
| 3..... | |
| 4..... | |

Reasons for the referral:.....

.....

Name of the medical escort :

Designation:.....

Referred by : Signature :.....

Name :.....

Designation :.....

Date / Time :.....

APPENDIX 2:PPH TRAY/ PACK / TRANSFER KIT:

Level I:

A. PPH Tray:

1. I.V. Infusion Set containing

- | | |
|------------------------|---------------------|
| a. N/S and R/L- | 2 no each |
| b. Large bore cannula- | 16 and 18 G- 2 each |
| c. Tourniquet – | 1 No |
| d. Plaster – | 1 No |
| e. Scissors- | 1pair |
| f. Spirit swab | |
| g. IV set | 2 Nos |
| h. Sterile gloves – | 2 pairs |

2. Catherization Tray:

- | | |
|-------------------------|--------------------------|
| a. Foley’s Catheter- | 14 and 16 French- 1 each |
| b. Urine bag- | 1 No |
| c. K. Y Jelly- | 1 tube |
| d. Water for injection- | 30 ml |
| e. sterile gloves- | 2 pairs |
| f. Catherization set- | 1no |
| g. Syringe- | 10 ml |

3. Injections:

- | | | |
|----------------------------------|--------|---------|
| a. Ampicillin – | 500 mg | 2 vials |
| b. Pethidine- | 100 mg | 1 amp |
| c. Syringes and Distilled water- | | |
| d. Lignocaine (2%) Plain | | 1 vial |

4. Suture Set containing;

- | | |
|-----------------------|--------|
| a. Needle holder- | 1 No |
| b. Scissors- | 1 No |
| c. Sterile drape- | 1 No |
| d. Sponge holder- | 1 No |
| e. Dissecting forceps | 1 No |
| f. Gallipot | 1 no |
| g. Betadine solution | |
| h. Gauze pieces | 5-6 no |

5. Kidney tray 6 inch

1 No

6. Condom temponade:

- | | |
|--------------------|---------|
| a. Condom- | 2 Nos |
| b. Normal Saline- | 1 No |
| c. IV tubing - | 1 No |
| d. Thread- | 2 Nos |
| e. Sponge holder- | 1 No |
| f. Sterile gloves- | 2 pairs |

B. Transfer Kit:

1. IV Set:

- | | |
|--------------------------|--------------|
| a. IV fluids - NS and RL | 3 pints each |
| b. Cannula (16 and 18 G) | 2 Nos each |
| c. Torniquete | 1 No |
| d. Plaster- | 1 No |
| e. Scissors- | 1 No |
| f. IV tubing- | 3 Nos |
| g. Inj. Oxytocin- | 4 Amp |
| h. Inj. Ampicillin- | 4 vials |
| i. Syringe with needles | 4 Nos |
| j. Sterile gloves- | 4 pairs |
| k. Bandages- | |
| l. Splints | |

Level II:

A. PPH Tray:

1. All mentioned in level I.
2. Cervical Suture Set:

- | | |
|---------------------------------|-------|
| a) Sim's Speculum- | 2 Nos |
| b) Sponge holder- | 1 No |
| c) Green Armytage/Sponge holder | 4 nos |
| d) Needle holder – | 1 No |
| e) Scissors- | 1 No |
| f) Dissecting tooth forceps- | 1 No |
| g) Galley pot- | 1 No |
| h) Sterile drape- | 1 No |
| i) Catgut-(1.0 and 2.0)- | 2 Nos |
| j) Antibiotics/ Analgesics | |
| k) Blood transfusion set | |

B. Transfer Kit:

1. Same as in Level I transfer kit
2. Blood- at least 2-3 units in ice box.

C. Medication Tray

1. inj oxytocin 12 amps
2. inj methergin 2 amps

Level III:

A. PPH Tray:

1. All as in levels I and II
2. Manual Vacuum Aspiration 1 set
3. Evacuation set

B. Medication Tray

1. Tab misoprostal 800mcg PR
2. inj tranexemic acid 1gm(atleast 2 vials)
3. inj carboprostal(stored in fridge) 250mcg
4. inj oxytocin 12 amps
5. inj methergin 2 amps

APPENDIX 2

MEMBERS OF THE TASK FORCE DURING FIRST EDITION (2009):

1. Dr. Phurb Dorji, Gyn/Obstetrician, HOD, JDWNRH
2. Dr. H.P Chettri , Paediatrician, JDWNRH
3. Dr. Chandralal Mongar
4. Ms. Tshering Yangchen, Incharge, RHU,JDWNRH
5. Ms. Yangden, Staff Nurse, Labour ward,JDWNRH
6. Mr. Ugyen Drukpa, ACO, Tsirang Hospital
7. Mr. Lungten, ACO, JDWNRH
8. Mr. Yeshey Nidup, Sr. Health Assistant, Trashiling BHU, Trongsa
9. Ms. Lham Choden, Sr. ANM,Chumey BHU, Bumthang
10. Mr. Jambay Tangbi, BHW, Tongtophe

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5. Ms. Rinchen Zangmo, SN, JDWNRH
6. Mr. Gembo Dorji, SN, Manager RRH
7. Ms. Kinley Chimmi, SN, Gelephu, CRRH
8. Ms. Sonam Deki, Lecture, FNoPH
9. Ms. Tashi Tshomo, Program Officer, RMNH Program
10. Mr. Pema Lethro, Program Officer, RMNH Program
11. Mr. Lobzang Tshering, Program Officer, RMNH Program

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